PLAN BAY AREA 2050

DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT

STATE CLEARINGHOUSE #2020090519

JUNE 2021

ASSOCIATION OF BAY AREA GOVERNMENTS

METROPOLITAN TRANSPORTATION COMMISSION

Association of
Bay Area Governments

METROPOLITAN
TRANSPORTATION
COMMISSION

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NOTICE OF AVAILABILITY and NOTICE OF PUBLIC HEARINGS
Metropolitan Transportation Commission and Association of Bay Area Governments
Plan Bay Area 2050
Draft Environmental Impact Report

Date:	June 4, 2021
To:	Interested Agencies, Organizations, and Individuals
From:	Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG)
Comment Period:	June 4, 2021 to July 20, 2021

The Draft Environmental Impact Report (Draft EIR) (SCH# 2020090519) for Plan Bay Area 2050 (proposed Plan), a long-range plan for the San Francisco Bay Area, is now available for public review. Plan Bay Area 2050 will serve as the Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS) for the nine-county region. Public comment on the Draft EIR is invited during the public comment period extending from June 4, 2021 to July 20, 2021. Additional information and public hearing dates are provided below.

The proposed Plan is a long-range regional plan that outlines 35 integrated strategies across four key issues—housing, the economy, transportation, and the environment—to make the Bay Area more equitable for all residents and more resilient in the face of unexpected challenges. The proposed Plan's strategies chart a course to make the Bay Area more affordable, connected, diverse, healthy, and vibrant for all residents, while also achieving regional greenhouse gas emissions reduction targets established by the California Air Resources Board pursuant to the Sustainable Communities and Climate Protection Act of 2008 (Senate Bill (SB) 375, Statutes of 2008). MTC and ABAG are required under State and Federal law to prepare an RTP/SCS every four years.

The Draft EIR for Plan Bay Area 2050 programmatically assesses and discloses the potential environmental impacts of implementing the proposed Plan, including: housing and economic strategies to accommodate forecasted regional growth; transportation strategies to invest expected forecasted transportation revenues; and environmental strategies to protect the region from future sea level rise inundation. The Draft EIR also recommends measures to mitigate any significant adverse impacts and analyzes a reasonable range of alternatives to the proposed Plan.

The region includes nine counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma) totaling approximately 4.4 million acres (7,000 square miles). In 2015 the region had 4.0 million jobs, 2.8 million households, and 7.6 million people. The proposed Plan would accommodate projected growth for an additional 1.4 million jobs, 1.4 million households, and 2.7 million people by 2050.

The Draft EIR has been prepared in accordance with the California Environmental Quality Act (CEQA) to analyze and disclose the potentially adverse significant impacts associated with

implementation of the proposed Plan. The Draft EIR identifies the potential for significant effects in the following areas: aesthetics and visual resources; agriculture and forestry resources; air quality; biological resources; climate change, greenhouse gases, and energy; cultural resources and tribal cultural resources; geology, seismicity, and mineral resources; hazards and wildfire; hydrology and water quality; land use, population, and housing; noise; public services and recreation; public utilities and facilities; and transportation.

A Final EIR will be prepared following public review and comment on the Draft EIR. The Final EIR will consist of changes to the Draft EIR and written responses to significant environmental points raised during the public comment period on the Draft EIR. MTC and ABAG will consider this information during their deliberations on certification of the Final EIR and adoption of the proposed Plan in fall 2021. The *Draft Plan Bay Area 2050* is subject to public review pursuant to a separate notice.

Beginning June 4, 2021, the Draft EIR will be available for public review online at the web link provided below. Copies of the Draft EIR are on file with the Secretary of the Board of MTC and open to public inspection at:

planbayarea.org/2050-plan/environmental-impact-report

Should you require a hard copy of the draft EIR, please submit your request to info@bayareametro.gov or call 415-778-6757 and one will be mailed to you. Note that the comment period remains the same regardless of when the printed copy is received. Furthermore, the document will be available for public review in at least one library in each of the nine member counties. A list of locations will be available beginning June 4 at planbayarea.org/2050-plan/environmental-impact-report.

MTC will be conducting three online public hearings to receive comments on the Draft EIR during the review period. All interested agencies, organizations and individuals are welcome to submit comments and/or participate in the public hearings for the Draft EIR. Oral and/or written comments will be accepted during these meetings.

The first public hearing will be held during the regular meeting of the Joint MTC Planning Committee with the ABAG Administrative Committee on:

Friday, June 11, 2021 at 9:40 a.m. **(Remotely)**
bit.ly/33xhpav
Webinar ID: 874 2787 4017
Bay Area Metro Center
Board Room, 1st Floor
375 Beale Street, San Francisco, CA 94105

In light of Governor Newsom's State of Emergency declaration regarding the COVID-19 outbreak and in accordance with Executive Order N-29-20 issued by Governor Newsom on March 17, 2020 and the Guidance for Gatherings issued by the California Department of Public Health, the meeting will be conducted via webcast, teleconference, and Zoom for all participants. Detailed instructions on participating via Zoom are available at: mtc.ca.gov/how-provide-public-comment-board-meeting-zoom. The meeting accessibility instructions also will be posted to: mtc.ca.gov/whats-happening/events/public-hearings no less than 72 hours prior to the hearing.

Two additional online public hearings have been scheduled for:

Hearing 2
Tuesday, June 22, 6:30 p.m. or upon the conclusion of the *Draft Plan Bay Area 2050* public hearing, whichever is later
bit.ly/3y0ZiYp
Passcode: 177176
Webinar ID: 812 0345 4209

Hearing 3
Wednesday, July 7, 2:30 p.m. or upon the conclusion of the *Draft Plan Bay Area 2050* public hearing, whichever is later
bit.ly/2SIduFK
Passcode: 908706
Webinar ID: 854 5833 8822

You may submit comments on the Draft EIR during the public comment and review period, which begins June 4, 2021 to July 20, 2021. Please refer to Plan Bay Area 2050 EIR in your comments and direct them to:

MTC Public Information
Attn: Draft EIR Comments
375 Beale Street, Suite 800
San Francisco, CA, 94105
(415) 778-6757 office
(415) 536-9800 fax
eircomments@bayareametro.gov

All written comments must be received no later than Tuesday, July 20, 2021 by 5:00 p.m. All comments postmarked by July 20, 2021 will be accepted as timely.

The following statement is required to be included in this notice: Pursuant to CEQA Guidelines Section 15087(c)(6), the nine county Bay Area region contains hazardous waste sites as enumerated under California Government Code Section 65962.5.

Do you need an interpreter or any other assistance to participate? Please call 415-778-6757. We require at least three working days' notice to accommodate assistance requests. For TDD or hearing impaired, call 711, California Relay Service, or 1-800-735-2929 (TTY), 1-800-735-2922 (voice) and ask to be relayed to 415-778-6700.

您需要口譯員或任何其他幫助才能參加嗎？請致電 415-778-6757。我們要求至少提前三個工作日通知，以便滿足您的請求。對於 TDD 或聽障人士，請致電 711，加州中繼服務(California Relay Service)，或 1-800-735-2929(TTY)，1-800-735-2922(語音)，並要求轉接到 415-778-6700。

¿Necesita un intérprete o algún otro tipo de ayuda para participar? Por favor llame al 415-778-6757. Requerimos de un aviso con al menos tres días laborables de anticipación para admitir solicitudes de ayuda. Personas con problemas de audición o usuarios de TDD, pueden llamar al 711, California Relay Service, o al 1-800-735-2929 (TTY), 1-800-735-2922 (voz) y pedir que le pasen al 415-778-6700.

Draft Environmental Impact Report

for

PLAN BAY AREA 2050

Regional Transportation Plan (RTP)/

Sustainable Communities Strategy (SCS)

State Clearinghouse Number SCH# 2020090519

Prepared for:

Metropolitan Transportation Commission
375 Beale Street, Suite 800
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and

Association of Bay Area Governments
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June 2021

TABLE OF CONTENTS

Chapter/Section **Page**

Appendices to the Draft EIR

Figures

TABLES

ACRONYMS AND ABBREVIATIONS

µg	micro grams
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACE	Altamont Corridor Express
ACWD	Alameda County Water District
AFY	acre feet per year
AIA	airport influence area
AIRFA	American Indian Religious Freedom Act of 1978
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
APS	Alternative Planning Strategy
ARPA	Archeological Resources Protection Act of 1979
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
ATCM	Airborne Toxic Control Measure
ATP	Active Transportation Program
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technology
BAIFA	Bay Area Infrastructure Financing Authority
BARR	Bay Area Regional Reliability
BART	Bay Area Rapid Transit
BASMAA	Bay Area Stormwater Management Agencies Association
BATA	Bay Area Toll Authority
BAWSCA	Bay Area Water Supply & Conservation Agency
Bay Region	San Francisco Bay Hydrologic Region
BCDC	Bay Conservation and Development Commission
BMP	best management practices
BP	Before Present
C&D	construction and demolition
CAA	Clean Air Act
CAAQS	California ambient air quality standards
Cal EMA	California Emergency Management Agency
CAL FIRE	California Department of Forestry and Fire Projection
Cal OES	California Governor's Office of Emergency Services
CalARP	California Accidental Release Prevention Program
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen	California Green Building Code

CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CARB	California Air Resource Board
CARE	Community Air Risk Evaluation
CASQA	California Stormwater Quality Association
CBC	California Building Code
CBP	Commuter Benefits Program
CBTP	Community-Based Transportation Plan
CCA	Community Choice Aggregations
CCWD	Contra Costa Water District
CDE	California Department of Education
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CESA	California Endangered Species Act
CFC	California Fire Code
CGS	California Geological Survey
CHHSL	California Human Health Screening Levels
CHP	California Highway Patrol
CLN	Conservation Land Network
CMA	Congestion Management Agencies
CMP	Congestion Management Plans
CMRA	Construction Materials Recycling Association
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO_2	carbon dioxide
CPP	corridor protection program
CPUC	California Public Utilities Commission
CRHR	California Register of Historic Resources
CRPR	California Rare Plant Rank
CRRP	Community Risk Reduction Plan
CTA	County Transportation Agencies
CTC	California Transportation Commission
CTMP	Comprehensive Truck Management Plan
CTP	Countywide Transportation Plans
CUPA	Certified Uniform Program Agencies
CVP	Central Valley Project
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibels

Delta	Sacramento–San Joaquin Delta
diesel PM	diesel particulate matter
DMA 2000	Disaster Mitigation Act of 2000
DOF	Department of Finance
DOT Act	U.S. Department of Transportation Act
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
DPS	distinct population segment
DSC	Delta Stewardship Council
DSOD	Division of Safety of Dams
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EACCS	East Alameda County Conservation Strategy
EBMUD	East Bay Municipal Utility District
ECA	Essential Connectivity Areas
ECCC HCP/NCCP	East Contra Costa County HCP and NCCP
ECCID	East Contra Costa Irrigation District
EFH	essential fish habitat
EIR	Environmental impact reports
EISA	Energy Independence and Security Act
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act
EPCRA	Emergency Planning Community Right-to-Know Act
ESA	Endangered Species Act
ESU	evolutionarily significant unit
EV	electric vehicle
FAA	Federal Aviation Administration
FAST	Fixing America's Surface Transportation
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FMMP	Farmland Mapping and Monitoring Program
FPA	Z'berg-Nejedly Forest Practice Act
FPI	Freeway Performance Initiative
FPPA	Farmland Protection Policy Act
FSP	Freeway Service Patrol
FTA	Federal Transit Administration
GHG	greenhouse gas
GIS	geographic information system
GSA	Groundwater Sustainability Agency

GSP	Groundwater Sustainability Plans
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HALS	Historic American Landscape Survey
HCD	California Department of Housing and Community Development
HCP	Habitat Conservation Plan
HCP/NCCP	Habitat Conservation Plan/Natural Community Conservation Plans
HDVIP	Heavy-Duty Vehicle Inspection Program
HEPA	high efficiency particulate air
HMTA	Hazardous Materials Transportation Act
HOV	High Occupancy Vehicle
HRA	High Resource Areas
HUD	U.S. Department of Housing and Urban Development
HVAC	heating, ventilation and air conditioning
Hz	hertz
I-	Interstate
IBC	International Building Code
IFC	International Fire Code
in/sec	inches/second
IPaC	Information for Planning and Consultation
IPM	integrated pest management
ISO	International Organization for Standardization
ISR	indirect source review
IWMA	Waste Management Act of 1989
kw	kilowatts
LAFCO	local agency formation commission
LCFS	Low Carbon Fuels Standard
LCP	local coastal programs
L_{dn}	Day-Night Average Level
LEA	local educational agency
L_{eq}	Equivalent Sound Level
L_{eq}[h	A-weighted equivalent sound level
LID	low-impact development
L_{max}	Maximum Sound Level
L_n	Percentile-Exceeded Sound Level
LOS	level of service
LRA	Local Responsibility Areas
m^3	cubic meter
MAQIP	Maritime Air Quality Improvement Plan

MCA	mitigation credit agreements
MERV	minimum efficiency reporting value
mgd	million gallons per day
MLD	most likely descendant
MMI	Modified Mercalli Intensity
MMWD	Marin Municipal Water District
MPO	metropolitan planning organization
MS4	municipal separate storm sewer systems
MTC	Metropolitan Transportation Commission
$MTCO_2e$	metric tons of carbon dioxide equivalent
MWELO	Model Water Efficient Landscape Ordinance
NAAQS	national ambient air quality standards
NAC	Noise Abatement Criteria
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NEHRP	National Earthquake Hazard Reduction Program
NEPA	National Environmental Policy Act of 1969
NFIP	National Flood Insurance Program
NGA	Natural Gas Act
NHPA	National Historic Preservation Act of 1966
NHTSA	National Highway Traffic Safety Administration
NO	nitric oxide
NO_2	nitrogen dioxide
NOA	Naturally occurring asbestos
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries Service
NOP	Notice of Preparation
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPDWR	National Primary Drinking Water Regulations
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSCAPCD	Northern Sonoma County Air Pollution Control District
NWIC	Northwest Information Center
OBAG	One Bay Area Grant program
OEHHA	Office of Environmental Health Hazard Assessment
OES	California Office of Emergency Services
OPR	Governor's Office of Planning and Research
OSPR	Office of Spill Prevention and Response
ozone	photochemical smog
PCA	Priority Conservation Areas

PCB	polychlorinated biphenyls
PDA	Planned Development Areas
PEV	Plug-in Electric Vehicles
PG&E	Pacific Gas and Electric Company
PM	Particulate matter
$PM_{2.5}$	fine particulate matter
PPA	Priority Production Areas
ppb	parts per billion
PPV	peak particle velocity"
PRMP	paleontological resource management plan
PSDC	Project Specific Design Criteria
PSIP	Periodic Smoke Inspection Program
PUA	Priority Use Area
PURPA	Public Utility Regulatory Policies Act
RCA	regional conservation assessments
RCIS	regional conservation investment strategies
RCRA	Resource Conservation and Recovery Act of 1976
RECP	Regional Emergency Coordination Plan
RFS	Renewable Fuel Standard
RHNA	Regional Housing Need Allocation
RMS	root-mean-square
ROG	Reactive Organic Gases
ROW	rights-of-way
RPF	Registered Professional Forester
RPS	Renewables Portfolio Standard
RTP	range transportation plans
RTPA	Regional Transportation Planning Agencies
RWQCB	Regional Water Quality Control Board
SAFE	Safer Affordable Fuel-Efficient
SARA	Superfund Act and Reauthorization Act of 1986
SB	Senate Bill
SBE	State Board of Education
SCEA	Sustainable Communities Environmental Assessment
SCS	Sustainable Communities Strategy
SCVHP	Santa Clara Valley Habitat Plan
SCVWD	Santa Clara Valley Water District
SCWA	Solano County Water Agency
SDC	Seismic Design Criteria
SEL	Single-Event Noise Level
SEMS	Standard Emergency Management System
SFPUC	San Francisco Public Utilities Commission

SGMA	Sustainable Groundwater Management Act
SIP	State Implementation Plans
SLCP	short-lived climate pollutants
SMARA	Surface Mining and Reclamation Act
SMART	Sonoma Marin Area Rail Transit
SMGB	State Mining and Geology Board
SO_2	sulfur dioxide
SO_X	sulfur oxide
SPL	sound pressure level
SR	State Route
SRA	State Responsibility Areas
SWAP	Shared Water Access Program
SWMP	Stormwater Management Plan
SWP	State Water Project
SWPPP	storm water pollution prevention plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminants
TAC	Transportation Analysis under CEQA
TAF	Transportation Analysis Framework
TCM	transportation control measures
TDM	Transportation demand management
THP	Timber Harvest Plan
TMDL	Total Maximum Daily Load
TNC	transportation network companies
TOD	Transit Oriented Development
TPA	Transit Priority Area
TPP	transit priority projects
TPZ	Timberland Production Zones
TRA	Transit Rich Areas
UCMP	University of California Museum of Paleontology
UHI	urban heat island”
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	United States Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	velocity level in decibels
VDECS	Verified Diesel Emissions Control Strategy
VMT	vehicle miles traveled
VTA	Santa Clara Valley Transportation Authority

WDR	waste discharge requirements
WSA	water supply assessment
WUI	wildland-urban interface
YSAQMD	Yolo-Solano Air Quality Management District
ZEV	Zero Emission Vehicles
µPa	micro-Pascals

EXECUTIVE SUMMARY

INTRODUCTION

This summary is provided in accordance with the State California Environmental Quality Act (CEQA) Guidelines (California Code of Regulations [CCR] Section 15123). As stated in the State CEQA Guidelines (CCR Section 15123[a]), "an environmental impact report (EIR) shall contain a brief summary of the proposed actions and its consequences. The language of the summary should be as clear and simple as reasonably practical." As required by the State CEQA Guidelines, this section includes: (1) a summary description of the proposed Plan; (2) a synopsis of environmental impacts and recommended mitigation measures; (3) identification of the alternatives evaluated and discussion of the environmentally superior alternative; (4) a discussion of the areas of controversy associated with the project; and (5) issues to be resolved, including the choice among alternatives.

SUMMARY DESCRIPTION OF THE PROJECT

Background

LOCATION

The San Francisco Bay Area region includes nine counties that may be aggregated geographically into four subareas: North Bay (Marin, Napa, Solano, and Sonoma Counties), East Bay (Alameda and Contra Costa Counties), South Bay (Santa Clara County), and the West Bay (San Francisco and San Mateo Counties). There are 101 cities spread throughout these nine counties. The total area of the region is approximately 4.4 million acres (7,000 square miles). The region is bordered by Mendocino, Lake, and Yolo Counties to the north; Sacramento, San Joaquin, Stanislaus, and Merced Counties to the east; San Benito, Monterey, and Santa Cruz Counties to the south; and the Pacific Ocean to the west. As of January 2020, the region had a population estimate of 7.79 million, which is approximately 20 percent of California's population. Roughly 18 percent of the region's approximately 4.4 million acres were developed as of 2018 (see Table 2-6 in Section 2, "Project Description"). The undeveloped area includes open space and agricultural lands, as well as water bodies (excluding the San Francisco Bay) and parks.

MTC, ABAG, AND PLAN BAY AREA

MTC is the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area region (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties). MTC was formed in 1970 and functions under State and federal law as the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area. It covers the same geographic area as ABAG. MTC is the federally designated metropolitan planning organization (MPO) and the State-designated regional transportation planning agency (RTPA) for the Bay Area. It is responsible for preparing and updating the RTP every 4 years.

ABAG was formed in 1961 by a joint powers agreement among Bay Area local governments and serves as the comprehensive regional planning agency and Council of Governments for the nine counties and 101 cities and towns of the San Francisco Bay region. It is a public entity created by local

governments to meet their planning and research needs related to land use and is responsible under State law for conducting the Regional Housing Needs Allocation process. ABAG also hosts several joint powers and administrative entities related to environmental and water resource protection, disaster resilience, energy efficiency, hazardous waste mitigation, financial services, and staff training to local counties, cities, and towns. It is responsible for preparing and updating the SCS every 4 years.

The most recent RTP/SCS for the Bay Area region—Plan Bay Area 2040—was adopted in 2017. As the Bay Area's second RTP to include an SCS, the 2017 plan was considered a "limited and focused" update of the original Plan Bay Area, adopted in 2013. The proposed Plan serves as the third RTP/SCS for the Bay Area, is a major update to Plan Bay Area 2040 while accompanying a new Regional Housing Needs Allocation cycle. The proposed Plan expands in scope relative to prior plans by examining the themes of economic development and environmental resilience. As a result, the proposed Plan focuses on 4 interrelated elements—housing, the economy, transportation, and the environment. The proposed Plan is composed of 35 integrated strategies across the 4 elements that provide a blueprint for how the Bay Area can accommodate future growth and make the region more equitable and resilient in the face of unexpected challenges, while achieving regional GHG emissions reduction targets established by the California Air Resources Board (CARB) pursuant to SB 375. As required by State legislation (Government Code Section 65080 et seq.) and by federal regulation (Title 23 U.S. Code Section 134), MTC is responsible for preparing the RTP for the San Francisco Bay Area region. The Plan meets all State and federal requirements for an RTP/SCS.

Once adopted by MTC and ABAG, Plan Bay Area 2050 will guide regional housing, economic, transportation, and environmental strategies and investments for the region. For additional background on Plan Bay Area 2050, see Section 1.7, "Plan Bay Area 2050 Background" in Chapter 1, "Introduction."

INTRODUCTION TO THE EIR

PURPOSE OF THIS EIR

This EIR has been prepared in compliance with the CEQA Statutes and Guidelines. In general, the purpose of an EIR is to:

- analyze the potential environmental effects of the adoption and implementation of the proposed Plan;
- inform decision-makers, responsible and trustee agencies, and members of the public as to the range of the environmental impacts of the proposed Plan;
- recommend mitigation measures to mitigate significant adverse impacts; and
- analyze a range of reasonable alternatives to the proposed Plan.

The final EIR will include a Mitigation, Monitoring, and Reporting Program that identifies who will be responsible for implementing identified mitigation measures and the required timing for implementation. As the joint lead agencies for preparing this EIR, MTC and ABAG will rely on the EIR analysis of potential environmental effects in their review and consideration of the proposed Plan before approval.

As discussed in Section 1.1.8 "CEQA Streamlining Opportunities," SB 375 provides streamlining benefits for certain transit-oriented projects consistent with an adopted SCS. Pursuant to these provisions of SB 375, this EIR has also been prepared to allow qualifying projects to streamline their environmental review.

EIR SCOPE

This is a program EIR, which is defined in Section 15168 of the CEQA Guidelines as: "[An EIR addressing a] series of actions that can be characterized as one large project and are related either:

(1) Geographically;

(2) As logical parts in the chain of contemplated actions;

(3) In connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or

(4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental impacts which can be mitigated in similar ways."

A program EIR can be used as the basic, general environmental assessment for an overall program of projects developed over a multi-year planning horizon, and therefore is an appropriate review document for the proposed Plan. A program EIR has several advantages. For example, it provides a basic reference document to avoid unnecessary repetition of facts or analysis in subsequent project-specific assessments. It also allows the lead agency to consider the broad, regional impacts of a program of actions before its adoption and eliminates redundant or contradictory approaches to the consideration of regional and cumulative impacts.

LEVEL OF ANALYSIS

This EIR presents a programmatic assessment of the potential impacts of the proposed Plan, focusing on the entire set of projects and programs contained in the proposed Plan. Individual transportation, sea level rise adaptation, and development project impacts are not addressed in detail. The analysis focuses on these three categories of projects at the local (county) and regional (Bay Area) level. Impacts are analyzed from a regional and local perspective, as applicable. Where appropriate, this EIR also provides a county-by-county assessment that considers growth geography footprint areas within Transit Priority Area (TPA) boundaries. (See Section 1.9, "CEQA Streamlining Opportunities," for discussion of why this approach is important.)

For quantitative impact assessments, a geographic information system (GIS) was used to digitally overlay the proposed Plan's footprints associated with forecasted land use development, sea level rise adaptation infrastructure, and transportation projects onto resource-specific data. Where impacts are quantified through modeling or GIS analysis, they are reported at the regional, county, and/or TPA level in tables and in the text. TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county. The portion of the projected land use growth footprint located outside of a TPA is captured in the county totals.

The analysis in this EIR does not evaluate project-specific impacts of individual projects, although it provides environmental analysis and mitigation that is intended to address the range of impacts that

may be associated with individual projects. This approach does not relieve local jurisdictions of responsibility for determining whether project-specific impacts require additional CEQA analysis.

EIR Organization

EXECUTIVE SUMMARY

The Executive Summary outlines the proposed Plan and alternatives and includes a summary of the potentially significant adverse environmental impacts of the proposed Plan, the measures identified to mitigate those impacts, and an overview of whether or not identified measures would mitigate the significant impacts and to what level. The executive summary also discusses the environmentally superior alternative, and "areas of known controversy" and "issues to be resolved" as required by CEQA.

CHAPTER 1: INTRODUCTION

Chapter 1, "Introduction," describes the relationship between the proposed Plan and the EIR, the organization of the EIR, and the basic legal requirements of a program level EIR. It discusses the level of analysis and the alternatives considered as well as potential tiering opportunities for future environmental documents. This is followed by additional content on the regional setting and regulatory framework that provides the context for the proposed Plan. This background information is followed by a discussion of the Plan development and public engagement process, as well as planning assumptions.

CHAPTER 2: PROJECT DESCRIPTION

Chapter 2, "Project Description," describes the proposed Plan and the project objectives and includes a discussion on planning assumptions and the Plan's strategies and resulting forecasted changes.

SECTIONS 3.1 THROUGH 3.15: ENVIRONMENTAL ANALYSIS

Section 3.1 provides an overview of the approach to the environmental analysis. Sections 3.2 through 3.15 describe the existing physical and regulatory settings for each of the environmental issue areas analyzed in the EIR, the potential impacts of the proposed Plan on these environmental issue areas, and measures to mitigate the potential impacts identified. Each issue area is analyzed in a separate section. Each section is organized as follows:

- Environmental Setting,
- Regulatory Setting,
- Significance Criteria,
- Method of Analysis, and
- Impacts and Mitigation Measures.

CHAPTER 4: ALTERNATIVES

Chapter 4 includes a description of the alternatives to the proposed Plan. It provides an assessment of the potential of each alternative to achieve the objectives of the proposed Plan while reducing potentially significant adverse environmental impacts. This discussion also includes a table that compares the effects of the Plan alternatives to the proposed Plan and the No Project Alternative. This chapter also includes a discussion of the environmentally superior alternative.

CHAPTER 5: OTHER CEQA-MANDATED SECTIONS

Chapter 5 includes an assessment of the impacts of the proposed Plan in several subject areas required by CEQA:

- significant irreversible environmental changes,
- significant and unavoidable impacts,
- growth-inducing impacts,
- cumulative impacts, and
- impacts found not to be significant.

Chapter 6: Report Preparers

Chapter 6 contains a list of report authors and others consulted for preparation of this EIR.

Chapter 7: References

Chapter 7 lists the references used to support preparation of this EIR.

APPENDICES

Appendix A includes the NOP of this EIR, and Appendix B includes the comments received on the NOP and at the scoping meetings, as well as the Scoping Summary Report. Appendix C includes special-status species data. Appendices D and E include detailed data used to support impact analyses related to energy, and climate change and GHG emissions. Appendix F presents input and output data used for the impact analyses in the Section 3.12, "Noise."

Project Objectives

The proposed Plan's adopted vision is to "ensure by the year 2050 that the Bay Area is affordable, connected, diverse, healthy, and vibrant for all." As part of the planning process, MTC and ABAG developed guiding principles and associated performance measures for the proposed Plan in conjunction with members of the public, partners, and elected officials. In addition, Senate Bill (SB) 375 mandates two performance targets related to housing the population and achieving GHG emission reduction targets. Together, the guiding principles and performance metrics serve as the basis for the following CEQA objectives:

- Address climate change by reducing carbon dioxide (CO_2) emissions pursuant to targets established by the California Air Resources Board (CARB); specifically, meet or exceed a 19-percent reduction in per-capita emissions from cars and light-duty trucks by 2035 relative to 2005 levels.
- House 100 percent of the region's projected growth by income level, and with no increase in in-commuters over the proposed Plan baseline year.
- Ensure that all current and future Bay Area residents and workers have sufficient housing options they can afford by reducing how much residents spend on housing and transportation and by producing and preserving more affordable housing.

- Support an expanded, well-functioning, safe, and multimodal transportation system that connects the Bay Area by improving access to destinations and by ensuring residents and workers have a transportation system they can rely on.
- Support an inclusive region where people from all backgrounds, abilities, and ages can remain in place with full access to the region's assets and resources by creating more inclusive communities and reducing the risk that Bay Area residents are displaced.
- Conserve the region's natural resources, open space, clean water, and clean air with the intent of improving health of Bay Area residents and workers and improving the health of the environment locally and globally.
- Support the creation of quality job opportunities for all and ample fiscal resources for communities by more evenly distributing jobs and housing in the Bay Area and by enabling the regional economy to thrive.

Project Overview

Plan Bay Area 2050 is defined by four elements: housing, economy, transportation, and environment. Within each, there are two or three central themes (totaling 11 across the entire Plan) under which several strategies (totaling 35 across the entire Plan) are nested. Equity and resilience—the cross-cutting themes of Plan Bay Area 2050—are integrated into each element, theme, and strategy. The strategies are envisioned to be implemented over the next three decades by local, regional, or State government, and the Implementation Plan specifies MTC's and ABAG's role in advancing each strategy through specific implementation actions over the next 5 years.

The proposed Plan identifies needs and revenues to implement the 35 strategies. It also seeks to meet or exceed State and federal planning requirements, including State-mandated targets for GHG emissions reductions. In summary, the proposed Plan:

- details housing and economic strategies ("land use") including investments of $702 billion in expected revenues to accommodate 2.7 million new persons, 1.4 million new households, 1.5 new forecasted housing units, and 1.4 million new jobs between 2015 and 2050;
- details transportation strategies including investments of $579 billion in expected revenues from federal, State, regional, and local sources over the next 30 years;
- details environmental strategies including investments of $102 billion in expected revenues to protect the region from at least two feet of future permanent sea level rise inundation, reduce climate emissions, and maintain and expand the region's parks and open space system; and
- complies with Senate Bill (SB) 375, the State's SCS law, which requires integration of land use and transportation planning to reduce per-capita passenger vehicle GHG emissions by 2035 and provide adequate housing for the region's growth forecast of 2.7 million new persons and 1.4 million new households.

The proposed Plan area covers the entire Bay Area, which includes the nine counties and the 101 cities that make up the region. The proposed Plan is constrained by expected transportation revenues and the forecasted population and job growth discussed in Section 2.3, "Planning Assumptions." The proposed Plan does not change local land use policies; individual jurisdictions retain all local land use authority. The proposed Plan facilitates subsequent streamlined CEQA analysis pursuant to SB 375,

SB 743, and other methods described in Section 1.9, "CEQA Streamlining Opportunities," in Chapter 1, "Introduction." The proposed Plan includes a fiscally constrained list of transportation projects and programs that are eligible for future federal and State funding but does not allocate funds to any specific transportation project or program.

SUMMARY OF ALTERNATIVES

ALTERNATIVES

CEQA requires EIRs to evaluate a reasonable range of alternatives to the proposed project that could feasibly attain most of the basic project objectives and that would avoid or substantially lessen any of the significant environmental impacts. In addition, CEQA requires assessment of the likely foreseeable future condition if the proposed project were not implemented; this scenario is called the No Project alternative.

This EIR evaluates the proposed Plan and three alternatives, assuming the same regional forecast control totals, same 2050 horizon year, and full Plan implementation. This EIR also documents the relative environmental advantages and disadvantages of the alternatives as compared to the proposed Plan, and discusses the environmentally superior alternative.

The proposed Plan and three alternatives are briefly described below. A full description of each alternative is provided in Chapter 4.

No Project Alternative

Analysis of the No Project Alternative is required under CEQA (CEQA Guidelines, Section 15126.6[e]). The purpose of the No Project Alternative is to allow a comparison of the environmental impacts of approving the proposed project with the effects of not approving it. This alternative represents a future land use pattern and suite of transportation and resilience investments if the proposed Plan is not adopted.

Under the No Project Alternative, growth is assumed to occur consistent with local general plans and zoning without an adopted RTP/SCS, and assumes no new transportation or sea level infrastructure projects beyond those currently under construction or those that have both full funding and environmental clearance ("committed"). Under the No Project Alternative, housing growth would be more dispersed, while job growth would be slightly more concentrated in the region's two largest job centers of San Francisco and Silicon Valley. In comparison to the proposed Plan, the No Project Alternative would result in higher household growth primarily in Contra Costa County, with higher job growth in San Francisco and Santa Clara Counties. The No Project Alternative includes substantially lower investments for transportation strategies and environment strategies than the proposed Plan.

Alternative 1 – TRA Focus Alternative

The TRA Focus Alternative would concentrate growth in areas that contain high-quality transit services. This alternative is characterized as providing a compact growth pattern, with the greatest share of housing and job growth in TRAs within walking distance of regional rail stations. To support this more urban-oriented growth pattern, additional core capacity transit investments are funded in lieu of highway projects that add lane-mileage to the system.

This alternative would result in higher levels of household and job growth in the growth geographies than under the proposed Plan, with substantially more housing growth in TRAs. In comparison to the

proposed Plan, the TRA Focus Alternative would result in higher household growth in San Francisco and San Mateo Counties and higher job growth in Contra Costa County.

Alternative 2 – HRA Focus Alternative

Alternative 2 focuses a substantially higher share of growth in HRAs, especially in the South Bay. To support this growth pattern and advance regional equity goals, infrastructure funding for major regional and interregional rail expansion projects would be reduced, and greater funding would be provided to local bus frequency increases, new express bus lines, expanded transit fare discount programs, and enhanced nonmotorized infrastructure.

This alternative features levels of household and job growth in growth geographies similar to those of the proposed Plan, with substantially more housing growth and substantially less job growth in HRAs. In comparison to the proposed Plan, Alternative 2 would result in higher household growth in Santa Clara County and higher job growth in San Francisco County.

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The EIR addresses impacts associated with projected growth and impacts associated with the projected land use, assumed transportation projects, and assumed sea level rise adaptation infrastructure. Where a significant or potentially significant impact may occur, mitigation measures are provided. **Table ES-1** summarizes the impact conclusions and recommended mitigation measures identified in this EIR. The impacts are organized by environmental impact issue area in the order in which they appear in Sections 3.2 through 3.15.

Significant unavoidable impacts are those that cannot be mitigated to a less-than-significant level. Sections 3.2 through 3.15 of this EIR identify significant unavoidable impacts of the proposed Plan, as summarized in **Table ES-1**. As stated in Chapter 3.1, "Approach to the Analysis," to the extent that an individual project adopts and implements all feasible mitigation measures described for each significant impact, many of the impacts listed below would be reduced to a less-than-significant level. For most impacts, MTC and ABAG do not have regulatory or approval authority over future projects. In those cases, MTC and ABAG identify specific mitigation measures for application by the lead agency. In order to rely on this EIR to streamline environmental review for an individual project, the lead agency must require the applicable mitigation measures as a part of the project-level environmental review. Therefore, many impacts have been identified as significant and unavoidable for purposes of this program-level review. Projects taking advantage of CEQA Streamlining provisions of SB 375 (Public Resources Code Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described in this EIR, as necessary and feasible to address site-specific conditions.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA Guidelines Section 15126.6(e)(2) states that if the environmentally superior alternative is the no project alternative, the EIR shall also identify an environmentally superior alternative from among the other alternatives analyzed.

As discussed in Section 4.5, "Comparative Impact Analysis of Alternative," the No Project Alternative would result in two more significant and unavoidable impacts than the proposed Plan (Impact AQ-1 and GHG-4) and would result in one less significant and unavoidable impact than the proposed Plan

(LU-2). Because the No Project Alternative would result in more significant and unavoidable impacts than the proposed Plan, it would not be the environmentally superior alternative. When this is the case, there is no further obligation under CEQA to assess the relative environmental superiority of other alternatives. However, as this information is useful in understanding the relative benefits and adverse effects of the other alternatives, MTC and ABAG have nevertheless chosen to provide this information as summarized below.

The TRA Focus and HRA Focus Alternatives would result in the same number of less-than-significant and significant and unavoidable impacts as the proposed Plan. As shown in Table 4-34, the TRA Focus Alternative would result in comparatively less significant and unavoidable impact than either the proposed Plan or the HRA Focus Alternative (AQ-4 and LU-4). Because the level or degree of resulting significant and unavoidable impact would be lower under the TRA Focus Alternative, this alternative is environmentally superior to the other alternatives.

AREAS OF CONTROVERSY

Section 15123 of the CEQA Guidelines requires that an EIR identify areas of controversy which are known to the Lead Agency, including issues raised by other agencies and the public. Areas of controversy associated with the proposed Plan are made known through comments received during the Notice of Preparation (NOP) process, as well as input solicited on the proposed Plan during public scoping meetings, and an understanding of the community issues in the Plan area. Areas of known controversy, related to the proposed Plan and EIR include:

- Unknown near-term and long-term impacts of COVID-19. With the effects of the COVID-19 pandemic still impacting the daily lives of Bay Area residents, projecting future conditions remains challenging. Longer-term assumptions about post-COVID impacts were integrated about future telecommuting levels, and strategies such as Strategy EN7 were designed to accelerate and incentivize further shifts toward telecommuting, transit, walking, and biking. Furthermore, the Regional Growth Forecast and associated revenue forecasts were updated prior to their finalization to reflect weaker economic conditions, especially in the early 2020s, in the wake of COVID-19. Future iterations of Plan Bay Area will be able to more accurately capture longer-term preferential changes in residential and commercial preferences beyond telecommuting, as more definitive long-term survey data becomes available.

- Linkage between Plan Bay Area 2050 and RHNA. The 2050 household forecasts from Plan Bay Area 2050 play a role in the RHNA process as the baseline allocation, influencing the housing allocations assigned to individual jurisdictions for the 2023 to 2031 RHNA cycle. Given the significant increase in the Regional Housing Need Determination from the California Department of Housing and Community Development, allocations to cities, towns, and counties are significantly higher than the prior RHNA cycle. As Plan Bay Area 2050 integrates growth geographies and strategies that exceed existing local zoning capacity, its appropriate use in RHNA was debated through the Housing Methodology Committee process in 2020.

- Concerns about displacement and gentrification, as well as strategies in EIR Alternative 2. Plan Bay Area 2050 includes specific renter protection and affordable housing strategies, yet displacement risk remains a critical issue in the planning context. These concerns sparked interest in exploring displacement and gentrification further through the EIR process, including through EIR Alternative 2. Strategies integrated in EIR Alternative 2 to address these issue areas, while successful at shifting more low-income households to high-resource communities, included office

development caps in job-rich cities that were controversial and ultimately discarded earlier in the Horizon and Draft Blueprint phases of the planning process.

- Strategies and assumptions related to climate change adaption. While sea level rise, wildfire, drought, and other impacts of climate change were addressed through specific strategies in the Draft Plan or through exclusion from regional growth geographies, some stakeholders remain concerned that the Draft Plan does not go far enough to reduce development in higher-risk areas for these natural hazards. Other stakeholders have advocated for assuming a faster rate of sea level rise, going beyond recommendations of California environmental agencies, to expand the scope of Strategy EN1.

- Strategies related to climate change mitigation. Plan Bay Area 2050 meets the year 2035 state greenhouse gas reduction target established by the California Air Resources Board, but some stakeholders have noted that MTC and ABAG should go further by further reducing or eliminating highway expansion projects from the Draft Plan or pursuing even more ambitious climate strategies. Stakeholders have also noted the need to further reduce emissions in both the near-term and long-term and to consider emissions from sources beyond cars and light-duty trucks to a greater degree.

- Implementation roles and responsibilities. The Draft Implementation Plan for Plan Bay Area 2050 identifies the proposed roles for MTC and ABAG in implementing each of the 35 strategies in the Draft Plan. In some cases, planning process stakeholders have noted that they would prefer MTC and ABAG to take on a lesser or greater role in the coming years. Furthermore, the Draft Implementation Plan has only delineated high-level roles and responsibilities for partner entities, with the vision of expanding this content for the Final Implementation Plan in response to feedback from partner agencies.

ISSUES TO BE RESOLVED

CEQA Guidelines Section 15123(b)(3) requires that an EIR contain a discussion of issues to be resolved and whether or how to mitigate significant effects. Identified issues to be resolved include the following:

- Land use and mitigation authority. How to address potential impacts from the projected land development pattern that must be mitigated by the local jurisdiction, given that MTC and ABAG do not have land use authority.

- Plan consistency determinations. Methods to be employed by local jurisdictions for determining project consistency with PBA 2050 and adoption of mitigation measures by project sponsors and/or implementing agencies in a manner to enable CEQA streamlining for qualifying projects, per SB 375.

- Consideration of alternatives. In approving PBA 2050 MTC and ABAG must consider CEQA alternatives and make a determination regarding the most beneficial Plan for the region.

- Balancing overriding considerations. In approving PBA 2050 MTC and ABAG must decide whether the benefits of implementing the final Plan will override those environmental impacts that cannot be feasibly avoided or substantially reduced. A Statement of Overriding Considerations is required to support such a determination.

Table ES-1: Summary of Impacts and Mitigation Measures

Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
3.2 AESTHETICS AND VISUAL RESOURCES				
Impact AES-1: Have a substantial adverse effect on a scenic vista	PS	**Mitigation Measure AES-1:** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Reduce the visibility of construction staging areas by fencing and screening these areas with low contrast materials consistent with the surrounding environment, and by revegetating graded slopes and exposed earth surfaces at the earliest opportunity. ◢ Site or design projects to minimize their intrusion into important viewsheds. Measures to achieve this could include, but are not limited to, requiring that the scale and massing of new development in higher-density areas provide appropriate transitions in building height and bulk that are sensitive to the physical and visual character of adjoining neighborhoods that have lower development intensities and building heights, and ensuring building heights are stepped back from sensitive adjoining uses to maintain appropriate transitions in scale and to protect scenic vistas and scenic resources. ◢ Design projects to minimize the potential to obscure, detract from, or negatively affect the quality of views from State-designated scenic roadways or scenic highways. ◢ Use see-through safety barrier designs (e.g., railings rather than walls). ◢ Develop interchanges and transit lines at the grade of the surrounding land to limit view blockage. ◢ Design landscaping along State-designated scenic highways and highway corridors in rural and open space areas to add natural elements and visual interest to soften the hard-edged, linear travel experience that would otherwise occur. Retain or replace trees bordering highways so that clear-cutting is not evident. ◢ Identify, preserve, and enhance scenic vistas to and from hillside areas and other visual resources.	SU	SU
Impact AES-2: Substantially damage scenic resources, including but not limited to trees, rock outcropping, and historical buildings within a state scenic highway	PS	**Mitigation Measure AES-2** Implement Mitigation Measure AES-1.	SU	SU

*= Significance assuming individual projects adopt and implement the listed mitigation measure, as required for future projects taking advantage of CEQA streamlining provisions of SB 375.

**= Significance assuming some or all of the listed mitigation measure(s) is/are not implemented because MTC/ABAG cannot require local implementing agencies to adopt mitigation measure(s).

LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable PSU = Potentially significant and unavoidable

Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
Impact AES-3: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings and in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality	PS	**Mitigation Measure AES-3:** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Require that the scale, massing, and design of new development provide appropriate transitions in building height, bulk, and architectural style that are sensitive to the physical and visual character of surrounding areas. ◢ Contour the edges of major cut and fill slopes to provide a finished profile that is appropriate to the surrounding context, using shapes, textures, colors, and scale to minimize contrasts between the project and surrounding areas. ◢ Require project sponsors to conduct shadow studies for four-story high (and higher) buildings and roadway facilities to identify and implement development strategies for reducing the impact of shadows on public open space, where feasible. Study considerations shall include, but are not limited to, the placement, massing, and height of structures, surrounding land uses, time of day and seasonal variation, and reflectivity of materials. Study recommendations for reducing shadow impacts shall be incorporated into the project design as feasible based on project- and site-specific considerations.	SU	SU
Impact AES-4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	PS	**Mitigation Measure AES-4:** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Design projects to minimize light and glare from lights, buildings, and roadways facilities. ◢ Minimize and control glare from transportation projects through the adoption of project design features that reduce glare. These features include: ◤ planting trees along transportation corridors to reduce glare from the sun; ◤ landscaping off-street parking areas, loading areas, and service areas; and ◤ shielding transportation lighting fixtures to minimize off-site light trespass. ◢ Minimize and control glare from land use and transportation projects through the adoption of project design features that reduce glare. These features include: ◤ limiting the use of reflective materials, such as metal; ◤ using non-reflective material, such as paint, vegetative screening, matte finish coatings, and masonry; ◤ screening parking areas by using vegetation or trees; and	LTS	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		◤ using low-reflective glass. ◢ Impose lighting standards that ensure that minimum safety and security needs are addressed and minimize light trespass and glare associated with land use development. These standards include the following: ◤ minimizing incidental spillover of light onto adjacent private properties and undeveloped open space; ◤ directing luminaries away from habitat and open space areas adjacent to the project site; ◤ installing luminaries that provide good color rendering and natural light qualities; and ◤ minimizing the potential for sky glow into the nighttime sky and for incidental spillover of light onto adjacent private properties and undeveloped open space.		
3.3 AGRICULTURE AND FORESTRY RESOURCES				
Impact AGF-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use, or conflict with existing zoning for agricultural use, or a Williamson Act contract	PS	**Mitigation Measure AGF-1** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Require project relocation or corridor realignment, where feasible, to avoid agricultural land, especially Prime Farmland, Farmland of Statewide Significance, and land under a Williamson Act contract. ◢ Provide buffers, berms, setbacks, fencing, or other project design measures to protect surrounding agriculture, and to reduce conflict with farming that could result from implementation of transportation improvements and/or projected land use pattern included as a part of the RTP/SCS. ◢ Maintain and expand agricultural land protections such as urban growthboundaries. ◢ Achieve compensatory mitigation in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through Regional Advance Mitigation Planning, as deemed appropriate by the permitting agencies. ◢ Require acquisition of conservation easements on land in the same jurisdiction, if feasible, and at least equal in quality and size as mitigation for the loss of agricultural land. ◢ Institute new protection of farmland in the project area or elsewhere through the use of long-term restrictions on use, such as 20-year Farmland Security Zone contracts	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		(Government Code Section 51296 et seq.) or 10-year Williamson Act contracts (Government Code Section 51200 et seq.).		
Impact AGF-2: Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))	PS	**Mitigation Measure AGF-2** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Require project relocation or corridor realignment, where feasible, to avoid forest land or timberland. ◢ Maintain and expand forest land protections such as urban growthboundaries. ◢ Achieve compensatory mitigation in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through Regional Advance Mitigation Planning, as deemed appropriate by the permitting agencies. ◢ Require acquisition of conservation easements on land at least equal in quality and size as mitigation for the loss of forestland or timberland.	SU	SU
Impact AGF-3: Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use	PS	**Mitigation Measure AGF-3** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Implement Mitigation Measures AGF-1 and AGF-2. ◢ Manage project operations to minimize the introduction of invasive species or weeds that may affect agricultural production on adjacent agricultural land. Where a project has the potential to introduce sensitive species or habitats or have other spill-over effects on nearby agricultural lands, the project proponents shall be responsible for acquiring easements on nearby agricultural land and/or financially compensating for indirect effects on nearby agricultural land. Easements (e.g., flowage easements) shall be required for temporary or intermittent interruption in farming activities (e.g., because of seasonal flooding or groundwater seepage). Acquisition or compensation would be required for permanent or significant loss of economically viable operations. ◢ Design project features to minimize fragmenting or isolating agricultural land. Where a project involves acquiring land or easements, ensure that the remaining agricultural land is of a size sufficient to allow economically viable farming operations. The project sponsors shall be responsible for acquiring easements, making lot line adjustments, and merging	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		affected land parcels into units suitable for continued commercial agricultural management.		
3.4 AIR QUALITY				
Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan	LTS	None required.	LTS	LTS
Impact AQ-2: Result in a substantial net increase in construction-related emissions	PS	**Mitigation Measure AQ-2** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: When applicable screening levels set by the relevant air district are exceeded, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: **Construction Best Practices for Exhaust** ◢ The applicant/general contractor for the project shall submit a list of all off-road equipment greater than 25 horsepower (hp) that would be operated for more than 20 hours over the entire duration of project construction, including equipment from subcontractors, to the relevant air district (e.g., BAAQMD, NSCAPCD, or YSAQMD) for review and certification. The list shall include all information necessary to ensure the equipment meets the following requirement: ◤ Equipment shall be zero emissions or have engines that meet or exceed either EPA or CARB Tier 4 off-road emission standards, and it shall have engines that are retrofitted with a CARB Level 3 Verified Diesel Emissions Control Strategy (VDECS), if one is available for the equipment being used. Equipment with engines that meet Tier 4 Interim or Tier 4 Final emission standards automatically meet this requirement; therefore, a VDECS would not be required. ◤ Idling time of diesel-powered construction equipment and trucks shall be limited to no more than two minutes. Clear signage of this idling restriction shall be provided for construction workers at all access points. ◤ All construction equipment shall be maintained and properly tuned in accordance with the manufacturers' specifications.	LTS-M	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		◤ Portable diesel generators shall be prohibited. Grid power electricity should be used to provide power at construction sites; or propane and natural gas generators may be used when grid power electricity is not feasible. **Construction Best Practices for Entrained Dust** ◢ All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. For projects over five acres in size, soil moisture should be maintained at a minimum of 12 percent. Moisture content can be verified by lab samples or a moisture probe. ◢ All haul trucks transporting soil, sand, or other loose material off-site shall be covered. ◢ On-site dirt piles or other stockpiled PM shall be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind-blown dust emissions. The use of approved nontoxic soil stabilizers shall be incorporated according to manufacturers' specifications to all inactive construction areas. ◢ All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. Dry power sweeping should only be performed in conjunction with thorough watering of the subject roads. ◢ All vehicle speeds on unpaved roads and surfaces shall be limited to 15 mph. ◢ All roadway, driveway, and sidewalk paving shall be completed as soon as possible. Building pads shall be paved as soon as possible after grading. ◢ All construction sites shall provide a posted sign visible to the public with the telephone number and person to contact at the lead agency regarding dust complaints. The recommended response time for corrective action shall be within 48 hours. BAAQMD's Complaint Line (1-800-334-6367) shall also be included on posted signs to ensure compliance with applicable regulations. ◢ All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph. ◢ Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.		

*= Significance assuming individual projects adopt and implement the listed mitigation measure, as required for future projects taking advantage of CEQA streamlining provisions of SB 375.

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		◢ Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established. ◢ The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time. ◢ All transfer processes involving a free fall of soil or other PM shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions. ◢ All trucks and equipment, including their tires, shall be washed off before leaving the site. ◢ Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel. ◢ Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent. ◢ Open burning shall be prohibited at the project site. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (e.g., trash, demolition debris) may be conducted at the project site. Vegetative wastes shall be chipped or delivered to waste-to-energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. It is unlawful to haul waste materials off-site for disposal by open burning. ◢ The primary contractor shall be responsible for ensuring that all construction equipment is properly tuned and maintained before and for the duration of on-site operation. ◢ Where accessible, existing power sources (e.g., power poles) or clean-fuel generators shall be used rather than temporary power generators. ◢ A traffic plan shall be developed to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Operations that affect traffic shall be scheduled for off-peak hours. Obstruction of through-traffic lanes shall be minimized. A flag person shall be provided to guide traffic properly and ensure safety at construction sites. Applicable mitigation measures shall be required at the time grading permits are issued.		

*= Significance assuming individual projects adopt and implement the listed mitigation measure, as required for future projects taking advantage of CEQA streamlining provisions of SB 375.

**= Significance assuming some or all of the listed mitigation measure(s) is/are not implemented because MTC/ABAG cannot require local implementing agencies to adopt mitigation measure(s).

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
Impact AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard	PS	**Mitigation Measure AQ-3(a)** MTC and ABAG, in partnership with BAAQMD, and implementing agencies, shall work together to support the use of existing air quality and transportation funds and seek additional funds to continue to implement BAAQMD and CARB programs (e.g., Carl Moyer) intended to retrofit and replace trucks and locomotives. **Mitigation Measure AQ-3(b)** MTC and ABAG, in partnership with BAAQMD and the Port of Oakland, and other agency partners, shall work together to secure incentive funding to reduce mobile PM emissions from mobile exhaust and entrained PM sources such as tire wear, brake wear, and roadway dust. **Mitigation Measure AQ-3(c)** MTC and ABAG, in partnership with local air districts, and implementing agencies shall: ◢ support the advancement of corridor-level plans and implementation of projects located on severely congested (LOS F) facilities and ◢ incorporate transportation demand management (TDM) strategies into individual land use land transportation projects and plans, as part of the planning process; TDM strategies could include ridesharing, carsharing, telecommuting, adopting flexible working hours, implementing parking management and traffic- calming measures, and marketing TDM options (especially alternative commuting services). **Mitigation Measure AQ-3(d)** When applicable screening levels set by the applicable air district are exceeded, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below or are updated by BAAQMD/the applicable air district or within CalEEMod: ◢ Provide for, or contribute to, dedication of land for off-site Class I and Class II bicycle trails linking the project to designated bicycle commuting routes in accordance with the regional bikeway master plan. ◢ Provide preferential parking spaces for carpool and vanpool vehicles, implement parking fees for single-occupancy vehicle commuters, and implement parking cash-out program for employees. ◢ Support local requirements regarding electric vehicle charging spaces. ◢ Support the inclusion of bus shelters at transit access points where deemed appropriate by local public transit operator in large residential, commercial, and industrial projects.	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		◢ Support local communities and agencies equipping of residential structures with electric outlets in the front and rear of the structure to facilitate use of electrical lawn and garden equipment. ◢ Support the contribution to the provision of synchronized traffic signals on roadways affected by the project and as deemed necessary by the local public works department. ◢ Support local transit-enhancing infrastructure that includes bus turnouts or bulbs, passenger benches, street lighting, route signs and displays, and shelters as demand and service routes warrant, subject to review and approval by local transportation planning agencies. ◢ Support pedestrian-enhancing infrastructure that includes sidewalks and pedestrian paths, direct pedestrian connections, street trees to shade sidewalks, pedestrian safety designs and infrastructure, street furniture and artwork, street lighting, pedestrian signalization and signage, and/or access between bus service and major transportation points in the Plan area. ◢ Support local community requirements to require all employment centers to include an adequate number of on-site shower/locker facilities for bicycling and pedestrian commuters (typically one shower and three lockers for every 25 employees per shift). ◢ Support local communities and agencies to provide park-and-ride lots as deemed feasible and appropriate by transportation planning agencies. ◢ At employment centers that exceed a designated size, as measured by the number of employees, support the provision of on-site child care and after-school facilities or contribute to off-site construction of such facilities within walking distance of employment land uses (for employment centers on or adjacent to industrial land uses, on-site child daycare centers shall be provided only if supported by the findings of a comprehensive health risk assessment performed in consultation with the local air district). ◢ Commit to support programs that include guaranteed ride home, subsidized transit passes, and rideshare matching. ◢ Support local communities and agencies to provide transportation (e.g., shuttles) to major transit stations and multimodal centers. **Mitigation Measure AQ-3(e)**: Implementing agencies and/or project sponsors shall implement the following measures, where feasible and necessary based on project- and site-specific considerations, to reduce criteria air pollutant emitted by natural gas combustion in buildings:		

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			w/ MM*	w/o MM**
		◢ Prohibit natural gas infrastructure in new development. ◢ Utilize, or design to support, microgrid electric systems to facilitate the resiliency of new developments prohibiting natural gas. ◢ Equip residential structures containing front and rear yard area with electric outlets in the front and rear of the structure to facilitate use of electrical lawn and garden equipment. ◢ Install ground-source heat pumps, solar, or other alternatively-fueled water heaters instead of natural gas or grid-based electric water heaters. ◢ Install ground-source heat pump, or other alternative, heating and cooling systems. ◢ Increase wall and attic insulation to 20 percent above Title 24 requirements (residential and commercial). ◢ Orient buildings to take advantage of solar heating and natural cooling, and use passive solar designs (residential, commercial, and industrial). ◢ Provide energy-efficient windows (double pane and/or Low-E) and awnings or other shading mechanisms for windows, porches, patios, and walkways. ◢ Utilize passive solar cooling and heating designs, ceiling and whole house fans, and programmable thermostats in the design of heating and cooling systems.		
Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations	PS	Implement Mitigation Measure AQ-2 **Mitigation Measure AQ-4(a)** When locating sensitive receptors in TAC risk areas, as identified in **Figure 3.4-2**, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Install, operate and maintain in good working order a central heating, ventilation and air conditioning (HVAC) system or other air intake system in the building, or in each individual unit, that meets or exceeds a minimum efficiency reporting value (MERV) of 13 (MERV-16 for projects located in the West Oakland Specific Plan area) or higher (BAAQMD 2016). The HVAC system shall include the following features: Installation of a high efficiency filter and/or carbon filter to filter particulates and other chemical matter from entering the building. Either high efficiency particulate air (HEPA) filters or American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) certified 85 percent supply filters shall be used.	SU	SU

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		◢ Reduce emissions from diesel trucks through implementing the following measures, if feasible: installing electrical hook-ups for diesel trucks at loading docks; requiring trucks to use Transportation Refrigeration Units that meet Tier 4 emission standards; requiring truck-intensive projects to use advanced exhaust technology (e.g., hybrid) or alternative fuels; prohibiting trucks from idling for more than 2 minutes; and establishing truck routes to avoid sensitive receptors in the project. Implement a truck route program, along with truck calming, parking, and delivery restrictions. ◢ Install passive electrostatic filtering systems with low air velocities (i.e., less than 1 mph). ◢ Phase residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible. ◢ Locate sensitive receptors as far away from truck activity areas, such as loading docks and delivery areas, as feasible. ◢ Ensure that existing and new standby or emergency diesel generators meet CARB's Tier 4 emission standards, if feasible. ◢ Locate individual and common exterior open space and outdoor activity areas proposed as part of individual projects as far away as possible from emission source within the project site boundary, face them away major freeways, and shield them from the source (i.e., the roadway) of air pollution with buildings or otherwise buffer them to further reduce air pollution for project occupants. ◢ Locate air intakes and design windows to reduce PM exposure (e.g., windows nearest to the roadway do not open). ◢ If sensitive receptors are located near a distribution center, do not locate residents immediately adjacent to a loading dock or where trucks concentrate to deliver goods. ◢ Locate sensitive receptors in buildings in areas upwind of major roadway traffic to reduce exposure to reduce cancer risk levels and exposure to $PM_{2.5}$. ◢ Plant trees and/or vegetation between sensitive receptors and pollution source. Trees that are best suited to trapping PM shall be planted, including one or more of the following species: pine (*Pinus nigra* var. *maritima*), cypress (x *Cupressocyparis leylandii*), hybrid popular (*Populus deltoids* x *trichocarpa*), California pepper tree (*Schinus molle*), and redwood (*Sequoia sempervirens*).		

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
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		◢ Reduce emissions from diesel trucks by establishing truck routes to avoid residential neighborhoods or other land uses serving sensitive populations, such as hospitals, schools, and child care centers. A truck route program, along with truck calming, parking and delivery restrictions, shall be implemented to direct traffic activity at non-permitted sources and large construction projects. These BMPs are consistent with recommendations in BAAQMD's CEQA Guidelines (BAAQMD 2017c) and Planning Healthy Places (BAAQMD 2016). **Mitigation Measure AQ-4(b)** MTC and ABAG shall partner with BAAQMD and local lead agencies to develop a program to install air filtration devices in existing residential buildings, and other buildings with sensitive receptors, located near freeways or sources of TACs and $PM_{2.5}$. **Mitigation Measure AQ-4(c)** MTC and ABAG shall partner with BAAQMD to develop a program to provide incentives to replace older locomotives and trucks in the region to reduce TACs and $PM_{2.5}$. **Mitigation Measure AQ-4(d)** Implementing agency shall implement the strategies identified in the CARB Technical Advisory to reduce air pollution exposure near high-volume roadways to less-than-significant levels, where feasible. Examples of effective strategies include (CARB 2017b): ◢ Using speed reduction mechanisms, such as roundabouts to reduce the frequency of stop-and-go driving common among streets that support stop signs; ◢ Using traffic signal management to limit the frequency of stop-and-go driving and vehicle idling; ◢ Establishing and enforcing speed limit reductions of high-speed roadways; ◢ Using design elements that promote air flow and pollutant dispersion along street corridors to optimize air flow, building downwash, and pollution dispersal; ◢ Incorporating bike lanes and sidewalks to promote alternative, zero-pollution modes of transportation; and ◢ Constructing solid barriers directly adjacent to high-volume roadways, such as sound walls to improve downwash.		
Impact AQ-5: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people	LTS	None required.	LTS	LTS

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			w/ MM*	w/o MM**
3.5 BIOLOGICAL RESOURCES				
Impact BIO-1a: Have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NOAA Fisheries	PS	**Mitigation Measure BIO-1(a)** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Implementing agencies shall require project sponsors to prepare biological resource assessments for specific projects proposed in areas known or likely to contain habitat suitable for special-status plants and wildlife. The assessment shall be conducted by qualified professionals pursuant to adopted protocols and agency guidelines, where applicable. Where the biological resource assessments establish that mitigation is required to avoid and minimize direct and indirect adverse effects on special-status plant and wildlife species, or compensate for unavoidable effects, mitigation shall be developed consistent with the requirements or standards of CEQA, USFWS, CDFW, and local regulations and guidelines, in addition to requirements of any applicable and adopted HCP/NCCP or other applicable plans developed to protect species or habitat. ◢ In support of CEQA, NEPA, CDFW, USFWS, and NOAA Fisheries review and permitting processes for individual proposed Plan projects, pre-project biological surveys shall be conducted as part of the environmental review process to determine the presence and extent of sensitive habitats and species in the project vicinity. Surveys shall follow established methods and shall be conducted at times when the subject species is most likely to be identified. In cases where impacts on State- or federally listed plant or wildlife species are possible, formal protocol-level surveys may be required on a species-by-species basis to determine the local presence and distribution of these species. Coordination with CDFW, USFWS, and NOAA Fisheries, as appropriate, shall be conducted early in the planning process at an informal level for projects that could adversely affect federal or State candidate, proposed, threatened, or endangered species to determine the need for consultation or permitting actions. Projects shall obtain incidental take authorization from the permitting agencies, as required, before project implementation. ◢ A species and habitat compensation plan shall be prepared for unavoidable direct impacts on special-status plant species and shall be reviewed and approved by the resource agencies and lead agency prior to project approval. The plan shall identify effective methods for reestablishing the affected species and habitat, including but not limited to seed collection, salvage of root masses, and planting seeds and/or root masses in an area	LTS-M	SU

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		with suitable conditions. The plan shall also specify a monitoring program designed to evaluate success in reestablishing the affected species and habitat, and remedial measures that shall be followed if the project is not meeting specified performance criteria. The monitoring program shall be designed to evaluate the current and probable future health of the resources, and their ability to sustain populations in keeping with natural populations following the completion of the program. Remedial measures are highly dependent upon the species and habitats in question, but generally shall include but not be limited to invasive species management, predator control, access control, replanting and reseeding of appropriate habitat elements, regarding, and propagation and seed bulking programs. ◢ Project designs shall be reconfigured, whenever practicable, to avoid special-status species and sensitive habitats. Projects shall minimize ground disturbances and transportation project footprints near sensitive areas to the extent practicable. ◢ Temporary access roads and staging areas shall not be located within the areas containing sensitive plants or wildlife species wherever feasible, to avoid or minimize impacts on these species. ◢ Project activities in the vicinity of sensitive resources shall be completed during the period that best avoids disturbance to plant and wildlife species present to the extent feasible. ◢ Individual projects shall minimize the use of in-water construction methods in areas that support sensitive aquatic species, especially when listed species could be present. ◢ If equipment needs to operate in any watercourse with flowing or standing water where special-status species may be affected, a qualified biological resource monitor shall be present to alert construction crews to the possible presence of such special-status species. ◢ If project activities involve pile driving or vibratory hammering in or near water, interim hydroacoustic threshold criteria for protected fish species shall be adopted as set forth by the Interagency Fisheries Hydroacoustic Working Group, as well as other avoidance methods to reduce the adverse effects of construction to sensitive fish, piscivorous birds, and marine mammal species. ◢ A qualified biologist shall locate and fence off sensitive resources before construction activities begin and, where required, shall inspect areas to ensure that barrier fencing, stakes, and setback buffers are maintained during construction.		

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		◢ For work sites located adjacent to special-status plant or wildlife populations, a biological resource education program shall be provided for construction crews and contractors (primarily crew and construction foremen) before construction activities begin. ◢ Biological monitoring shall be considered for areas near identified habitat for State- and federally listed species, and a "no take" approach shall be taken whenever feasible during construction near special-status plant and wildlife species. ◢ Mitigation Measure NOISE-1 shall be implemented when permanent or temporary noise has been identified as a potential impact on wildlife. ◢ Nighttime lighting shall be directed at the construction or project site and away from sensitive habitats. Light glare shields shall be used to reduce the extent of illumination onto adjoining areas. Permanent lighting shall be shielded and directed at intended use areas. ◢ Fencing and/or walls shall be built to avoid temporary or permanent access of humans or domestic animals from development areas into areas occupied by special status species. Spoils, trash, or any debris shall be removed offsite to an approved disposal facility. ◢ Project activities shall comply with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures protective of special-status species. ◢ Compensatory mitigation for unavoidable loss of habitat or other impacts on special-status species may be achieved in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through Regional Advance Mitigation Planning (RAMP), as deemed appropriate by the permitting agencies.		
Impact BIO-1b: Have substantial adverse impacts on designated critical habitat for federally listed plant and wildlife species	PS	**Mitigation Measure BIO-1(b)** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, for projects that could affect designated critical habitat for federally listed plant and wildlife species that include those identified below: ◢ Coordination with USFWS and NOAA Fisheries, as appropriate based on the species, shall be conducted early in the environmental review process to determine the need for further mitigation, consultation, or permitting actions. Formal consultation is required for any project with a federal nexus when a listed species or designated critical habitat is likely to be adversely affected. Any conservation measures required by USFWS or NOAA Fisheries as	LTS-M	LTS-M

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		part of formal consultation (e.g., through issuance of a biological opinion) would be implemented. ◢ Reconfigure project design to avoid or minimize adverse effects on protected species within designated critical habitats. ◢ Implementing agencies and/or project sponsors shall comply with existing local regulations and policies, including applicable HCP/NCCPs. ◢ Additionally, implementation of Mitigation Measure BIO-1(a), above, which includes an initial biological resource assessment and, if necessary, compensatory mitigation for unavoidable loss of habitat or other impacts on special-status species. Compensatory mitigation may be achieved in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through RAMP, as deemed appropriate by the permitting agencies.		
Impact BIO-2: Have a substantial adverse effect on riparian habitat, State- or federally protected wetlands (including but not limited to marsh, vernal pool, coastal), or other sensitive natural communities identified in local or regional plans, policies, or regulations, or by CDFW or USFWS, through direct removal, filling, hydrological interruption, or other means	PS	**Mitigation Measure BIO-2** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Implementing agencies shall require project sponsors to prepare biological resource assessments for specific projects proposed in areas containing, or likely to contain, jurisdictional waters or other sensitive or special-status communities. These assessments shall be conducted by qualified professionals in accordance with agency guidelines and standards. Where the biological resource assessments establish that mitigation is required to avoid and minimize direct and indirect adverse effects on State- or federally protected wetlands, or compensate for unavoidable effects, mitigation shall be developed consistent with the requirements or standards of USACE, EPA, RWQCB, and CDFW, and local regulations and guidelines, in addition to requirements of any applicable and adopted HCP/NCCP or other applicable plans developed to protect these resources. In keeping with the "no net loss" policy for jurisdictional waters (i.e., wetlands and other waters of the United States or State), project designs shall be configured, whenever possible, to avoid wetlands and other waters and avoid disturbances to wetlands and riparian corridors to preserve both the habitat and the overall ecological functions of these areas. Projects shall minimize ground disturbances and transportation project footprints near such areas to the extent practicable.	LTS-M	LTS-M

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		◤ Project sponsors shall consult with USFWS, NMFS, USFS, CDFW where state-designated sensitive or riparian habitats provide potential or occupied habitat for federally listed rare, threatened, and endangered species afforded protection pursuant to the federal ESA, the MBTA during the breeding season, the California ESA, or Fully Protected Species afforded protection pursuant to the State Fish and Game Code and with the CDFW pursuant to the provisions of Section 1600 of the State Fish and Game Code as they relate to Lakes and Streambeds. ◢ Where avoidance of jurisdictional waters is not feasible, project sponsors shall minimize fill and the use of in-water construction methods, and place fill only with express permit approval from the appropriate resource agencies (e.g., USACE, RWQCB, CDFW, BCDC, and CCC) and in accordance with applicable existing regulations, such as the Clean Water Act or local stream protection ordinances. ◢ Project sponsors shall arrange for compensatory mitigation in the form of mitigation bank credits; on-site or off-site enhancement of existing waters; or wetland creation in accordance with applicable existing regulations and subject to approval by USACE, RWQCB, CDFW, BCDC, and/or CCC. If compensatory mitigation is required by the implementing agency, the project sponsor shall develop a restoration and monitoring plan that describes how compensatory mitigation will be achieved, implemented, maintained, and monitored. At a minimum, the restoration and monitoring plan shall include clear goals and objectives, success criteria, specifics on restoration/creation/enhancement (e.g., plant palette, soils, irrigation design standards and requirements), specific monitoring periods and reporting guidelines, and a maintenance plan. The following minimum performance standards (or other standards as required by the permitting agencies) shall apply to any wetland compensatory mitigation: ◤ Compensation shall be provided at a minimum 1:1 ratio for restoration, preservation, and creation but shall in all cases be consistent with mitigation ratios set forth in locally applicable plans (e.g., general plans, HCP/NCCPs) or in project-specific permitting documentation. Compensatory mitigation may be a combination of on-site restoration/creation/enhancement or off-site restoration, preservation, or enhancement. Compensatory mitigation may be achieved in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through RAMP, as deemed appropriate by the permitting agencies.		

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		◤ In general, any compensatory mitigation shall be monitored for a minimum of 5 years and will be considered successful when at least 75 percent cover (or other percent cover considered appropriate for the vegetation type) of installed vegetation has become successfully established. ◤ If the restoration is not meeting success criteria, remedial measures shall be implemented and would typically include, but are not limited to, replanting, reseeding, grading adjustments, supplemental irrigation, access control, increased weed control, and extended maintenance and monitoring periods. After final success criteria have been met and relevant permitting agencies have approved the mitigation project as complete, all mitigation areas shall be permanently conserved (e.g., conservation easement) and managed in perpetuity. ◢ Salvage and stockpile topsoil (i.e., the surface material from 6 to 12 inches deep) and perennial native plants, when recommended by the qualified wetland biologist, for use in restoring native vegetation to areas of temporary disturbance within the project area. Salvage of soils containing invasive species, seeds and/or rhizomes shall be avoided as identified by the qualified wetland biologist. ◢ In accordance with CDFW guidelines and other instruments protective of sensitive or special-status natural communities, project sponsors shall avoid and minimize impacts on sensitive natural communities and habitats when designing and permitting projects. Where applicable, projects shall conform to the provisions of special area management or restoration plans, such as the Suisun Marsh Protection Plan and the East Contra Costa County HCP, which outline specific measures to protect sensitive vegetation communities. ◢ If any portion of a sensitive natural community is permanently removed or temporarily disturbed, the project sponsor shall compensate for the loss. If such mitigation is required by the implementing agency, the project sponsor shall develop a restoration and monitoring plan that describes how compensatory mitigation will be achieved, implemented, maintained, and monitored. At a minimum, the restoration and monitoring plan shall include clear goals and objectives, success criteria, specifics on restoration/creation/enhancement (e.g., plant palette, soils, irrigation design standards and requirements), specific monitoring periods and reporting guidelines, and a maintenance plan. The following minimum performance standards (or other standards as		

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		required by the permitting agencies) shall apply to any compensatory mitigation for sensitive natural communities: ◤ Compensation shall be provided at a minimum 1:1 ratio for restoration and preservation but shall in all cases be consistent with mitigation ratios set forth in locally applicable plans (e.g., general plans, HCP/NCCPs) or in project-specific permitting documentation. Compensatory mitigation may be a combination of on-site restoration/creation/enhancement or off-site restoration, preservation, or enhancement. Compensatory mitigation may be achieved in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through RAMP, as deemed appropriate by the permitting agencies. ◤ In general, any compensatory mitigation shall be monitored for a minimum of 5 years and will be considered successful when at least 75 percent cover (or other percent cover considered appropriate for the vegetation type) of installed vegetation has become successfully established. ◤ If the restoration is not meeting success criteria, remedial measures shall be implemented and would typically include, but are not limited to, replanting, reseeding, grading adjustments, supplemental irrigation, access control, increased weed control, and extended maintenance and monitoring periods. After final success criteria have been met and relevant permitting agencies have approved the mitigation project as complete, all mitigation areas shall be permanently conserved (e.g., conservation easement) and managed in perpetuity. ◢ All construction materials, staging, storage, dispensing, fueling, and maintenance activities shall be located in upland areas outside of sensitive habitat, and adequate measures shall be taken to prevent any potential runoff from entering jurisdictional waters. Fueling of equipment shall take place within existing paved roads. Contractor equipment shall be checked for leaks prior to operation and repaired, as necessary. ◢ Construction activities shall be scheduled, to the extent feasible, to avoid sensitive times for biological resources and to avoid the rainy season when erosion and sediment transport is increased. ◢ Compliance with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures protective of wetlands and other waters or sensitive natural communities.		

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Impact BIO-3: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites	PS	**Mitigation Measure BIO-3(a)** Implementing agencies shall require project sponsors to prepare detailed analyses for specific projects affecting ECA lands to determine the wildlife species that may use these areas and the habitats those species require. Projects that would not affect ECA lands but that are located within or adjacent to open space lands, including wildlands and agricultural lands, shall also assess whether significant wildlife corridors are present, what wildlife species may use them, and what habitat those species require. The assessment shall be conducted by qualified professionals and according to applicable agency standards. Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Design projects to minimize impacts on wildlife movement and habitat connectivity and preserve existing and functional wildlife corridors. ◢ Design projects to promote wildlife corridor redundancy by including multiple connections between habitat patches. ◢ Conduct wildlife movement studies for projects that may fragment or constrict regional or local corridors and impede use to nursery sites. These studies will include, but would not be limited to, the following objectives: identify activity levels and directional wildlife movement trends within the study area, assess current functionality of existing underpasses, and determine what species or groups of species exhibit sensitivity to the existing roadways. Movement studies shall identify project-specific measures to avoid or mitigate impacts on corridors and movement to nursery sites that may include, but are not limited to, developing alternative project designs that allow wider movement corridors to remain; provide for buffer zones adjacent to corridors, such as passive recreation zones; implement physical barriers that prevent human and/or domestic predator entry into the corridor or block noise and lighting from development; incorporate shielded and directed lighting in areas near corridors; implement a “natives only” landscaping policy within 200 feet of identified wildlife corridors; incorporate periodic larger habitat patches along a corridor’s length; minimize the number of road crossings of identified wildlife corridors; and replace roadway culverts with bridges to allow for wildlife movement. ◢ For projects that cannot avoid significant impacts on wildlife movement corridors or native wildlife nursery areas, consult with CDFW to determine appropriate measures to minimize	LTS-M	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		direct and indirect impacts and implement measures to mitigate impacts on wildlife corridors or native wildlife nursery sites. ◢ Conduct site-specific analyses of opportunities to preserve or improve habitat linkages with areas on- and off-site. ◢ Analyze habitat linkages and wildlife movement corridors on a broad scale for long linear projects with the possibility of adversely affecting wildlife movement to avoid critical narrow choke points that could reduce function of recognized movement corridor. ◢ Construct wildlife-friendly overpasses and culverts. ◢ Fence major transportation corridors in the vicinity of identified wildlife corridors. ◢ Use wildlife-friendly fences that allow larger wildlife, such as deer, to cross over and smaller wildlife to move under. ◢ For projects that require the placement of stream culverts in a fish spawning stream, follow USACE, NOAA Fisheries, USFWS, and CDFW permit conditions and design requirements to allow fish passage through the culverts. ◢ Limit wildland conversions in identified wildlife corridors. ◢ Retain wildlife-friendly vegetation in and around developments. ◢ Monitor and maintain fencing, under crossings, and/or other crossing structures as needed to ensure corridor permeability and functionality. Development and implementation of a fencing and wildlife crossing structure maintenance plan is recommended to maintain permeability for wildlife across corridors. ◢ Prohibit construction activities within 500 feet of occupied breeding areas for wildlife afforded protection pursuant to Title 14 Section 460 of the California Code of Regulations protecting fur-bearing mammals, during the breeding season. ◢ Comply with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures to protect wildlife corridors. **Mitigation Measure BIO-3(b)** Implementing agencies and/or project sponsors shall implement the following measures, where feasible and necessary based on project- and site-specific considerations: ◢ Implement Mitigation Measures BIO-1(a) and BIO-2.		

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			w/ MM*	w/o MM**
Impact BIO-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, or with provisions of an adopted Habitat Conservation Plan (HCP); Natural Community Conservation Plan (NCCP); or other approved local, regional, or State HCP	LTS	None required.	LTS	LTS
Impact BIO-5: Have the potential to substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species	PS	**Mitigation Measure BIO-5** Implementing agencies and/or project sponsors shall implement the following measures, where feasible and necessary based on project- and site-specific considerations: ◢ Implement Mitigation Measures BIO-1(a), BIO-1(b), BIO-2, and BIO-3(a).	LTS-M	SU
3.6 Climate Change, Greenhouse Gases, and Energy				
Impact GHG-1: Result in a net increase in greenhouse gas emissions, either directly or indirectly, compared to 2015 conditions that may have a significant impact on the environment	PS	**Mitigation Measure GHG-1** Consistent with the recommendations in the 2017 Scoping Plan, the applicable lead agency can and should implement, where necessary and feasible to address site-specific construction climate change impacts, the following measures to avoid or minimize impacts related to construction GHG emissions: ◢ Project proponents shall require its contractors to restrict the idling of on- and off-road diesel equipment to no more than 5 minutes while the equipment is on-site. ◢ Project proponents of new facilities shall implement waste, disposal, and recycling strategies (i.e., 10 percent recycled content for Tier 1 and 15 percent recycled content for Tier 2) in accordance with the voluntary measures for non-residential land uses contained in Section A5.405 of the 2016 CALGreen Code or in accordance with any update to these requirements in future iterations of the CALGreen Code in place at the time of project construction. ◢ Project proponents of new facilities shall achieve or exceed the enhanced Tier 2 target for nonresidential land uses of recycling or reusing 80 percent of the construction waste as described in Section A5.408 of the 2016 CALGreen Code or in accordance with any update to these requirements in future iterations of the CALGreen Code in place at the time of project construction. ◢ Project proponents shall require all diesel-powered, off-road construction equipment meet EPA's Tier 3 or Tier 4 emissions standards as defined in 40 CFR 1039 and comply with the exhaust emission test procedures and provisions of 40 CFR Parts 1065 and 1068. This	SU	SU

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		measure can also be achieved by using battery-electric off-road equipment as it becomes available. ◢ Project proponents shall implement a program that incentivizes construction workers to carpool, and/or use public transit or electric vehicles to commute to and from the project site.		
Impact GHG-2: Conflict with the Bay Area region's achievement of the GHG emissions reduction target of 19 percent below 2005 emissions by 2035 established by CARB pursuant to SB 375	LTS	None required.	LTS	LTS
Impact GHG-3: Conflict with an applicable state plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases	PS	Implement Mitigation Measures TRA-2a and TRA-2b **Mitigation Measure GHG-3** Consistent with the recommendations in the 2017 Scoping Plan, implementing agencies and/or project sponsors shall implement the following, where feasible and necessary based on project- and site-specific considerations: ◢ CAP support programs: MTC and ABAG, in partnership with the BAAQMD, shall provide technical assistance to the counties and cities in the Bay Area to adopt qualified GHG reduction plans (e.g., CAPs). The CAPs can be regional or adopted by individual jurisdictions, so long as they meet the standards of a GHG reduction program as described in CEQA Guidelines Section 15183.5. At the regional level, the cumulative emissions reduction of individual CAPs within the region or a regional CAP should demonstrate an additional Bay Area-wide reduction of 33 $MMTCO_2e$ from land uses and on-road transportation compared with projected 2050 emissions levels already expected to be achieved by the Plan. (This is based on the 2015 Bay Area land use and on-road transportation emissions of 37 $MMTCO_2e$, the statewide GHG reduction target of 80 percent below 1990 levels by 2050, and a two percent increase in statewide emissions between 1990 and 2015). However, MTC and ABAG do not have jurisdiction over the adoption of CAPs by individual jurisdictions. ◢ Energy reduction incentive programs: These reductions can be achieved through a combination of programs supported by BayREN, which focus on energy reduction by homeowners, multifamily property owners, and businesses through energy retrofits of existing buildings. BayREN also supports other programs that help local jurisdictions reduce building energy use through improved design and construction standards, such as updated Title 24 energy standards, and including ZNE in new construction. These	SU	SU

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		programs and other measures supported by MTC and ABAG may be included so long as the additional 33 $MMTCO_2e$ reduction (by 2050) can be demonstrated. However, MTC and ABAG cannot require engagement in these programs. This target can be adjusted depending on the progress of statewide legislation or regulations in reducing statewide GHG emissions, so long as a trajectory to achieve this target in the Bay Area is maintained. While many local jurisdictions in the region have released CAPs, the additional implementation of CAPs in the region would continue to help to reduce GHG emissions from the land use projects that would be constructed under the Plan, as well as reducing GHG emissions from existing uses. Energy reduction incentive programs, such as those supported by BayRen, would help with reduce GHG emissions from energy usage in existing and new structures in the region.		
Impact GHG-4: Conflict with an applicable local plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases	LTS	None required.	LTS	LTS
Impact EN-1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation	LTS	None required.	LTS	LTS
Impact EN-2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	LTS	None required.	LTS	LTS
3.7 Cultural Resources and Tribal Cultural Resources				
Impact CUL/TCR-1: Cause a substantial adverse change in the significance of a historical resource as defined in Guidelines Section 15064.5	PS	**Mitigation Measure CUL/TCR-1** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Require a survey and evaluation of structures greater than 45 years in age within the area of potential effect to determine their eligibility for recognition under federal, State, or local historic preservationcriteria. The evaluation shall be prepared by an architectural historian or historical architect meeting the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation Professional Qualification Standards (SOI PQS). The evaluation shall comply with CEQA Guidelines Section 15064.5(b) and, if federal funding or	SU	SU

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		permits are required, with Section 106 of the National Historic Preservation Act of 1966 (16 U.S. Code Section 470 et seq.). Study recommendations shall be implemented. ◢ Realign or redesign projects to avoid impacts on known historical resources where possible. ◢ If avoidance of a significant historical resource is not feasible, implement additional mitigation options that include specific design plans for historic districts or plans for alteration or adaptive reuse of a historical resource that follows the Secretary of the Interior's *Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.* The application of the standards shall be overseen by an architectural historian or historic architect meeting the SOI PQS. Prior to any construction activities that may affect the historical resource, a report meeting industry standards shall identify and specify the treatment of character-defining features and construction activities and be provided to the lead agency for review and approval. ◢ If a project would result in the demolition or significant alteration of a historical resource, the resource shall be recorded prior to demolition or alteration. Recordation shall take the form of Historic American Buildings Survey (HABS), Historic American Engineering Record (HAER), or Historic American Landscape Survey (HALS) documentation and shall be performed by an architectural historian or historian who meets the SOI PQS. The documentation package shall be archived in appropriate public and secure repositories. The specific scope and details of documentation shall be developed at the project level in coordination with the lead agency. ◢ Comply with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect historical resources.		
Impact CUL/TCR-2: Cause a substantial adverse change in the significance of a unique archaeological resource as defined in Guidelines Section 15064.5	PS	**Mitigation Measure CUL/TCR-2** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Before construction activities, project sponsors shall retain a qualified archaeologist to conduct a record search at the appropriate information center to determine whether the project area has been previously surveyed and whether resources were identified; the record search shall include contacting the NAHC to request a Sacred Lands File search and a list of relevant Native American contacts who may have additional information. If a survey	SU	SU

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		of the project area has not been conducted in the last 5 years, project sponsors shall retain a qualified archaeologist to conduct archaeological surveys prior to constructionactivities. Project sponsors shall follow recommendations identified in the survey, which may include activities such as subsurface testing, designing and implementing a Worker Environmental Awareness Program, construction monitoring by a qualified archaeologist, avoidance of sites, or preservation in place. ◢ Areas determined to be of cultural significance shall be monitored during the grading, excavation, trenching, and removal of existing features by a qualified archeologist and culturally affiliated California Native American tribal monitor. ◢ To ensure that new transportation facilities, such as the Transbay rail crossing, do not adversely affect potentially buried archaeological deposits, an underwater archaeological survey shall be conducted to identify, evaluate, and protect significant submerged cultural resources prior to activities that would disturb the shoreline or the floor of the bay. Additionally, the archaeologist shall request a search of California State Lands Commission's Shipwreck Database. ◢ When a project would impact a known archaeological site, the project sponsor and/or implementing agency shall determine whether the site is a historical resource (CEQA Guidelines Section 15064.5(c)(1)). If archaeological resources identified in the project area are considered potentially significant, the project sponsor and/or responsible implementing agency shall undertake additional studies overseen by a qualified archaeologist (36 CFR Section 61) to evaluate the resources eligibility for listing in the CRHR, NRHP, or local register and to recommend further mitigative treatment. Evaluations shall be based on, but not limited to, surface remains, subsurface testing, or archival and ethnographic resources, on the framework of the historic context and important research questions of the project area, and on the integrity of the resource. If a site to be tested is prehistoric, culturally affiliated California Native American tribal representatives shall be afforded the opportunity to monitor the ground-disturbing activities. Appropriate mitigation may include curation of artifacts removed during subsurface testing. ◢ If prehistoric archeological resources are identified through survey or discovered in the project area, the culturally affiliated California Native American tribe shall be notified. Both the archeologist and tribal monitor or tribal representative should strive for agreement on the determined significance of an artifact or cultural resource.		

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		◢ If significant archaeological resources that meet the definition of historical or unique archaeological resources are identified in the project area, the preferred mitigation of impacts is preservation in place (CEQA Guidelines Section 15126.4(b); PRC Section 21083.2). Preservation in place may be accomplished by, but is not limited to, avoidance by project design, incorporation within parks, open space or conservation easements, covering with a layer of sterile soil, or similar measures. If preservation in place is feasible, mitigation is complete. Additionally, where the implementing agency determines that an alternative mitigation method is superior to in-place preservation, the project sponsor and/or implementing agency may implement such alternative measures. ◢ When preservation in place or avoidance of historical or unique archaeological resources are infeasible, data recovery through excavation shall be required (CEQA Guidelines Section 15126.4(b)). Data recovery would consist of approval of a Data Recovery Plan and archaeological excavation of an adequate sample of site contents so that research questions applicable to the site can be addressed. For prehistoric sites, the culturally affiliated California Native American tribe shall be afforded the opportunity to monitor the ground-disturbing activities. If only part of a site would be impacted by a project, data recovery shall only be necessary for that portion of the site. Data recovery shall not be required if the implementing agency determines prior testing and studies have adequately recovered the scientifically consequential information from the resources. Confidential studies and reports resulting from the data recovery shall be deposited with the Northwest Information Center. Mitigation may include curation for artifacts removed during data recovery excavation. ◢ If archaeological resources are discovered during construction, all work near the find shall be halted and the project sponsor and/or implementing agency shall follow the steps described under CEQA Guidelines Section 15064.5(f), including an immediate evaluation of the find by a qualified archaeologist (36 CFR Section 61) and implementation of avoidance measures or appropriate mitigation if the find is determined to be a historical resource or unique archaeological resource. If the find is a prehistoric archaeological site, the culturally affiliated California Native American tribe shall be notified and afforded the opportunity to monitor mitigative treatment. During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project area.		

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		◢ Integrate curation of all historical resources or a unique archaeological resources and associated records in a regional center focused on the care, management, and use of archaeological collections. All Native American human remains and associated grave goods discovered shall be returned to their Most Likely Descendent and repatriated. The final disposition of artifacts not directly associated with Native American graves will be negotiated during consultation with the culturally affiliated California Native American tribes. Artifacts include material recovered from all phases of work, including the initial survey, testing, indexing, data recovery, and monitoring. Curated materials shall be maintained with respect for cultures and available to future generations for research. ◢ Project sponsors shall comply with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect archaeologicalresources.		
Impact CUL/TCR-3: Disturb any human remains, including those interred outside of formal cemeteries	LTS	None required.	LTS	LTS
Impact CUL/TCR-4: Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe	PS	**Mitigation Measure CUL/TCR-4(a)** If the implementing agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process required under PRC Section 21080.3.2, implementing agencies and/or project sponsors shall implement the following measures, where feasible and necessary, to address site-specific impacts and avoid or minimize the significant adverse impacts: ◢ Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource (PRC Section 21084.3[a]). If the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process, provisions in the PRC describe mitigation measures that, if determined by the lead agency to be feasible, may avoid or minimize the significant adverse impacts (PRC Section 21084.3[b]). Examples include: ◤ avoiding and preserving the resources in place, including planning and constructing to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space to incorporate the resources with culturally appropriate protection and management criteria; ◤ treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including: ▪ protecting the cultural character and integrity of the resource,	SU	SU

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		▪ protecting the traditional use of the resource, and ▪ protecting the confidentiality of the resource; ◤ establishing permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or using the resources or places; and ◤ protecting the resource. ◢ The implementing agency shall determine whether or not implementation of a project would indirectly affect tribal cultural resources by increasing public visibility and ease of access. If it would, the implementing agency shall take measures to reduce the visibility or accessibility of the tribal cultural resource to the public. Visibility of the resource can be reduced through the use of decorative walls or vegetation screening. Accessibility can be reduced by installing fencing or vegetation barriers, particularly noxious vegetation, such as poison oak or blackberry bushes. It is important to avoid creating an attractive nuisance when protecting tribal cultural resources. Conspicuous walls or signs indicating that an area is restricted may result in more attempts to access the excluded area. **Mitigation Measure CUL/TCR-4(b)** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Implement Mitigation Measure CUL/TCR-2.		
3.8 Geology, Seismicity and Mineral Resources				
Impact GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault	LTS	None required	LTS	LTS
Impact GEO-2: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking	LTS	None required	LTS	LTS
Impact GEO-3: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or	LTS	None required	LTS	LTS

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death involving seismic-related ground failure, including liquefaction, lateral spreading, and subsidence				
Impact GEO-4: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides	LTS	None required	LTS	LTS
Impact GEO-5: Result in substantial soil erosion or the loss of topsoil	LTS	None required	LTS	LTS
Impact GEO-6: Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property	LTS	None required	LTS	LTS
Impact GEO-7: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	PS	**Mitigation Measure GEO-7** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Ensure compliance with the Paleontological Resources Preservation Act, the Federal Land Policy and Management Act, the Antiquities Act, Section 5097.5 of the PRC, adopted county and city general plans, and other federal, State, and local regulations, as applicable and feasible, by adhering to and incorporating the performance standards and practices for the assessment and mitigation of adverse impacts on paleontological resources. ◢ Obtain review by a qualified paleontologist to determine whether the project has the potential to require ground disturbance of parent material with potential to contain unique paleontological resources or to require the substantial alteration of a unique geologic feature. The assessment should include museum records searches, a review of geologic mapping and the scientific literature, geotechnical studies (if available), and potentially a pedestrian survey if units with paleontological potential are present at the surface. ◢ Avoid exposure or displacement of parent material with potential to yield unique paleontological resources. ◢ Implement the following measures where avoidance of parent material with the potential to yield unique paleontological resources is not feasible: ◤ All on-site construction personnel shall receive Worker Education and Awareness Program training before the commencement of excavation work to understand the regulatory framework that provides for protection of paleontological resources and	LTS-M	SU

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		become familiar with diagnostic characteristics of the materials with the potential to be encountered. ◤ A qualified paleontologist shall prepare a paleontological resource management plan (PRMP) to guide the salvage, documentation, and repository of unique paleontological resources encountered during construction. If unique paleontological resources are encountered during construction, qualified paleontologist shall oversee the implementation of the PRMP. ◤ Ground-disturbing activities in parent material with a moderate to high potential to yield unique paleontological resources shall be monitored using a qualified paleontological monitor to determine whether unique paleontological resources are encountered during such activities, consistent with the specified or comparable protocols. ◢ Identify where ground disturbance is proposed in a geologic unit having the potential to contain fossils, and specify the need for a paleontological monitor to be present during ground disturbance in these areas. ◢ Avoid routes and project designs that would permanently alter unique geological features. ◢ Salvage and document adversely affected resources sufficient to support ongoing scientific research and education. ◢ If paleontological resources are discovered during earthmoving activities, the construction crew will be directed to immediately cease work and notify the implementing agencies and/or project sponsors. The project sponsor will retain a qualified paleontologist for identification and salvage of fossils so that construction delays can be minimized. The paleontologist will be responsible for implementing a recovery plan which could include the following: ◤ in the event of discovery, salvage of unearthed fossil remains, typically involving simple excavation of the exposed specimen but possibly also plaster-jacketing of large and/or fragile specimens, or more elaborate quarry excavations of richly fossiliferous deposits; ◤ recovery of stratigraphic and geologic data to provide a context for the recovered fossil remains, typically including description of lithologies of fossil-bearing strata,		

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		measurement and description of the overall stratigraphic section, and photographic documentation of the geologic setting; ◤ laboratory preparation (cleaning and repair) of collected fossil remains to a point of curation, generally involving removal of enclosing rock material, stabilization of fragile specimens (using glues and other hardeners), and repair of broken specimens; ◤ cataloging and identification of prepared fossil remains, typically involving scientific identification of specimens, inventory of specimens, assignment of catalog numbers, and entry of data into an inventory database; ◤ transferal, for storage, of cataloged fossil remains to an appropriate repository, with consent of property owner; ◤ preparation of a final report summarizing the field and laboratory methods used, the stratigraphic units inspected, the types of fossils recovered, and the significance of the curated collection; and ◤ project sponsors shall comply with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect paleontological or geologic resources. ◢ Prepare significant recovered fossils to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated paleontological curation facility. ◤ Following the conclusion of the paleontological monitoring, ensure that the qualified paleontologist prepares a report stating that the paleontological monitoring requirement has been fulfilled and summarizes the results of any paleontological finds. The report should be submitted to the CEQA lead agency and to the repository curating the collected artifacts and should document the methods and results of all work completed under the PRMP, including the treatment of paleontological materials; results of specimen processing, analysis, and research; and final curation arrangements.		
Impact MR-1: Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or a locally-important mineral resources recovery site delineated on a local land use plan	LTS	None required	LTS	LTS

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			w/ MM*	w/o MM**
3.9 Hazards and Wildfire				
Impact HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials	LTS	None required	LTS	LTS
Impact HAZ-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment	LTS	None required	LTS	LTS
Impact HAZ-3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school	LTS	None required	LTS	LTS
Impact HAZ-4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment	PS	**Mitigation Measure HAZ-4** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ The project proponent shall perform a records review to determine whether there is existing permitted use of hazardous materials or documented evidence of hazardous waste contamination on the project site and provide the results of this investigation to the implementing agency. ◢ For any project located on or near a hazardous materials and/or waste site pursuant to Government Code Section 65962.5 or sites that have the potential for residual hazardous materials as a result of historic land uses, project proponents shall prepare a Phase I ESA in accordance with the American Society for Testing and Materials' E-1527-05 standard. ◢ For any project located on or near sites that are not listed and do not have the potential for residual hazardous materials as a result of historic land uses, no action is required unless unknown hazards are discovered during development. In that case, the implementing agency shall discontinue development until DTSC, RWQCB, the local air district, and/or other responsible agency issues a determination, which would likely require a Phase I ESA as part of the assessment. ◢ Develop, train, and implement worker awareness and protective measures to minimize worker and public exposure to an acceptable level and to prevent environmental contamination as a result of construction.	LTS-M	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		◢ Projects preparing a Phase I ESA, where required, shall fully implement the recommendations contained in the report. If a Phase I ESA indicates the presence or likely presence of contamination, the project proponent shall prepare a Phase II ESA, and recommendations of the Phase II ESA shall be fully implemented. ◢ Consult with the appropriate local, state, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps.		
Impact HAZ-5: Result in a safety hazard for people residing or working in the planning area for projects located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport	LTS	None required	LTS	LTS
Impact HAZ-6: Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan	PS	**Mitigation Measure HAZ-6** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Continue to participate in the San Francisco Bay Area Regional Transportation Emergency Management (RTEMP), review the plan annually, and update as appropriate. ◢ Develop new methods of conveying projected and real time evacuation information to citizens using emerging electronic communication tools including social media and cellular networks. ◢ Adopt and/or revise, as appropriate, local emergency response and evacuation plans that address growth and potential for congestion on evacuation routes. Include contingencies for lower private automobile ownership and reliance on public transit for evacuation, consistent with the RTEMP. ◢ Require specific projects to demonstrate consistency with all applicable emergency response and evacuation plans. Where temporary road closures would be required during construction, prepare traffic mitigation plans that address traffic control and establish alternate emergency response and evacuation routes in coordination with emergency service providers.	LTS-M	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
Impact HAZ-7: Exacerbate the risk of wildland fires, associated pollutant release, and potential for flooding and landslides due to projected land use patterns and infrastructure in or near State Responsibility Areas or land classified as very high hazard severity zones	PS	**Mitigation Measure HAZ-7** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Restrict development of areas mapped by CAL FIRE as high and very high fire hazard zones. ◢ Improve and educate residents and businesses regarding local emergency communications and notifications. ◢ Enforce defensible space regulations to keep overgrown and unmanaged vegetation, accumulations of trash and other flammable material away from structures. ◢ Provide public education about wildfire risk and fire prevention measures, and safety procedures and practices to allow for safe evacuation and/or options to shelter-in-place. ◢ Plan for and promote rapid revegetation of burned areas to help prevent erosion and protect bare soils. ◢ Develop a regulatory mechanism for permitting an aggressive hazardous fuels management program. ◢ Establish standards for fuel breaks that can slow or stop a wildfire advancing into a community or into the wildlands. Fuel breaks shall be strategically located to protect a community, structures, or routes of access and egress. Strategic locations may include ridgelines, greenbelts, or other locations to manage embers or support community-level fire suppression tactics. ◢ MTC shall facilitate minimizing future impacts to fire protection services through information sharing regarding fire-wise land management (vegetation data, fire-resistant building materials, locations where development is vulnerable to wildfire, and best practices for safe land management) with county and city planning departments. ◢ MTC, in partnership with technical experts and stakeholders, shall launch or continue existing initiatives to help local cities and counties to protect Bay Area communities and economies from the disruption of wildfire occurrences. Initiatives could include but not be limited to seminars that review the risk of wildfire and approaches for preparation, including strengthening of infrastructure, emergency services, emergency evacuation plans and reviewing building safety codes.	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
3.10 Hydrology and Water Quality				
Impact HYDRO-1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality	LTS	None required	LTS	LTS
Impact HYDRO-2: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin	LTS	None required	LTS	LTS
Impact HYDRO-3: Substantially alter existing drainage patterns, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion, siltation, or additional sources of polluted runoff	LTS	None required	LTS	LTS
Impact HYDRO-4: Substantially alter existing drainage patterns, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in runoff that exceeds capacity of existing or planned stormwater drainage systems or results in flooding on- or off-site	LTS	None required	LTS	LTS
Impact HYDRO-5: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows	LTS	None required	LTS	LTS
Impact HYDRO-6: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation	LTS	None required	LTS	LTS
3.11 Land Use, Population, and Housing				
Impact LU-1: Physically divide an established community	PS	**Mitigation Measure LU-1** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		◢ Incorporate design features such as sidewalks, bike lanes, and bike/pedestrian bridges or tunnels that maintain or improve access and connections within existing communities and to public transit through regional programs, such as OBAG. ◢ Encourage implementing agencies to orient transportation projects to minimize impacts on existing communities by: ◤ selecting alignments within or adjacent to existing public rights-of-way; ◤ designing sections above or below grade to maintain viable vehicular, cycling, and pedestrian connections between portions of communities where existing connections are disrupted by the transportation project; and ◤ wherever feasible incorporating direct crossings, overcrossings, or undercrossings at regular intervals for multiple modes of travel (e.g., pedestrians, bicyclists, vehicles). Where it has been determined that it is infeasible to avoid creating a barrier in an established community, encourage implementing agencies to consider other measures to reduce impacts, including but not limited to: ◢ shifting alignments to minimize the area affected; ◢ reducing the proposed right-of-way take to minimize the overall area of impact; and ◢ providing for bicycle, pedestrian, and vehicle access across improved roadways.		
Impact LU-2: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect	PS	**Mitigation Measure LU-2** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ MTC shall continue to provide targeted technical services, such as GIS and data support for cities and counties to update their general plans at least every 10 years, as recommended by the Governor's Office of Planning and Research. ◢ MTC shall provide technical assistance and regional leadership to encourage implementation of the Plan goals and strategies that integrate growth and land use planning with the existing and planned transportation network.	SU	SU
Impact LU-3: Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)	LTS	None required	LTS	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
Impact LU-4: Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere	PS	**Mitigation Measure LU-4** Implementing agencies and/or project sponsors shall implement, where feasible and necessary based on project- and site-specific considerations, the mitigation measures described throughout this EIR to address the effects of displacement that could result in the construction of replacement housing, including ◢ Mitigation Measures AES-1 through AES-4 ◢ Mitigation Measures AGF-1 through AGF-3 ◢ Mitigation Measures AQ-2 through AQ-4 ◢ Mitigation Measures BIO-1 through BIO-3 and BIO-5 ◢ Mitigation Measures GHG-1 and GHG-3 ◢ Mitigation Measures CUL/TCR-1, CUL/TCR-2, and CUL/TCR-4 ◢ Mitigation Measure GEO-7 ◢ Mitigation Measures HAZ-4, HAZ-6 and HAZ-7 ◢ Mitigation Measures LU-1 and LU-2 ◢ Mitigation Measures NOISE-1 through Noise-4 ◢ Mitigation Measures PSR-1 and PSR-2 ◢ Mitigation Measures PUF-1 through PUF-4 ◢ Mitigation Measure TRA-2	SU	SU
3.12 Noise				
Impact NOISE-1: Generate a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies	PS	**Mitigation Measure NOISE-1** To reduce construction noise levels to achieve the applicable noise standards of the relevant jurisdiction within the Plan Area, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Comply with local construction-related noise standards, including restricting construction activities to permitted hours as defined under local jurisdiction regulations (e.g., Alameda County Code restricts construction noise to between 7:00 am and 7:00 pm on weekdays and between 8:00 am and 5:00 pm on weekends). ◢ Notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance. ◢ Designate an on-site construction complaint and enforcement manager for the project.	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
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		◢ Post procedures and phone numbers at the construction site for notifying the implementing agency staff, local Police Department, and construction contractor (during regular construction hours and off-hours), along with permitted construction days and hours, complaint procedures, and who to notify in the event of a problem. ◢ Properly maintain construction equipment and outfit construction equipment with the best available noise suppression devices (e.g., mufflers, silencers,wraps). ◢ Prohibit idling of construction equipment for extended periods of time in the vicinity of sensitive receptors. ◢ Locate stationary equipment, such as generators, compressors, rock crushers, and cement mixers, a minimum of 50 feet from sensitive receptors, but further if possible. ◢ Use hydraulically or electrically powered tools (e.g., jack hammers, pavement breakers, and rock drills) for project construction to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust should be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves should be used, if such jackets are commercially available, and this could achieve a further reduction of 5 dBA. Quieter procedures should be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures. ◢ Erect temporary construction-noise barriers around the construction site when adjacent occupied sensitive land uses are present within 75 feet. ◢ Use noise control blankets on building structures as buildings are erected to reduce noise emission from the site.		
Impact NOISE-2: Generate a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies	PS	**Mitigation Measure NOISE-2(a)** To reduce exposure from traffic noise when significant to achieve the applicable noise thresholds for each roadway type (i.e., 70 dBA CNEL for major roads/freeway, 65 dBA CNEL for all other roads), implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Design adjustments to proposed roadway or transit alignments to reduce noise levels in noise-sensitive areas (e.g., below-grade roadway alignments can effectively reduce noise levels in nearby areas by providing a barrier between the source and receptor).	LTS-M	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
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		◢ Use techniques such as landscaped berms, dense plantings, reduced-noise paving materials, and traffic-calming measures in the design of transportation improvements. ◢ Use rubberized asphalt or "quiet pavement" to reduce road noise for new roadway segments, roadways in which widening or other modifications require re-pavement, or normal reconstruction of roadways where re-pavement is planned. ◢ Maximize the distance between existing noise-sensitive land uses and new noise-generating facilities and transportation systems. ◢ Contribute to the insulation of buildings or construction of noise barriers around sensitive receptor properties adjacent to the transportation improvement. ◢ Use land use planning measures, such as zoning, restrictions on development, site design, and buffers to ensure that future development is noise compatible with adjacent transportation facilities and land uses. ◢ Monitor the effectiveness of noise reduction measures by taking noise measurements and installing adaptive mitigation measures to achieve the standards for ambient noise levels established by the noise element of the general plan or noise ordinance. **Mitigation Measure NOISE-2(b)** To reduce the exposure of existing sensitive receptors to non-transportation noise associated with projected development and achieve a noise reduction below 70 dBA CNEL or local applicable noise standard, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Local agencies approving land use projects shall require that routine testing and preventive maintenance of emergency electrical generators be conducted during the less sensitive daytime hours (per the applicable local municipal code). Electrical generators or other mechanical equipment shall be equipped with noise control (e.g., muffler) devices in accordance with manufacturers' specifications. ◢ Local agencies approving land use projects shall require that external mechanical equipment, including HVAC units, associated with buildings and other stationary sources (e.g., commercial loading docks) incorporate features designed to reduce noise to below 70 dBA CNEL or the local applicable noise standard. These features may include locating equipment or activity areas within equipment rooms or enclosures that incorporate noise reduction features, such as acoustical louvers, and exhaust and intake silencers. Enclosures shall be oriented so that major openings (i.e., intake louvers, exhaust) are		

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		directed away from nearby noise-sensitive receptors. Site design considerations shall also incorporate appropriate setback distances, to the extent practical, from the noise and existing sensitive receptors to minimize noise exposure. **Mitigation Measure NOISE-2(c)** To reduce transit-related noise exposure to existing receptors within 50 feet of a rail transit line to below 70 dBA, or other applicable standard, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ When finalizing development project site plans or transportation project design, sufficient setback between occupied structures and the railroad tracks shall be provided to minimize noise exposure to the extent feasible. ◢ When finalizing development project site plans, noise-sensitive outdoor use areas shall be sited as far away from adjacent noise sources as possible and site plans shall be designed to shield noise-sensitive spaces with buildings or noise barriers whenever possible. ◢ Prior to project approval, the implementing agency for a transportation project shall ensure that the transportation project sponsor applies the following mitigation measures (or other technologically feasible measures) to achieve a site-specific exterior noise level of 70 dBA CNEL (or other applicable local noise standard) and interior noise level of 45 dBA CNEL at sensitive land uses, as applicable for transit projects: ◤ use sound reduction barriers, such as landscaped berms and dense plantings; ◤ locate rail extension below grade as feasible; ◤ use damped wheels on railway cars; ◤ use vehicle skirts; ◤ use undercar acoustically absorptive material; and ◤ install sound insulation treatments for affected structures.		
Impact NOISE-3: Generate excessive groundborne vibration or groundborne noise levels	PS	**Mitigation Measure NOISE-3(a)** To reduce construction vibration levels to acceptable levels (i.e., 65 VdB to 80 VdB depending on frequency of event and 0.1 to 0.6 PPV in/sec depending on building type), implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ To minimize disturbance of receptors within 550 feet of pile-driving activities, implement "quiet" pile-driving technology (such as predrilling of piles and the use of more than one	LTS-M	SU

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		pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions. ◢ To reduce structural damage, where pile driving is proposed within 50 feet of an older or historic building, engage a qualified geotechnical engineer and qualified historic preservation professional (for designated historic buildings only) and/or structural engineer to conduct a preconstruction assessment of existing subsurface conditions and the structural integrity of nearby (i.e., within 50 feet) historic structures that would be exposed to pile-driving activity. If recommended by the preconstruction assessment, for structures or facilities within 50 feet of pile-driving activities, the project sponsors shall require ground vibration monitoring of nearby historic structures. Such methods and technologies shall be based on the specific conditions at the construction site. Conditions will be determined through activities such as the preconstruction surveying of potentially affected historic structures and underpinning of foundations of potentially affected structures, as necessary. The preconstruction assessment shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of pile-driving activities and identify corrective measures to be taken should monitored vibration levels indicate the potential for building damage. In the event of unacceptable ground movement with the potential to cause structural damage, all impact work shall cease, and corrective measures shall be implemented to minimize the risk to the subject, or adjacent, historic structure. Use cushion blocks to dampen impact noise from pile driving. **Mitigation Measure NOISE-3(b)** To reduce vibration effects from rail operations, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Ensure that project sponsors apply the following mitigation measures to achieve FTA-recommended vibration levels of 72 VdB at residential land uses, or other applicable standard, for rail extension projects: ◢ Use high-resilience (soft) direct fixation fasteners for embedded track. ◢ Install ballast mat, or other approved technology for the purpose of reducing vibration, for ballast and tietrack.		

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			w/ MM*	w/o MM**
		◢ Conduct regular rail maintenance, including rail grinding and wheel truing to recontour wheels, to provide smooth running surfaces.		
Impact NOISE-4: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels	PS	**Mitigation Measure NOISE-4** Local lead agencies for all new development proposed to be located within an existing airport influence zone, as defined by the locally adopted airport land use compatibility plan or local general plan, shall require a site-specific noise compatibility study. The study shall consider and evaluate existing aircraft noise, based on specific aircraft activity data for the airport in question, and shall include recommendations for site design and building construction to ensure compliance with interior noise levels of 45 dBA CNEL, such that the potential for sleep disturbance is minimized.	LTS-M	SU
3.13 Public Services and Recreation				
Impact PSR-1: Result in substantial adverse physical impacts associated with the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, and other public facilities	PS	**Mitigation Measure PSR-1(a)** Implementing agencies and/or project sponsors shall implement the following measure, where feasible and necessary based on project- and site-specific considerations: ◢ Prior to approval of new development projects, local agencies shall ensure that adequate public services, and related infrastructure and utilities, will be available to meet or satisfy levels identified in the applicable local general plan or service master plan, through compliance with existing local policies related to minimum levels of service for schools, police protection, fire protection, medical emergency services, and other government services (e.g., libraries, prisons, social services). Compliance may include requiring projects to either provide the additional services required to meet service levels or pay fees toward the project's fair share portion of the required services pursuant to adopted fee programs and State law. **Mitigation Measure PSR-1(b)** Implementing agencies and/or project sponsors shall implement the following measure, where feasible and necessary based on project- and site-specific considerations: ◢ For projects that could increase demand for public services facilities, implementing agencies and/or project sponsors shall coordinate with relevant service providers to ensure that the existing public services could accommodate the increase in demand. If existing facilities are found to be inadequate to maintain adequate capital capacity, equipment, personnel, and/or response times, facility improvements for the appropriate public service shall be identified in each project's CEQA documentation. Implementing agencies and/or project sponsors shall implement, where feasible and necessary, the	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		mitigation measures described throughout this EIR to address the environmental effects related to the construction of new or expanded public service facilities: ◤ Mitigation Measures AES-1 through AES-4 ◤ Mitigation Measures AGF-1 through AGF-3 ◤ Mitigation Measures AQ-2 through AQ-4 ◤ Mitigation Measures BIO-1 through BIO-3 and BIO-5 ◤ Mitigation Measures GHG-1 and GHG-3 ◤ Mitigation Measures CUL/TCR-1, CUL/TCR-2, and CUL/TCR-4 ◤ Mitigation Measure GEO-7 ◤ Mitigation Measures HAZ-4, HAZ-6 and HAZ-7 ◤ Mitigation Measures LU-1, LU-2, and LU-4 ◤ Mitigation Measures NOISE-1 through Noise-4 ◤ Mitigation Measures PSR-2 ◤ Mitigation Measures PUF-1 through PUF-4 ◤ Mitigation Measure TRA-2		
Impact PSR-2: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities the construction or relocation of which could cause significant environmental effects	PS	**Mitigation Measure PSR-2** Implementing agencies and/or project sponsors shall implement, where feasible and necessary, the mitigation measures described throughout this EIR to address the environmental effects related to the construction of new or expanded recreational facilities: ◢ Mitigation Measures AES-1 through AES-4 ◢ Mitigation Measures AGF-1 through AGF-3 ◢ Mitigation Measures AQ-2 through AQ-4 ◢ Mitigation Measures BIO-1 through BIO-3 and BIO-5 ◢ Mitigation Measures GHG-1 and GHG-3 ◢ Mitigation Measures CUL/TCR-1, CUL/TCR-2, and CUL/TCR-4 ◢ Mitigation Measure GEO-7 ◢ Mitigation Measures HAZ-4, HAZ-6 and HAZ-7 ◢ Mitigation Measures LU-1, LU-2, and LU-4 ◢ Mitigation Measures NOISE-1 through Noise-4	SU	SU

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		◢ Mitigation Measures PSR-1 ◢ Mitigation Measures PUF-1 through PUF-4 ◢ Mitigation Measure TRA-2		
3.14 Public Utilities and Facilities				
Impact PUF-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities the construction or relocation of which could cause significant environmental effects	PS	**Mitigation Measure PUF-1(a)** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ For projects that could increase demand on water and wastewater treatment facilities, coordinate with the relevant service provider to ensure that the existing public services and utilities could accommodate the increase in demand. If the current infrastructure servicing the project site is found to be inadequate, infrastructure improvements for the appropriate public service or utility shall be identified in each project's CEQA documentation. The relevant public service provider or utility shall be responsible for undertaking project-level review as necessary to provide CEQA clearance for new facilities. **Mitigation Measure PUF-1(b)** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ During the design and CEQA review of individual future projects, determine whether sufficient stormwater drainage facilities exist for a proposed project. These CEQA determinations must ensure that the proposed development can be served by its existing or planned drainage capacity. If adequate stormwater drainage facilities do not exist, project sponsors shall coordinate with the appropriate utility and service provider to ensure that adequate facilities could accommodate the increased demand, and if not, infrastructure and facility improvements shall be identified in each project's CEQA determination. The relevant public service provider or utility shall be responsible for undertaking project-level review as necessary to provide CEQA clearance for new facilities. ◢ For projects of greater than 1 acre in size, reduce stormwater runoff caused by construction by implementing stormwater control best practices, based on those required for a SWPPP. ◢ Model and implement a stormwater management plan or site design that prevents the post-development peak discharge rate and quantity from exceeding pre-development rates.	SU	SU

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LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable PSU = Potentially significant and unavoidable

Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		Mitigation Measure PUF-1(c) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ For transportation projects, incorporate stormwater control, retention, and infiltration features, such as detention basins, bioswales, vegetated median strips, and permeable paving, early into the design process to ensure that adequate acreage and elevation contours are planned. **Mitigation Measure PUF-1(d)** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ For transportation projects implemented by Caltrans or subject to Caltrans review, adhere to Caltrans' Stormwater Management Plan, which includes best practices to reduce the volume of stormwater runoff and pollutants in the design, construction, and maintenance of highway facilities. **Mitigation Measure PUF-1(e)** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ Consider the use of onsite electric generation and storage systems that produce all or a portion of the energy used by a land use, sea level rise adaptation, or transportation project. Further, Mitigation Measures PUF-2(a), PUF-2(b), and PUF-2(c), summarized under Impact PUF-2, and PUF-3, summarized under Impact PUF-3, would reduce water demand and wastewater generation, and subsequently reduce the need for new or expanded water and wastewater treatment facilities. **Mitigation Measure PUF-1(f)** Implementing agencies and/or project sponsors shall implement, where feasible and necessary based on project- and site-specific considerations, the mitigation measures described throughout this EIR to address the effects related to the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, including: ◢ Mitigation Measures AES-1 through AES-4 ◢ Mitigation Measures AGF-1 through AGF-3 ◢ Mitigation Measures AQ-2 through AQ-4		

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		◢ Mitigation Measures BIO-1 through BIO-3 and BIO-5 ◢ Mitigation Measures GHG-1 and GHG-3 ◢ Mitigation Measures CUL/TCR-1, CUL/TCR-2, and CUL/TCR-4 ◢ Mitigation Measure GEO-7 ◢ Mitigation Measures HAZ-4, HAZ-6 and HAZ-7 ◢ Mitigation Measures LU-1, LU-2, and LU-4 ◢ Mitigation Measures NOISE-1 through Noise-4 ◢ Mitigation Measures PSR-1 and PSR-2 ◢ Mitigation Measures PUF-2 through PUF-4 ◢ Mitigation Measure TRA-2		
Impact PUF-2: Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years	SU	**Mitigation Measure PUF-2(a)** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ For projects that could increase demand for water, coordinate with the relevant water service provider to ensure that the provider has adequate supplies to accommodate the increase in demand. This can and should be documented in the form of an SB 610 Water Supply Assessment, an SB 221 Water Supply Verification, or other capacity analysis. ◢ Implement water conservation measures which result in reduced demand for potable water. This could include reducing the use of potable water for landscape irrigation (such as through drought-tolerant plantings, water-efficient irrigation systems, the capture and use of rainwater) and the use of water-conserving fixtures (such as dual-flush toilets, waterless urinals, reduced flow faucets). ◢ Coordinate with the water provider to identify an appropriate water consumption budget for the size and type of project and designing and operating the project accordingly. ◢ For projects located in an area with existing reclaimed water conveyance infrastructure and excess reclaimed water capacity, use reclaimed water for non-potable uses, especially landscape irrigation. For projects in a location planned for future reclaimed water service, projects should install dual plumbing systems in anticipation of future use. Large developments could treat wastewater onsite to tertiary standards and use it for non-potable uses onsite.	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		◢ Apply Tier 1 or Tier 2 CALGreen standards as mandatory local requirements, which reduce water use by 12 and 20 percent, respectively, and require additional qualifying elective actions. **Mitigation Measure PUF-2(b)** Implementing agencies and/or project sponsors shall require the construction phase of transportation projects to connect to reclaimed water distribution systems for non-potable water needs, when feasible based on project- and site-specific considerations. **Mitigation Measure PUF-2(c)** Implementing agencies and/or project sponsors shall require transportation projects with landscaping to use drought-resistant plantings or connect to reclaimed water distribution systems for irrigation and other non-potable water needs when available and feasible based on project- and site-specific considerations.		
Impact PUF-3: Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments	PS	**Mitigation Measure PUF-3** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below: ◢ During the design and CEQA review of individual future projects, determine whether sufficient wastewater treatment capacity exists for a proposed project. These CEQA determinations must ensure that the proposed development can be served by its existing or planned treatment capacity. If adequate capacity does not exist, project sponsors shall coordinate with the relevant service provider to ensure that adequate public services and utilities could accommodate the increased demand, and if not, infrastructure improvements for the appropriate public service or utility shall be identified in each project's CEQA documentation. The relevant public service provider or utility shall be responsible for undertaking project-level review as necessary to provide CEQA clearance for new facilities. ◢ Require compliance with Mitigation Measure PUF-2(a), and MTC shall require implementation of Mitigation Measures PUF-2(b) and PUF-2(c), as feasible based on project- and site-specific considerations to reduce water usage and, subsequently, some wastewater flows.	LTS-M	SU
Impact PUF-4: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction	PS	**Mitigation Measure PUF-4** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
goals, and comply with federal, state, and local management and reduction statutes and regulations related to solid waste		◢ Provide an easily accessible area that is dedicated to the collection and storage of non-hazardous recycling materials. ◢ Maintain or reuse existing building structures and materials during building renovations and redevelopment. ◢ Use salvaged, refurbished, or reused materials to help divert such items from landfills. ◢ Divert construction waste from landfills, where feasible, through means such as: ◤ submitting and implementing a construction waste management plan that identifies materials to be diverted from disposal; ◤ establishing diversion targets, possibly with different targets for different types and scales of development; and ◤ helping developments share information on available materials with one another, to aid in the transfer and use of salvaged materials. ◢ Apply the specifications developed by the Construction Materials Recycling Association (CMRA) to assist contractors and developers in diverting materials from construction and demolition projects, where feasible (CalRecycle 2021b).		
3.15 Transportation				
Impact TRA-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities	LTS	None required	LTS	LTS
Impact TRA-2: Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b)	PS	**Mitigation Measure TRA-2a** MTC shall work with state and local agencies to ensure implementation of components of the Plan that will help to reduce regional VMT, particularly projects that improve and/or expand transit service, as well as bicycle and pedestrian facilities. These transportation projects, in conjunction with land use policies included in the Plan, will help the region to achieve the projected decreases in regional VMT per capita and achieve the region's SB 375 targets for GHG emissions. MTC will collaborate with State and other agencies to explore the feasibility of new programs for reducing VMT such as VMT fees, banks, and exchanges. **Mitigation Measure TRA-2b** Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, consistent with MTC's "Key SB 743 Implementation Steps for Land Use Projects" that include but are not limited to those identified below:	SU	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation	
			w/ MM*	w/o MM**
		◢ Transportation demand management (TDM) strategies shall be incorporated into individual land use and transportation projects and plans, as part of the planning process. These TDM measures are strategies not included in EN09, rather they are measures that could and should be implemented by the local agency based on land use authority that neither MTC nor ABAG has. Local agencies shall incorporate strategies identified in the Federal Highway Administration's publication: Integrating Demand Management into the Transportation Planning Process: A Desk Reference (August 2012) into the planning process (FHWA 2012). For example, the following strategies may be included to encourage use of transit and non-motorized modes of transportation and reduce vehicle miles traveled on the region's roadways: ◤ include TDM mitigation requirements for new developments; ◤ incorporate supporting infrastructure for non-motorized modes, such as, bike lanes, secure bike parking, sidewalks, and crosswalks; ◤ provide incentives to use alternative modes and reduce driving, such as universal transit passes, road and parking pricing; ◤ implement parking management programs, such as parking cash-out, priority parking for carpools and vanpools; ◤ develop TDM-specific performance measures to evaluate project-specific and system-wide performance; ◤ incorporate TDM performance measures in the decision-making process for identifying transportation investments; ◤ implement data collection programs for TDM to determine the effectiveness of certain strategies and to measure success over time; and ◤ set aside funding for TDM initiatives. **Mitigation Measure TRA-2c** Implement Mitigation Measures GHG-3		
Impact TRA-3: Substantially increase hazards due to geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)	LTS	None required	LTS	LTS
Impact TRA-4: Result in inadequate emergency access	LTS	None required	LTS	LTS

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1 INTRODUCTION

This environmental impact report (EIR) has been prepared on behalf of the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) in accordance with the California Environmental Quality Act (CEQA). It analyzes the potentially significant impacts of adopting and implementing the proposed Plan Bay Area 2050 (proposed Plan), which is the update to Plan Bay Area 2040, and serves as the Regional Transportation Plan (RTP) and the Sustainable Communities Strategy (SCS) for the San Francisco Bay Area.

1.1 PURPOSE OF PLAN BAY AREA 2050

An RTP is a long-range plan that identifies the strategies and investments to maintain, manage, and improve the region's transportation network. As required by State legislation (Government Code Section 65080 et seq.) and by federal regulation (Title 23 U.S. Code Section 134), MTC is responsible for preparing the RTP for the San Francisco Bay Area region. The RTP must be updated every 4 years. The Sustainable Communities and Climate Protection Act of 2008, commonly known as Senate Bill (SB) 375 (Chapter 728, Statutes of 2008), requires California's 18 metropolitan planning organizations (including MTC) to develop an SCS as an element of the federally mandated RTP. The SCS is a growth strategy for the region that, in combination with the transportation strategy, strives to achieve State greenhouse gas (GHG) emissions reduction targets. The SCS demonstrates how the region will meet its GHG reduction targets established by the California Air Resources Board (CARB) through integrated land use, housing, and transportation planning. In the Bay Area, MTC and ABAG are jointly responsible for this planning effort. The Draft Plan, supplementary reports, and other technical documents on the planning process can be found at the Plan Bay Area 2050 website: www.planbayarea.org.

The most recent RTP/SCS for the Bay Area region—Plan Bay Area 2040—was adopted in 2017. As the Bay Area's second RTP to include an SCS, the 2017 plan was considered a "limited and focused" update of the original Plan Bay Area, adopted in 2013. The proposed Plan will serve as the third RTP/SCS for the Bay Area, is a major update to Plan Bay Area 2040, and accompanies a current Regional Housing Needs Allocation cycle. The proposed Plan expands in scope relative to prior plans by examining the themes of economic development and environmental resilience. The Plan also meets all State and federal requirements for an RTP/SCS. As a result, the proposed Plan focuses on four key issues—transportation, housing, the environment, and the economy—and has been developed to improve equitable outcomes for all Bay Area residents and to provide greater resilience in an uncertain future.

The proposed Plan is a long-range plan that specifies the strategies and investments to maintain, manage, and improve the region's transportation network, including improvements to bicycle and pedestrian facilities, local streets and roads, public transit systems, and highways. The proposed Plan also calls for focused housing and job growth around high-quality transit corridors. This land use strategy is anticipated to enhance mobility and economic growth by linking the location of housing and jobs with transit, thus offering a more efficient land use pattern around transit and a greater return on existing and planned transit investments. In addition, the proposed Plan has integrated the issue of sea level rise inundation and identifies a strategy to protect shoreline communities affected by sea level rise by identifying a series of adaptation infrastructure strategies. The adaptation infrastructure includes archetypes that have been identified for regularly inundated shoreline areas. Archetypes include elevated roadways, a variety of levees, seawalls, tidal gates, and marsh restoration.

Once adopted, Plan Bay Area 2050 will be reviewed by CARB to confirm whether it would, if implemented, achieve the GHG emission reduction target for the region. If the combination of measures in the SCS is determined to be insufficient to achieve the region's target, an alternative planning strategy to achieve the targets must be prepared. For additional background on Plan Bay Area 2050, see Section 1.7, "Plan Bay Area 2050 Background."

1.2 PURPOSE OF THIS EIR

This EIR has been prepared in compliance with the CEQA statutes and guidelines. In general, the purpose of this EIR is to:

- analyze the potential environmental effects of adopting and implementing the proposed Plan;
- inform decision makers, responsible and trustee agencies, and members of the public as to the range of the environmental impacts of the proposed Plan;
- recommend mitigation measures to mitigate significant adverse impacts; and
- analyze a range of reasonable alternatives to the proposed Plan.

The Final EIR will include a mitigation monitoring and reporting program that identifies responsibility for implementing identified mitigation measures and required timing for implementation. As joint lead agencies for preparing this EIR, MTC and ABAG will rely on the EIR analysis of potential environmental effects in their review and consideration of the proposed Plan prior to approval.

As discussed in further detail below in Section 1.9, "CEQA Streamlining Opportunities," SB 375 provides streamlining benefits for certain transit-oriented projects consistent with an adopted SCS. Pursuant to these provisions of SB 375, this EIR has also been prepared to allow qualifying projects to streamline their environmental review.

1.3 NOTICE OF PREPARATION AND PUBLIC SCOPING

CEQA requires an early and open process for determining the scope of issues that should be addressed in the EIR. The Notice of Preparation (NOP) provides formal notification to all federal, State, regional, and local agencies involved with funding or approval of the project, and to other interested organizations and members of the public, that an EIR will be prepared for the project. The NOP is intended to encourage interagency communication concerning the proposed Plan and to provide background information about the proposed Plan sufficient to allow agencies, organizations, and individuals to respond with specific comments and questions on the scope and content of the EIR. A copy of the NOP is provided in Appendix A; the written comments received during the 30-day NOP period are provided in Appendix B. The NOP and comments on the NOP are also available on the project website: www.planbayarea.org.

MTC and ABAG initiated the scoping process on September 28, 2020, through issuance of the NOP. As required by CEQA, MTC and ABAG sent a copy of the NOP to the State Clearinghouse within the California Office of Planning and Research and to the county clerks in each of the nine Bay Area counties. The NOP was also posted on the Plan Bay Area website (www.planbayarea.org) and distributed to State and federal resource agencies and to interested individuals and organizations.

1.3.1 Scoping Meetings

A scoping meeting is required by State CEQA Guidelines Section 15082(c)(1) for projects of Statewide, regional, or areawide significance. Similar to circulation of the NOP, the purpose of the scoping meeting is to provide notification that an EIR for Plan Bay Area 2050 was being prepared and to solicit input on the scope and content of the environmental document. The virtual scoping meeting was held on Thursday, October 15, 2020, from 11:00 a.m. to 1:00 p.m. At this meeting, a presentation by MTC staff provided an overview of the proposed Plan, the CEQA process, and key environmental issues identified in the NOP. Oral and written comments were accepted during the meeting.

The NOP and public scoping meeting also helped to meet federal requirements for public involvement in development of the RTP, as specified in 23 U.S. Code 134(i), the Moving Ahead for Progress in the 21st Century Act, and the Fixing America's Surface Transportation Act. In particular, through the NOP and scoping process, resource agencies, public agencies, tribal governments, transportation providers, and the public had an opportunity to provide early input on environmental issues and concerns that could be addressed in the EIR for the proposed Plan.

In addition, SB 375 requires opportunities for input by local officials and the public into the development of the SCS and the alternative planning strategy if one is prepared. Participation requirements include regional target workshops and development of an SCS public participation plan. Additional information about the comprehensive public involvement process for the proposed Plan is available at www.planbayarea.org and is described further in Section 1.7.6, "Public Engagement."

In addition to circulating the NOP and holding the scoping meeting, MTC initiated tribal consultation consistent with Assembly Bill 52, Statutes of 2014. This process is discussed in more detail in Section 3.7, "Cultural Resources and Tribal Cultural Resources."

1.4 EIR SCOPE

1.4.1 Program EIR

This is a program EIR, which is defined in Section 15168 of the State CEQA Guidelines as an EIR addressing a series of actions that can be characterized as one large project and are related either:

(1) geographically,

(2) as logical parts in the chain of contemplated actions;

(3) in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or

(4) as individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.

A program EIR can be used as the basic, general environmental assessment for an overall program of projects developed over a multiyear planning horizon; therefore, it is an appropriate review document for the proposed RTP/SCS. A program EIR offers several advantages. For example, it provides a basic reference document to avoid unnecessary repetition of facts or analysis in subsequent project-specific assessments. It also allows the lead agency to consider the broad, regional impacts of a program of actions before its adoption and eliminates redundant or contradictory approaches to the consideration of regional and cumulative impacts.

1.4.2 Level of Analysis

This EIR presents a programmatic assessment of the potential impacts of the proposed Plan, focusing on the entire set of projects, programs, and strategies contained in the proposed Plan. Individual transportation, sea level rise adaptation, and development project impacts are not addressed in detail. The analysis focuses on these three categories of projects at the local (county) and regional (Bay Area) level. Impacts are analyzed from a regional and local perspective, as applicable. Where appropriate, this EIR also provides a county-by-county assessment that considers growth geography footprint areas within Transit Priority Area (TPA) boundaries. (See Section 1.9, "CEQA Streamlining Opportunities," for discussion of why this approach is important.)

For location-based impact assessments, a geographic information system (GIS) was used to digitally overlay onto resource-related data, the footprint of the proposed Plan associated with forecasted land use development, sea level rise adaptation infrastructure, and transportation projects. Results are presented, where relevant, for the region, for each county, and for the portions of the growth footprint specifically within the TPAs. Where impacts are quantified through modeling or GIS analysis, they are reported at the regional, county, and/or TPA level in tables and in the text. TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county. The portion of the projected land use growth footprint located outside of a TPA is captured in the county totals.

The analysis in this EIR does not evaluate project-specific impacts of individual projects, although it provides environmental analysis and mitigation that is intended to address the range of impacts that may be associated with individual projects. This approach does not relieve local jurisdictions of responsibility for determining whether project-specific impacts require additional CEQA analysis; see Section 1.8, "Future Environmental Review," below, for more details.

1.5 EIR ORGANIZATION

1.5.1 Executive Summary

The executive summary in this EIR outlines the proposed Plan and alternatives and includes a summary of the potentially significant adverse environmental impacts of the proposed Plan, the measures identified to mitigate those impacts, and an overview of whether or not identified measures would mitigate the significant impacts and to what level. The executive summary also discusses the environmentally superior alternative, and identifies "areas of controversy" and "issues to be resolved" as required by CEQA.

1.5.2 Chapter 1: Introduction

Chapter 1, "Introduction," describes the relationship between the proposed Plan and the EIR, the organization of the EIR, and the basic legal requirements of a program-level EIR. It discusses the level of analysis and the alternatives considered, as well as how this EIR is related to other environmental documents and the EIR's intended uses. This is followed by more content on the regional setting and regulatory framework that provides the context for the proposed Plan. This background information is followed by a discussion of the Plan development and public engagement process, as well as planning assumptions.

1.5.3 Chapter 2: Project Description

Chapter 2, "Project Description," describes the proposed Plan and the project objectives and includes a discussion on planning assumptions and the Plan's strategies and resulting forecasted changes.

1.5.4 Chapter 3: Environmental Impacts and Mitigation Measures

Chapter 3 presents the environmental analysis of the proposed Plan. Section 3.1 provides an overview of the approach to the environmental analysis. Sections 3.2 through 3.15 describe the existing physical and regulatory settings for each of the environmental issue areas analyzed in this EIR, the potential impacts of the proposed Plan on these environmental issue areas, and measures to mitigate the significant and potentially significant impacts identified. Each issue area is analyzed in a separate section, and each section is organized into the following subsections:

- "Environmental Setting,"
- "Regulatory Setting,"
- "Significance Criteria,"
- "Method of Analysis," and
- "Impacts and Mitigation Measures."

1.5.5 Chapter 4: Alternatives

Chapter 4 contains a description and analysis of the alternatives to the proposed Plan. It provides an initial assessment of the potential of each alternative to achieve the objectives of the proposed Plan while reducing potentially significant adverse environmental impacts. This discussion also includes a comparison summary table of regional environmental impacts associated with the alternatives, and information regarding the environmentally superior alternative.

1.5.6 Chapter 5: Other CEQA-Mandated Sections

Chapter 5 provides an assessment of the impacts of the proposed Plan in several subject areas required by CEQA, consisting of the following:

- significant irreversible environmental changes,
- significant and unavoidable impacts,
- growth-inducing impacts,
- cumulative impacts, and
- impacts found to be not significant.

1.5.7 Chapter 6: Report Preparers

Chapter 6 contains a list of report authors and other consulted for preparation of this EIR.

1.5.8 Chapter 7: References

Chapter 7 lists the references used to support preparation of this EIR.

1.5.9 Appendices

Appendix A includes the NOP of this EIR, and Appendix B includes the comments received on the NOP and at the scoping meetings, as well as the Scoping Summary Report. Appendix C includes air quality modeling data. Appendix D includes special-status species data. Appendices E and F include detailed data used to support impact analyses related to energy, and climate change and GHG emissions. Appendix G presents input and output data used for the impact analyses in the Section 3.12, "Noise."

1.6 EIR APPROACH

1.6.1 Baseline Assumptions

The analysis in this EIR generally assumes 2020 as the base year (existing conditions). This EIR uses data from this year or the year closest to 2020, based on the degree that information is available from across the region. However the analyses of air quality in Section 3.4, "Air Quality,"; GHG emissions and energy in Section 3.6, "Climate Change, Greenhouse Gases, and Energy,"; noise in Section 3.12, "Noise,"; and transportation in Section 3.15, "Transportation," use a baseline year of 2015 consistent with the assumptions for land use and traffic volumes in Travel Model 1.5. Also, the analysis of GHG emissions in Section 3.6 includes a 2005 baseline to satisfy statutory requirements under SB 375 and a 1990 baseline to assess consistency with SB 32. The proposed Plan has a horizon year of 2050 and therefore covers a 30-year planning period. Projects and programs identified in the proposed Plan are assumed to be fully implemented by 2050.

1.6.2 Alternatives

CEQA requires EIRs to evaluate a reasonable range of alternatives to the proposed project that could feasibly attain most of the basic project objectives and that would avoid or substantially lessen any of the significant environmental impacts. In addition, CEQA requires assessment of the likely foreseeable future condition if the proposed project were not implemented; this scenario is called the No-Project Alternative.

This EIR describes a number of alternatives to the proposed Plan, several of which were dismissed from further consideration. The EIR evaluates the proposed Plan and following three alternatives, assuming the 2050 horizon year and full implementation. It also compares the relative magnitude of identified environmental impacts of the alternatives to the proposed Plan, and discusses the environmentally superior alternative.

The proposed Plan and three alternatives are briefly described below. A full description of each alternative is provided in Chapter 4.

NO PROJECT ALTERNATIVE

An EIR must analyze the "no project alternative" (CEQA Guidelines Section 15126.6(e)). The purpose of the no project alternative is to allow a comparison of the environmental impacts of approving the proposed project with the effects of not approving it. The no project alternative must discuss the existing conditions, "as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services." This alternative represents a future land use pattern and suite of transportation and resilience investments if the proposed Plan is not adopted. The No Project

Alternative illustrates trends assumed under adopted local general plans and zoning without an adopted regional plan, and assuming no new infrastructure projects beyond those currently under construction or those that have both full funding and environmental clearance ("committed"). Under the No Project Alternative, housing growth would be more dispersed, while job growth would be slightly more concentrated in the region's two largest job centers of San Francisco and Silicon Valley. In comparison to the proposed Plan, the No Project Alternative would result in higher household growth primarily in Contra Costa County, with higher job growth in San Francisco and Santa Clara counties. The No Project Alternative includes substantially lower funding for transportation strategies and environment strategies than the proposed Plan.

ALTERNATIVE 1: TRA FOCUS ALTERNATIVE

The TRA Focus Alternative (Alternative 1) would concentrate growth into areas that contain high-quality transit services. This alternative is characterized as providing a compact growth pattern, with the greatest share of housing and job growth in transit-rich areas (TRAs)—especially within walking distance of regional rail stations. To support this more urban-oriented growth pattern, additional core capacity transit investments are funded in lieu of highway projects that add lane-mileage to the system. This alternative would result in higher levels of household and job growth in the growth geographies than the proposed Plan, with substantially more housing growth in TRAs. The TRA Focus Alternative modifies three strategies in the proposed Plan in order to accommodate demand for local transit services in the urban core, while reducing funding for highway expansion projects to reduce environmental impacts. This alternative modifies an additional two strategies in the proposed Plan in order to reduce environmental impacts from resilience projects that involve new highway capacity and to reduce the size of the urban footprint by protecting unincorporated areas from lower-density growth.

ALTERNATIVE 2: HRA FOCUS ALTERNATIVE

The HRA Focus Alternative (Alternative 2) addresses the regional challenges of displacement and gentrification by shifting more housing growth toward locations with well-resourced schools and access to jobs and open space that have historically rejected more housing growth. The high resource areas (HRAs) included in this alternative also meet a baseline transit service threshold of bus service with peak headways of 30 minutes or better. Some HRAs also meet the designation of TRAs, meaning they are both well-resourced and transit-rich. This alternative places a substantially higher share of growth in HRAs—especially in the South Bay. To support this growth pattern and advance regional equity goals, infrastructure funding for major regional and interregional rail expansion projects would be reduced and greater funding would be provided to local bus frequency increases, new express bus lines, expanded transit fare discount programs, and enhanced non-motorized infrastructure. This alternative features similar levels of household and job growth in growth geographies to the proposed Plan, with substantially more housing growth and substantially less job growth in HRAs. The HRA Focus Alternative modifies five strategies in the proposed Plan to align transportation funding with projects that advance equity and climate goals. Transportation investments under this alternative seek to support additional lower-vehicle miles traveled growth in historically exclusionary job-rich areas, while funding express bus projects to provide regional connectivity without contributing to urban displacement pressures. The HRA Focus Alternative would contain the same sea level rise adaptation infrastructure as the proposed Plan.

1.6.3 Cumulative Impact Assumptions

Section 15130 of the CEQA Guidelines requires that an EIR evaluate potential environmental impacts that are individually limited but cumulatively significant. CEQA defines "cumulative impacts" as "two

or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Section 15355). "'Cumulatively considerable' means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (CEQA Guidelines Section 15065[a][3]). This means that cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

The proposed Plan, which includes a forecasted land use development pattern for the Bay Area to accommodate projected regional growth through 2050, and regionwide transportation projects and programs, is a cumulative plan by definition. For this reason, the environmental analysis included in this EIR is a cumulative analysis to the extent that impacts may combine to result in a cumulative condition, compliant with the requirements of CEQA and the CEQA Guidelines. Furthermore, this EIR contains analysis of cumulative impacts that extend beyond the region for identified CEQA impact areas. This discussion is included in Section 5.4.

1.7 PLAN BAY AREA 2050 BACKGROUND

1.7.1 Regional Location and General Settings

REGION

The San Francisco Bay Area region includes nine counties that may be aggregated geographically into four subareas: North Bay (Marin, Napa, Solano, and Sonoma Counties), East Bay (Alameda and Contra Costa Counties), South Bay (Santa Clara County), and the West Bay (San Francisco and San Mateo Counties). There are 101 cities spread throughout these nine counties. The total area of the region is approximately 4.4 million acres (7,000 square miles). The region is bordered by Mendocino, Lake, and Yolo Counties to the north; Sacramento, San Joaquin, Stanislaus, and Merced Counties to the east; San Benito, Monterey, and Santa Cruz Counties to the south; and the Pacific Ocean to the west. As of January 2020, the region had a population estimate of 7.79 million, which is approximately 20 percent of California's population. Roughly 18 percent of the region's approximately 4.4 million acres were developed in 2018 (see **Table 2-6**). The undeveloped area includes open space and agricultural lands, as well as water bodies (excluding the San Francisco Bay) and parks. Approximately 24 percent of the region is identified as protected open space (GreenInfo Network 2020). **Figure 2-7** illustrates the regional location of the Bay Area. More information about the physical setting is provided by environmental issue area in the setting sections throughout Chapter 3 of this EIR.

A summary of the region by subarea and county is provided below.

North Bay Counties

Marin County covers an area of approximately 518 square miles that contains 11 incorporated cities (Belvedere, Corte Madera, Fairfax, Larkspur, Mill Valley, Novato, Ross, San Anselmo, San Rafael, Sausalito, and Tiburon) and eight unincorporated communities. San Rafael is the city with the highest population level in the county, with approximately 60,000 people. Overall, the county has approximately 261,000 residents (California Department of Finance).

Napa County covers an area of approximately 789 square miles and contains a population of approximately 139,000 people. There are five incorporated cities within Napa County: American Canyon, Calistoga, Napa, St. Helena, and Yountville; the city with the highest population is Napa, where approximately 79,000 people reside. Napa County also contains 20 unincorporated communities (DOF 2020).

Solano County is home to approximately 440,000 people, over an area of 906 square miles. There are seven incorporated cities in Solano County (Benicia, Dixon, Fairfield, Rio Vista, Suisun City, Vacaville, and Vallejo) and eight unincorporated communities. Of these incorporated cities, Vallejo has the highest population, with approximately 119,000 people (DOF 2020).

Sonoma County has a population of approximately 493,000 people and covers an area of approximately 1,768 square miles. There are nine incorporated cities within Sonoma County (Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, and Windsor) and over 25 unincorporated communities. Of these cities, Santa Rosa has the highest population, with approximately 174,000 residents (DOF 2020).

East Bay Counties

Alameda County is home to over 1.67 million people living in 14 incorporated cities, as well as in six unincorporated communities and rural areas. Total land area measures approximately 813 square miles. The incorporated cities are Alameda, Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, and Union City. The City of Oakland has the highest population among the incorporated cities, with approximately 434,000 people (DOF 2020). Oakland is the third most populated jurisdiction in the region.

Contra Costa County has a population of more than 1.15 million residents. This county contains 19 incorporated cities (Antioch, Brentwood, Clayton, Concord, Danville, El Cerrito, Hercules, Lafayette, Martinez, Moraga, Oakley, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, and Walnut Creek) and many established communities in the unincorporated area. The city with the highest population level is Concord, with approximately 130,000 people (DOF 2020). Contra Costa County covers an area of approximately 804 square miles.

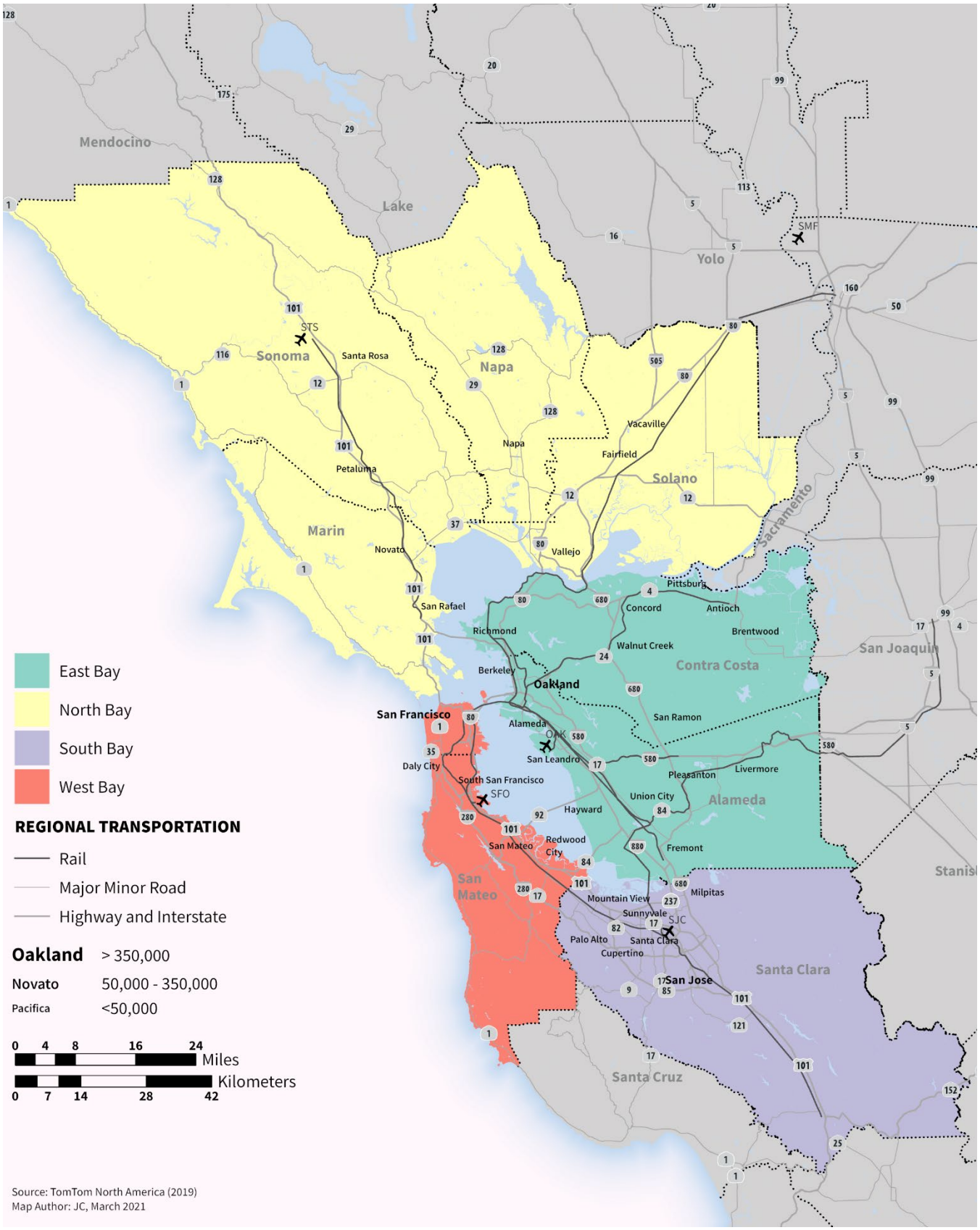

Figure 1-1: Regional Location

COUNTIES

South Bay Counties

Santa Clara County is home to approximately 1,962,000 people and covers approximately 1,302 square miles. Thirteen incorporated cities are located within Santa Clara County (Campbell, Cupertino, Gilroy, Los Altos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Palo Alta, San Jose, Santa Clara, Saratoga, and Sunnyvale) and two incorporated towns (Los Gatos and Los Altos Hills). Of the incorporated cities and towns, the highest population is located in San Jose, where over 1,049,000 people reside. The City of San Jose is the most populated jurisdiction in the Bay Area region (DOF 2020).

West Bay Counties

San Francisco County and the City of San Francisco occupy the same physical area, covering approximately 48 square miles. Approximately 898,000 people reside within the City and County of San Francisco. San Francisco is the second most populated city in the Bay Area region (DOF 2020).

San Mateo County covers approximately 744 square miles and is home to approximately 773,000 people. The county includes 16 incorporated cities (Belmont, Brisbane, Burlingame, Daly City, East Palo Alto, Foster City, Half Moon Bay, Menlo Park, Millbrae, Pacifica, Portola Valley, Redwood City, San Bruno, San Carlos, San Mateo, and South San Francisco) and eight unincorporated communities. Of the incorporated cities, Daly City has the highest population, approximately 109,000 people (DOF 2020).

1.7.2 Regional Planning Agencies

MTC was formed in 1970 and functions under State and federal law as the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area. It covers the same geographic area as ABAG. MTC is the federally designated metropolitan planning organization (MPO) and the State-designated regional transportation planning agency (RTPA) for the Bay Area. It is responsible for preparing and updating the RTP every 4 years.

ABAG was formed in 1961 by a joint powers agreement among Bay Area local governments and serves as the comprehensive regional planning agency and Council of Governments for the nine counties and 101 cities and towns of the San Francisco Bay region. It is a public entity created by local governments to meet their planning and research needs related to land use and is responsible under State law for conducting the Regional Housing Needs Allocation process. ABAG also hosts several joint powers and administrative entities related to environmental and water resource protection, disaster resilience, energy efficiency, hazardous waste mitigation, financial services, and staff training to local counties, cities, and towns.

1.7.3 Federal and State Requirements

METROPOLITAN PLANNING GENERAL REQUIREMENTS

Under the Fixing America's Surface Transportation Act (FAST Act) (Public Law 114-94) and Moving Ahead for Progress in the 21st Century Act (MAP-21) (Public Law 112-141), the U.S. Department of Transportation requires that MPOs, such as MTC, prepare long-range RTPs and update them every 4 years if they are in areas designated as "nonattainment" or "maintenance" for federal air quality standards. Prior to enactment of MAP-21, the primary federal requirements regarding RTPs were included in the metropolitan transportation planning rules (Title 23 Code of Federal Regulations Part

450 and 49 CFR Part 613). The FAST Act and MAP-21 changed the statutes that underpin these regulations.

REGIONAL TRANSPORTATION PLAN REQUIREMENTS

In accordance with federal planning requirements, an RTP is a long-range plan that identifies the strategies and investments to maintain, manage, and improve the region's transportation network. The RTP must address no less than a 20-year planning horizon and include long-range and short-range strategies and actions that support the development of an integrated multimodal transportation system. The RTP must be updated at least every 4 years and seek to address projected transportation demand over the RTP planning horizon and pursue operational and management strategies that will improve the performance of the transportation system. It must have a fiscally constrained financial plan that demonstrates how the RTP can be implemented and how the transportation system can be operated and maintained using revenues reasonably expected to be available over the planning horizon. The RTP also is subject to myriad State and federal requirements with respect to public participation, equity and environmental justice, and air quality conformity, among others. As required by State legislation (Government Code Section 65080 et seq.) and by federal regulation (Title 23 U.S. Code Section 134), MTC is responsible for preparing the RTP for the San Francisco Bay Area region.

An RTP outlines the region's goals and strategies for meeting current and future mobility needs and for providing a foundation for transportation planning and funding decisions by local, regional, and State officials that are ultimately aimed at achieving a coordinated and balanced transportation system. In addition, an RTP identifies the region's transportation needs; sets forth actions, programs, and a plan of projects to address the needs consistent with adopted regional strategies and goals; and documents the financial resources needed to implement the RTP. The process for development of the RTP takes into account all modes of transportation and is accompanied by a continuing, cooperative, and comprehensive planning approach that is also performance driven and outcome based, consistent with the provisions of MAP-21 and the FAST Act.

The RTP must also comply with Section 65080 of the California Government Code. The State requirements largely mirror the federal requirements and require each transportation planning agency in urban areas to adopt and submit an updated RTP to the California Transportation Commission (CTC) and Caltrans every 4 years. To ensure a degree of Statewide consistency in the development of RTPs, CTC adopted RTP Guidelines pursuant to Government Code Section 14522. The RTP Guidelines include a requirement for program-level performance measures, which include objective criteria that reflect the goals and objectives of the RTP. The RTP Guidelines are intended to assist MPOs and RTPAs with developing RTPs that are consistent with federal and State planning requirements. An RTP is used to guide the development of the Federal Transportation Improvement Program, a federally mandated 4-year program of all regionally important surface transportation projects and all projects that will receive federal funding, as well as other transportation programming documents and plans. The proposed Plan follows the 2017 RTP Guidelines, which were adopted on January 18, 2017.

SUSTAINABLE COMMUNITIES STRATEGY REQUIREMENTS

Pursuant to the Sustainable Communities and Climate Protection Act of 2008 (SB 375), the SCS is a required component of the RTP. SB 375 directs CARB to set regional targets for reducing GHG emissions. SB 375 requires that an MPO prepare and adopt an SCS that sets forth a forecasted regional development pattern that reduces GHG emissions associated with the land use and transportation network, measures, and policies. SB 375 is part of California's overall strategy to reach GHG emissions

reduction goals as set forth by Assembly Bill 32, SB 32, and Executive Orders S-03-05 and B-30-15. According to Section 65080(b)(2)(B) of the California Government Code, the SCS must:

- identify existing land uses,
- identify areas to house long-term population growth,
- identify areas to accommodate an 8-year projection of regional housing needs,
- identify transportation needs and the planned transportation network,
- consider resource areas and farmland,
- consider State housing goals and objectives,
- set forth an integrated forecasted development pattern and transportation network that will reduce GHG emissions, and
- comply with federal Clean Air Act requirements for developing an RTP.

As stated above, ABAG, the Council of Governments for the Bay Area, generally focuses on regional land use, housing, environmental quality, and economic development. MTC functions under State and federal law as the RTPA and MPO and generally focuses on transportation planning, distribution of federal transportation funding, and air quality conformity. SB 375 recognizes the bifurcated roles of each agency. Under California Government Code Section 65080(b)(2)(C), ABAG is responsible for the following portions of the SCS, which address housing policy:

- Identify the general location of uses, residential densities, and building intensities within the region.

- Identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the RTP, taking into account net migration into the region, population growth, household formation, and employment growth.

- Identify areas within the region sufficient to house an 8-year projection of the regional housing need for the region pursuant to Section 65584.

- Gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (a) and (b) of Section 65080.01.

- Consider the State housing goals specified in Sections 65580 and 65581.

MTC is responsible for the following portions of the SCS, which address transportation:

- Identify a transportation network to service the transportation needs of the region.

- Allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act (42 U.S. Code Section 7506).

Both agencies are jointly responsible for the following portion of the SCS:

- Set forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, will reduce the GHG emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the GHG emission reduction targets approved by the California Air Resources Board.

SB 375 requires the designated transportation planning agency (MTC) to "prepare and adopt" both the RTP and the SCS (California Government Code Section 65080[a], [b][2][B], and [b][2][H]).

1.7.4 Prior Plan Lawsuits and Settlement Agreement (2013)

Shortly after adoption of the first Plan Bay Area and certification of the EIR in July 2013, four lawsuits were filed challenging those actions. The lawsuits, based on CEQA and other California laws, were filed in August and October 2013. Two of the four lawsuits were settled out of court. The remaining two lawsuits have been fully litigated with final trial court judgments in favor of MTC and ABAG, affirmed by the court of appeal. More specifically:

- In February 2014, MTC and ABAG agreed to settle with the Building Industry Association (BIA) of the Bay Area. More detail on the components of this settlement agreement and the agencies' compliance with its terms appears in Table 1-1.
- In June 2014, MTC and ABAG agreed to settle with the Sierra Club and Communities for a Better Environment (CBE). The terms of that settlement agreement applied only to the last update of the Plan, adopted in 2017. MTC and ABAG have no continuing obligations under the CBE Settlement Agreement.
- In August 2014, a suit filed by Bay Area Citizens, represented by Pacific Legal Foundation, failed in Alameda Superior Court. The judge upheld adoption of the Plan and certification of the EIR. Bay Area Citizens appealed, and following briefing and oral argument, the court of appeal affirmed the trial court ruling in favor of MTC and ABAG. There are no further proceedings in the Bay Area Citizens case.
- In February 2015, a suit filed by the Post Sustainability Institute failed in Alameda Superior Court. The judge upheld approval of the Plan and denied declaratory and injunctive relief. The court of appeal affirmed the trial court ruling in favor of MTC and ABAG. There are no further proceedings in the Post Sustainability Institute case.

Table 1-1: Building Industry Association Settlement Agreement Components and Compliance Information

Agreement Paragraph	Agency Obligation	Timing	Where Addressed	Compliance Completed
6a.	**Regional Housing Control Total and Forecasted Development Pattern**. The SCS shall set forth a forecasted development pattern for the region that includes the Regional Housing Control Total, which shall have no increase in in-commuters over the baseline year for the SCS.	Regional Housing Control Total must be determined and disclosed prior to issuance of a Notice of Preparation for the SCS/RTP EIR, or if no EIR is prepared, then at least 6 months before a draft SCS is released for public review.	The agencies shall use the adopted methodology for determining the Regional Housing Control Total in the final Plan Bay Area SCS.	Yes, ABAG adopted the Final Regional Growth Forecast on September 17, 2020, and it was used to develop the forecasted development pattern in the SCS. The projection for 2050 housing units *(previously referred to as a "control total")* was determined to be 1.54 million (2015–2050). For more discussion on the Final Regional Growth Forecast, see the discussion of planning assumptions below.
6b.	**Validation**. The agencies shall implement robust monitoring of regional development patterns, at a minimum tracking building permit issuance, number of units in PDAs, and type of residential development.	Monitoring would be done prior to release of the SCS.	The results shall inform each update of the Plan Bay Area SCS.	Yes, ABAG has tracked residential permitting activity in PDA/non-PDA areas and made the data available on its website, http://abag.ca.gov/planning/housing/datasets.html#tracking. In addition, MTC is tracking housing growth through its Vital Signs regional monitoring initiative, http://www.vitalsigns.mtc.ca.gov/housing-growth.
6c.	**Feasibility Analysis**. The agencies shall prepare an update to the PDA	The update shall be published prior to issuance of a Notice of	The results of the analysis shall inform	Yes, MTC and ABAG prepared an update to the PDA feasibility analysis prior to the

Agreement Paragraph	Agency Obligation	Timing	Where Addressed	Compliance Completed
	Feasibility Analysis to include analysis of local land use policies, market demand, financial feasibility, site-related issues, financing, and infrastructure needs.	Preparation for the SCS/RTP EIR or, if no EIR is prepared, then at least 6 months before a draft SCS is released for public review.	each update of the Plan Bay Area SCS.	development of the Plan, available at: https://www.planbayarea.org/sites/default/files/documents/2021-06/PDA_Implementation_Draft_Tech_Memo.pdf
6d.	**Assumptions and Disclosure**. The agencies shall disclose and accept public comments on the key assumptions and descriptors to be used in preparation of each SCS update.	Key assumptions shall be disclosed prior to preparation of a document comparable to the Initial Vision Scenario, setting forth development scenarios, or if no such document is prepared, assumptions shall be disclosed at least 6 months prior to public release of a draft SCS. Key descriptors shall be disclosed with release of the SCS.	Appropriate assumptions and descriptors are to be used in preparation of the final Plan Bay Area SCS.	Yes, ABAG consulted with a technical advisory committee during the development of the Regional Growth Forecast. The Regional Growth Forecast process was also presented to working groups and committees. The Regional Growth Forecast is considered as part of the Draft Blueprint strategies (25), which were defined in February 2020 and include land use modeling assumptions influencing the land use pattern. The outcomes of the strategies were shared in July 2020. MTC and ABAG held engagement activities on the refinement of the Blueprint in summer 2020. The Final Blueprint strategies (35) were defined in September 2020, including refinements to land use modeling assumptions influencing the land use pattern. The outcomes of the Final Blueprint strategies were shared in December 2020 prior to adoption of the Final Preferred Scenario in January 2021.

Notes: PDA=priority development area.

1.7.5 Plan Development Process

The proposed Plan—Plan Bay Area 2050—serves as the 2021 RTP/SCS and builds upon the previous strategies developed in the first two iterations of Plan Bay Area, as well as a predecessor initiative "Horizon" discussed below.

The proposed Plan development process was composed of several key phases:

- **Horizon** (spring 2018 to fall 2019): A predecessor initiative to the proposed Plan, Horizon explored a suite of strategies to ensure a more resilient and equitable future in the face of uncertainty.
- **Draft Blueprint** (fall 2019 to summer 2020): Integrating the recommendations from Horizon, the Draft Blueprint served as a "first draft" of the proposed Plan. Comprised of 25 strategies, it was designed to advance the Plan vision of a more affordable, connected, diverse, healthy, and vibrant Bay Area for all.
- **Final Blueprint** (summer 2020 to winter 2021): Building on the Draft Blueprint, the Final Blueprint refined and expanded strategies (35 in total) to make further progress on the five key challenges identified in the Draft Blueprint analysis while integrating robust public feedback received during summer 2020.

HORIZON

Beginning in early 2018, MTC and ABAG conducted an 18-month effort called the Horizon initiative. The Horizon initiative was the first step for MTC and ABAG to explore what the Bay Area can do to address current challenges, avoid future obstacles, and leverage opportunities. Findings from the Horizon initiative provided the Bay Area with a foundational analysis to start discussions on which strategies the Bay Area might consider to address affordability, connectivity, diversity, environmental health, and economic vibrancy.

The Work Elements of Horizon

The 18-month Horizon process included five core work elements:

- **Guiding Principles:** To establish guideposts for the Horizon initiative, MTC and ABAG conducted public engagement in early 2018 and received over 10,000 unique comments from residents across the Bay Area in response to the question: What are the most pressing issues that should be considered to plan for life in 2050? This feedback helped MTC and ABAG refine the five Guiding Principles—Affordable, Connected, Diverse, Healthy, and Vibrant—that underlie the Horizon initiative and the proposed Plan.

- **Futures Planning:** Central to the Horizon initiative was the development and study of three divergent what-if scenarios called "Futures" to identify how a range of forces will potentially shape the Bay Area. See MTC's web page, https://mtc.ca.gov/our-work/plans-projects/horizon/futures-planning, for more information.

- **Perspective Papers:** A series of white papers, known as Perspective Papers, proposed a set of priority strategies for further investigation in the Futures Planning process. See MTC's web page, https://mtc.ca.gov/our-work/plans-projects/horizon/perspective-papers, for more information.

- **Project Performance Assessment:** Similar to prior iterations of Plan Bay Area, Horizon included a robust Project Performance Assessment of over 90 major transportation projects considered for inclusion in the proposed Plan. In addition, MTC and ABAG opened the process to the public by issuing a request for transformative projects and assessed the top Transformative Projects alongside those submitted by partner agencies. Analyses include benefit-cost assessments against the three different futures, a guiding principles assessment to determine project alignment with regional goals, and an equity assessment to consider the distribution of benefits by income level and geography. See MTC's webpage, https://mtc.ca.gov/our-work/plans-projects/horizon/project-performance-assessment, for more information.

- **Public Engagement:** Finally, public engagement weaved together all the components of Horizon, providing an opportunity for community members to offer input on the most effective strategies and investments to address current and future regional challenges. Staff organized workshops, convened "pop-up" forums at community events, hosted committee meetings and webinars, and attended events hosted by community-based organizations to hear from as many voices as possible. See Section 1.7.6, "Public Engagement," for more information.

THE BLUEPRINT

Building on the foundation of the Horizon initiative, the Blueprint integrates strategies across four elements—transportation, housing, the economy, and the environment—aimed at creating a more resilient and equitable future for the Bay Area. The Blueprint planning process was developed in two phases: the Draft and the Final Blueprint. Because the Blueprint was a key first step in creating the proposed Plan, it required iteration and engagement with the public, stakeholders, and elected officials.

The Draft Blueprint

The Draft Blueprint, approved by MTC and ABAG in February 2020, integrated 25 strategies to move the region toward its adopted vision of a more affordable, connected, diverse, healthy, and vibrant Bay Area for all residents. The Draft Blueprint weaved together transportation, housing, economic, and environmental strategies, alongside an expanded set of growth geographies (see Section 2.5.4, "Proposed Plan Growth Geographies," for a description) designed to accommodate 1.4 million new households and 1.4 million new jobs identified in the regional growth, described in more detail in Section 2.5.2, "Planning Assumptions." The Draft Blueprint included a fiscally constrained revenue forecast from the needs and revenue assessments, also described in more detail in Section 2.3, as well as new regional revenues for transportation, housing, economic development, and environmental resilience. See MTC's webpage, https://www.planbayarea.org/2050-plan/plan-bay-area-2050-draft-blueprint, for more information.

The Final Blueprint

The package of Draft Blueprint strategies was revised based on robust engagement with Bay Area residents and stakeholders to increase the effectiveness of strategies in realizing the vision and guiding principles of the proposed Plan. The Final Blueprint also added 10 more strategies that were not featured in the Draft Blueprint. In September 2020, MTC and ABAG approved the Final Blueprint, which includes a set of 35 revised and expanded strategies, as well as the growth geographies and the regional growth forecast, described in Section 2.5, "Proposed Plan." The Final Blueprint was advanced by MTC and ABAG in January 2021 as the proposed Plan for analysis in the EIR, following the completion of modeling and analysis. See MTC's webpage, https://www.planbayarea.org/2050-plan/plan-bay-area-2050-final-blueprint, for more information.

1.7.6 Public Engagement

On June 27, 2018, MTC adopted its *2018 Public Participation Plan* to ensure that Bay Area residents would have ample opportunities for early and ongoing engagement on the proposed Plan's development. The novel coronavirus (COVID-19) pandemic required engagement to be conducted virtually in 2020 and into 2021, forcing the use of digital engagement rather than traditional in-person engagement tactics to ensure that the public continued to have the opportunity to participate.

MTC's public involvement procedures for the proposed Plan incorporated the following goals:

- **Promote a transparent process:** MTC and ABAG should make every effort to make the often-complex planning process transparent by developing user-friendly content written in plain language. This will improve the public's understanding of the Plan's strategies and policies, improving the public's ability to provide quality input that affects policy decisions.

- **Encourage broad participation:** The engagement process should include the greatest number of Bay Area residents as possible, reflecting its diverse population, especially from communities with low incomes, communities of color, persons with disabilities, and persons with limited English proficiency. An individual's access to the internet, especially relevant since the pandemic began, should not be an obstacle to participate. The document will be available for public review in at least one library in each of the nine member counties and at planbayarea.org/2050-plan/environmental-impact-report. Members of the public can also make appointments with MTC staff to view the DEIR. Should you require a hard copy of the draft plan, please submit your request to info@bayareametro.gov or call 415-778-6757 and one will be mailed to you.

- **Engage for impact:** Input on the Plan should be analyzed and provided to policy makers in a timely manner to inform their decisions. Interested participants should be informed of actions by MTC and ABAG at key milestones throughout the planning process.

- **Build knowledge:** The proposed Plan is an opportunity for MTC and ABAG to inform a wide range of people about transportation, housing, environmental, and economic issues in the Bay Area. Each step of the process should provide enough information to set context and promoting increased understanding of the Plan and relevant topics.

Public engagement for the proposed Plan, and its development, consisted of three main rounds. In total, Horizon and the proposed Plan were discussed at over 130 public meetings through 2020. Meetings included over 100 in-person and digital public workshops, and 60 technical workshop events consisting of webinars and meetings. Public engagement efforts resulted in over 33,000 public comments from nearly 16,000 participants. In addition, MTC partnered with eight community organizations working with communities with low incomes and communities of color to obtain ongoing input on the proposed Plan. In addition, MTC provided detailed project information on the www.planbayarea.org website and sent a monthly digital newsletter so that Bay Area residents and stakeholders could remain informed. MTC also developed three in-depth games to inform participants and obtain feedback on strategies under consideration. MTC held two summits with Native American tribal leaders and hosted government-to-government consultations as requested by individual tribes. Finally, MTC conducted a statistically valid telephone poll of nearly 3,000 Bay Area residents. Additional public engagement opportunities on the Draft Plan Bay Area 2050 will be held in June and July of 2021, with anticipated adoption to occur in fall 2021.

The first round of engagement began in fall 2019 and focused on introducing the proposed Plan to the public. The purpose of the first round was to gauge the public's support of high-performing strategies aimed at meeting the Plan's transportation, housing, environmental, and economic goals while also capturing any new strategy ideas. Engagement consisted of a series of pop-up workshops at existing community events and locations and an interactive online tool called Mayor of Bayville. The input from these tactics helped staff prioritize and refine the strategies that were then incorporated into the Draft Blueprint. This effort resulted in submission of over 13,000 comments.

In late spring and summer 2020, ABAG and MTC began the second round of engagement, which focused on improving the strategies from the previous round of engagement. This work began as the Bay Area and the rest of the world began contending with the novel coronavirus pandemic that required all Bay Area residents to shelter in place and maintain physical distancing. Because in-person engagement was impossible, staff leveraged a suite of digital and nondigital approaches—which provided the opportunity to try new technology while also reaching a broader audience—including public, community, and tribal workshops and focus groups using video conferencing software; telephone town hall meetings using a telephone meeting system; an online survey using an online polling platform; workshops with technical partners using online collaboration software; and a statistically valid telephone poll to ask Bay Area residents key questions about various elements within the Draft Blueprint, the precursor to the proposed Plan. Over 7,500 residents participated in these activities, which yielded over 3,400 comments and helped inform the Draft Blueprint.

Finally, as a regular practice, MTC and ABAG contract with community-based organizations that work with communities with low incomes and communities of color to regularly engage with these communities throughout the planning process. The eight community-based organizations were selected through a competitive process and provided input via focus groups, attendance at pop-up events, and correspondence to their constituents. Since March 2020, two round of focus groups were held with the community-based organizations and their respective constituents. The first round focused on the Draft Blueprint in early summer 2020, and the second round focused on the

Implementation Plan in late 2020. The community-based organization will help reach out to constituents to participate in workshops on the Draft Plan in June/July 2021.

The final round of engagement will take place in late spring and summer 2021. Engagement activities will include virtual public workshops, virtual public hearings, presentations to elected officials, and youth engagement through a regional scavenger hunt. Additional documentation on public engagement activities is available at www.planbayarea.org.

1.8 FUTURE ENVIRONMENTAL REVIEW

Implementation of the projects addressed in the proposed Plan must individually demonstrate compliance with the requirements of CEQA and/or NEPA (for projects requiring federal funding or approvals). As appropriate, individual projects may be required to prepare a project-level analysis to fulfill CEQA and/or NEPA requirements. The lead agency responsible for reviewing these projects shall determine the level of review needed, and the scope of that analysis will depend on the specifics of the particular project. These projects may, however, use the discussion of impacts in this program EIR as a basis of their assessment of these regional or cumulative impacts. These projects may also be eligible for CEQA streamlining under SB 375, as explained further below.

This program EIR is a first-tier document that addresses the environmental impacts that may affect the nine-county Bay Area as a result of adoption and implementation of Plan Bay Area 2050. "Tiering" generally refers to using the analysis of a broader environmental document that covers the general impacts of a program or larger-scale project so that subsequent environmental documents for a related individual project can be narrow and focused on unique or unanalyzed issues. CEQA encourages the use of tiering to reduce the time and excessive paperwork involved in the review process by eliminating repetitive analyses of issues that were addressed in the program EIR (CEQA Guidelines Section 15168). SB 375 enables certain qualifying projects to tier off the SCS or alternative planning strategy developed to meet California's climate change goals. Tiered documents may consist of initial studies or focused EIRs that may incorporate by reference portions of the program EIR from which they are tiered. If the potential environmental effects of subsequent actions are consistent with and adequately addressed by a certified program EIR, additional environmental analysis may be unnecessary.

1.9 CEQA STREAMLINING OPPORTUNITIES

Following certification of this EIR and adoption of Plan Bay Area 2050 by MTC and ABAG, CARB must then confirm that the Plan will achieve the GHG emission reduction targets required by Assembly Bill 32 and SB 375. After this determination is made, a number of streamlining benefits become available to lead agencies that carry out or approve future projects consistent with the Plan.

For a lead agency to take advantage of the potential streamlining benefits associated with the SCS, the lead agency must comply with all feasible and applicable mitigation measures included in this EIR, to the extent necessary, to substantially lessen or avoid potentially significant impacts of the project. Where a future project, as mitigated by the lead agency, would not result in a potentially significant impact identified in this EIR, the lead agency is not required to adopt the mitigation measures set forth in this EIR and/or other relevant project-level EIRs to take advantage of the CEQA streamlining benefits discussed below.

1.9.1 Streamlining Under SB 375

SB 375 provides streamlining benefits for transit priority projects (TPPs). A TPP is a project that meets all the following criteria:

- consistent with the general land use designation, density, building intensity, and applicable policies specified for the project area in the SCS;
- located within half a mile of a major transit stop or high-quality transit corridor;
- composed of at least 50 percent residential use based on total building square footage and if 26–50 percent of total building square footage is nonresidential, a minimum floor area ratio of 0.75); and
- built out with a minimum of 20 dwelling units per acre (Public Resources Code [PRC] Section 21155).

For the purposes of this EIR, geographic areas that meet the TPP requirements are referred to as Transit Priority Areas (TPAs).

One of three potential streamlining benefits may apply to a TPP pursuant to SB 375, as described below and in **Table 1-2**.

First, TPPs that meet a detailed list of criteria set forth in PRC Section 21155.1 are statutorily exempt from CEQA. Because the list of criteria that must be met to achieve this exemption is extensive, the exemption may be available only in limited circumstances.

Second, a TPP that does not qualify for the statutory exemption may be eligible to comply with CEQA using a Sustainable Communities Environmental Assessment (SCEA). An SCEA is similar to a streamlined negative declaration or mitigated negative declaration and requires a 30-day public review period. An SCEA is available for a TPP that would not result in any potentially significant environmental impacts after mitigation and that has incorporated all feasible mitigation measures, performance standards, or criteria set forth in the prior applicable EIRs, including the EIR for the RTP/SCS. An SCEA is not required to discuss (1) growth-inducing impacts or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network (PRC Sections 21155.2[b][1], 21159.28[a]). In addition, unlike a negative declaration or mitigated negative declaration, a lead agency's decision to approve a TPP based on an SCEA is reviewed, if challenged, by a court under the substantial evidence standard (PRC Section 21155.2[b][7]).

Third, a TPP that would result in one or more potentially significant impacts after mitigation may be reviewed using a tiered TPP EIR as established by PRC Section 21155.2(c). A tiered TPP EIR is required to address only the significant or potentially significant effects of the TPP on the environment. It is not required to include a discussion of (1) growth-inducing impacts, (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network, (3) cumulative effects that have been adequately addressed and mitigated in prior applicable certified EIRs, (4) off-site alternatives, or (5) a reduced-density alternative to address effects of car and light truck trips generated by the TPP (PRC Sections 21155.2[c], 21159.28[a] and [b]).

In addition to the benefits provided for TPPs, SB 375 provides streamlining benefits for residential or mixed-use residential projects, as defined in PRC Section 21159.28(d), that are consistent with the use designation, density, building intensity, and applicable policies specified for the project area in the

SCS. Projects eligible for streamlining must incorporate mitigation measures required by an applicable prior environmental document, such as this EIR if it is certified by MTC and ABAG. EIRs for qualifying residential or mixed-use residential projects are not required to include a discussion of (1) growth-inducing impacts, (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network, or (3) a reduced-density alternative to address effects of car and light truck trips generated by the project (PRC Section 21159.28[a] and [b]).

Table 1-2 lists the prerequisites and qualifications for residential/mixed-use residential projects, TPPs, and sustainable communities projects and the corresponding CEQA streamlining benefits under SB 375. Projects that use the SB 375 CEQA streamlining benefits would still need to obtain discretionary permits or other approvals from the lead agency and the local jurisdiction, in accordance with local codes and procedures, including any agreements related to zoning, design review, use permits, and other local code requirements. Other development projects that do not fall into any of these categories could still use this EIR for other CEQA tiering benefits. For more information, see Section 1.9.4, "Other Tiering Opportunities."

Table 1-2: SB 375 Requirements for CEQA Streamlining Related to an SCS

Project Designation	Mixed-Use Residential Project	Transit Priority Project	Sustainable Communities Project
Prerequisites	◢ MPO adopts an SCS or APS that can achieve region's GHG emissions reduction target ◢ CARB accepts the SCS or APS ◢ Proposed project is a residential or residential mixed-use project consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in the SCS or APS ◢ Project has incorporated applicable mitigation measures or performance standards required by a prior environmental document ◢ Regardless of any CEQA streamlining or exemption benefits that a project receives from the SB 375 CEQA provisions, the lead agency must consider the merits of the project before moving forward with project approvals in accordance with local codes and procedures		
Qualifications	◢ At least 75% of total building square footage for residential use	◢ At least 50% of total building square footage for residential use and If 26–50% of total building square footage is nonresidential, a minimum FAR of 0.75; ◢ Minimum net density of 20 du/acre; and ◢ Within 0.5 mile of major transit stop or high-quality transit corridor included in the RTP	◢ Everything for Transit Priority Project PLUS: ◢ Served by existing utilities ◢ Applicant pays all applicable fees ◢ Does not contain wetlands or riparian areas ◢ Does not have significant value as a wildlife habitat and does not harm any protected species ◢ Not on the Cortese List ◢ No risks from hazardous substances ◢ No impacts on historic resources ◢ No wildfire, seismic, flood, or public health risk ◢ Not on developed open space ◢ Buildings are 15% more energy efficient than required under Title 24 ◢ Landscaping uses 25% less water than average households ◢ Site is no more than 8 acres

Project Designation	Mixed-Use Residential Project	Transit Priority Project	Sustainable Communities Project
			◢ No more than 200 housing units ◢ No net loss of affordable housing within project area ◢ No building greater than 75,000 square feet ◢ Does not conflict with nearby industrial uses ◢ Meets minimum affordable housing requirements as prescribed in SB 375 OR in-lieu fee paid OR 5 acres of open space per 1,000 residents provided
Streamlining Benefits	Environmental documents are **not** required to reference, describe, or discuss: ◢ Growth-inducing impacts ◢ Impacts from car and light-duty truck trips on global warming or ◢ the regional transportation network ◢ A reduced-density alternative to project (EIRs only) ◢ Cumulative effects that have been adequately addressed and mitigated in prior applicable certified EIRs ◢ Off-site alternatives	The lead agency may determine whether to pursue a Sustainable Communities Environmental Assessment (SCEA) or a Limited Environmental Review SCEA: ◢ Lead agency prepares only an initial study that identifies all significant impacts, except for growth-inducing impacts and impacts from car and light-duty truck trips on global warming or the regional transportation network ◢ Cumulative effects identified and mitigated for in previous applicable EIRs shall NOT be treated as cumulatively considerable for the project ◢ Shall contain mitigation measures to avoid or mitigate to a level of less than significant all significant effects identified ◢ 30-day public comment period ◢ May be approved after the lead agency conducts a public hearing, reviews comments received, and finds that all potentially significant effects have been identified, analyzed, and mitigated to a level of less than significant ◢ The fee to appeal a planning commission decision to the decision-making body shall not exceed $500 ◢ Deferential review standard—the burden of proof for legal challenge is on the petitioner/plaintiff ◢ Limited analysis EIR	Exempt from CEQA Lead agency may file a notice of exemption upon project approval.

Source: California Public Resources Code, Division 13, Chapter 4.2 (Implementation of the Sustainable Communities Strategy), Section 21155

1.9.2 Streamlining Under SB 226

In 2011, the legislature enacted SB 226 to establish additional streamlining benefits applicable to infill projects that are consistent with the requirements set forth in CEQA Guidelines Section 15183.3 (PRC Sections 21094.5[c], 21094.5.5). Residential, commercial and retail, public office buildings, transit stations, and schools are eligible for this streamlining provided they meet the following requirements: (1) are located in an urban area on a site that has been previously developed or adjoins existing qualified urban uses on at least 75 percent of the site's perimeter; (2) satisfy the performance standards provided in Appendix M of the CEQA Guidelines; and (3) are consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in either an SCS or an alternative planning strategy, with some exceptions. For these projects, an "infill EIR" is required to analyze only effects on the environment that are specific to the project or to the project site and that were not addressed as significant effects in a prior planning-level EIR unless new information shows the effects would be more significant than described in the prior EIR (PRC Section 21094.5[a][1]). Moreover, an infill EIR is not required to consider potentially significant environmental effects of the project that would be reduced to a less-than-significant level by applying uniformly applicable development policies or standards adopted by the city, county, or the lead agency (PRC Section 21094.5[a][2]). The infill EIR is not required to discuss (1) alternative locations, project densities, or building intensities or (2) growth-inducing impacts.

Unlike the CEQA streamlining benefits established by SB 375 which are limited to residential projects, the benefits created by SB 226 may apply to nonresidential projects, including qualifying commercial, retail, transit station, school, or public office building projects (CEQA Guidelines Section 15183.3[f][1]).

1.9.3 Streamlining Under SB 743

SB 743 (2013) (PRC Sections 21099 and 21155.4) created an exemption from CEQA for certain projects that are consistent with a specific plan. (See PRC Section 21155.4.) A specific plan is a local plan that contains specific policies and development regulations for a defined area, such as a downtown core or along a transit corridor. The exemption applies if a project meets all of the following criteria:

- It is a residential, employment center, or mixed-use project.
- It is located within a TPA.
- The project is consistent with a specific plan for which an EIR was certified.
- It is consistent with an adopted SCS or alternative planning strategy.

The exemption cannot be applied if the project would cause new or worse significant environmental impacts compared to those analyzed in the EIR for the specific plan. In that case, supplemental environmental review must be conducted.

SB 743 also specifies that aesthetic and parking impacts of residential, mixed-use residential, or employment center uses on infill sites within a TPA shall not be considered significant effects on the environment (see PRC Section 21099[d]).

1.9.4 Other Tiering Opportunities

Finally, for all other types of projects proposed to be carried out or approved by a lead agency within the region, the lead agency may use this EIR for the purposes of other allowed CEQA tiering (PRC Sections 21068.5, 21093–21094; CEQA Guidelines 15152, 15385). Moreover, by tiering from this EIR (if certified by MTC and ABAG), a later tiered EIR would not be required to examine effects that (1) were

mitigated or avoided in this EIR; (2) were examined in this EIR at a level of detail sufficient to allow those effects to be mitigated or avoided by site-specific revisions, the imposition of conditions, or other means in connection with the approval of the later project; or (3) constitute cumulative effects and that were adequately addressed in this EIR (PRC Section 21094).

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

The proposed project is a long-range regional plan for the nine-county San Francisco Bay Area (Bay Area or region), encompassing housing, economic, transportation, and environmental strategies designed to make the Bay Area more equitable for all residents and more resilient in the face of unexpected challenges. Known as Plan Bay Area 2050, referred to herein as the "proposed Plan," it serves as the region's 2021 RTP/SCS.

An RTP, also sometimes referred to as a Metropolitan Transportation Plan or Long-Range Transportation Plan, is the mechanism used in California by both Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Agencies (RTPAs) to conduct required long-range (minimum 20-year) planning for the region's multimodal transportation system. The SCS is a land use plan for the region that, in combination with the RTP, would accommodate future regional growth at all income levels while achieving State greenhouse gas (GHG) emissions reduction targets if implemented.

The draft Plan, supplementary reports, and other technical documents on the planning process can be found at the Plan Bay Area 2050 website: www.planbayarea.org.

This chapter describes the proposed Plan and the project objectives and includes a discussion on planning assumptions and the Plan's strategies and resulting forecasted changes.

2.2 PROPOSED PLAN

The most recent RTP/SCS for the Bay Area region—Plan Bay Area 2040—was adopted in 2017. As the Bay Area's second RTP to include an SCS, the 2017 plan was considered a "limited and focused" update of the original Plan Bay Area, adopted in 2013. The proposed Plan serves as the third RTP/SCS for the Bay Area and is a major update to Plan Bay Area 2040 while accompanying a current Regional Housing Needs Allocation (RHNA) cycle. The proposed Plan expands in scope, relative to prior plans, by examining the themes of economic development and environmental resilience. As a result, the proposed Plan focuses on 4 interrelated elements—housing, the economy, transportation, and the environment. The proposed Plan is composed of 35 integrated strategies across the 4 elements that provide a blueprint for how the Bay Area can accommodate future growth and make the region more equitable and resilient in the face of unexpected challenges and achieve regional GHG emissions reduction targets established by the California Air Resources Board (CARB) pursuant to SB 375. Strategies in the context of the proposed Plan are defined as either a public policy or a set of investments that can be implemented in the Bay Area over the next 30 years.

The proposed Plan's 14 housing and economic strategies detail how the region can accommodate the region's forecasted growth in population, households, housing units, and jobs within the region (see Section 2.3.1, "Regional Growth Forecast") and shape the ensuing forecasted development pattern. The land use strategies along with specific geographic areas—known as growth geographies—work in tandem to focus housing and job growth into existing communities well served by the transportation network, as well as communities with well-resourced schools and easy access to jobs, parks, and other amenities. This core strategy is known as the "focused growth" strategy. Key to implementing the "focused growth" strategy are the locally nominated growth geographies, including priority

development areas (PDAs) and priority production areas (PPAs). The proposed Plan also includes the designation of new growth geographies for both housing and jobs. These growth geographies are explained in more detail in Section 2.3.4 in this chapter and depicted in **Figure 2-5**.

The proposed Plan's 12 transportation strategies build upon the region's long-standing commitment to a "fix-it-first" strategy to maintain and optimize the existing transportation system and establish project and program priorities that allow project sponsors to qualify for federal funding for public transit, streets and roads, and bicycle and pedestrian facilities. Undergirding the transportation strategies is the fiscally constrained transportation project list, constrained by expected transportation revenues is fundamental to the RTP and required per federal and State regulations.

The proposed Plan's 9 environmental strategies promote conservation, adaptation, and climate resilience, including a specific strategy (EN01, "Adapt to Sea Level Rise,") to protect shoreline communities affected by sea level rise by identifying a series of adaptation infrastructure strategies (see Section 2.2.2, "Proposed Plan Strategies"). As part of the proposed Plan, archetype adaptation infrastructure was identified for regularly inundated shoreline areas. Archetypes include elevated roadways, a variety of levees, seawalls, tidal gates, and marsh restoration. The sea level rise adaptation infrastructure archetypes are described below under Section 2.2.2.

In summary, the proposed Plan:

- details housing and economic strategies ("land use") to invest $702 billion in expected revenues to accommodate 2.7 million new persons, 1.4 million new households, 1.5 new forecasted housing units, and 1.4 million new jobs between 2015 and 2050;
- details transportation strategies to invest $579 billion in expected revenues from federal, State, regional, and local sources over the next 30 years;
- details environmental strategies to invest $102 billion in expected revenues to protect the region from at least two feet of future permanent sea level rise inundation, reduce climate emissions, and maintain and expand the region's parks and open space system; and
- complies with Senate Bill (SB) 375, the State's SCS law, which requires integration of land use and transportation planning to reduce per-capita passenger vehicle GHG emissions by 2035 and provide adequate housing for the region's forecast of 2.7 million new persons and 1.4 million new households.

The proposed Plan area covers the entire Bay Area, which includes the nine counties and the 101 cities that make up the region. The proposed Plan is constrained by expected transportation revenues and the forecasted population and job growth discussed in Section 2.3, "Planning Assumptions." The proposed Plan does not change local land use policies; individual jurisdictions retain all local land use authority. The proposed Plan facilitates subsequent streamlined CEQA analysis pursuant to SB 375, SB 743, and other methods described in Section 1.9, "CEQA Streamlining Opportunities," in Chapter 1, "Introduction." The proposed Plan includes a fiscally constrained list of transportation projects and programs that are eligible for future federal and State funding but does not allocate funds to any specific transportation project or program.

2.2.1 Project Objectives

The proposed Plan's adopted vision is to "ensure by the year 2050 that the Bay Area is affordable, connected, diverse, healthy, and vibrant for all." As part of the planning process, MTC and ABAG developed guiding principles and associated performance measures for the proposed Plan in

conjunction with members of the public, partners, and elected officials. In addition, SB 375 mandates two performance targets related to housing the population and achieving GHG emission reduction targets. Together, the guiding principles and performance metrics serve as the basis for the following CEQA objectives:

1. Address climate change by reducing carbon dioxide emissions pursuant to targets established in consultation with the California Air Resources Board; specifically, meet or exceed a 19-percent reduction in per-capita emissions from cars and light-duty trucks by 2035 relative to 2005 levels.

2. House 100 percent of the region's projected growth by income level, and with no increase in in-commuters over the proposed Plan baseline year.

3. Ensure that all current and future Bay Area residents and workers have sufficient housing options they can afford by reducing how much residents spend on housing and transportation and by producing and preserving more affordable housing.

4. Support an expanded, well-functioning, safe and multimodal transportation system that connects the Bay Area by improving access to destinations and by ensuring residents and workers have a transportation system they can rely on.

5. Support an inclusive region where people from all backgrounds, abilities, and ages can remain in place with full access to the region's assets and resources by creating more inclusive communities and reducing the risk that Bay Area residents are displaced.

6. Conserve the region's natural resources, open space, clean water, and clean air with the intent of improving health of Bay Area residents and workers and improving the health of the environment locally and globally.

7. Support the creation of quality job opportunities for all and ample fiscal resources for communities by more evenly distributing jobs and housing in the Bay Area and by enabling the regional economy to thrive.

2.2.2 Proposed Plan Strategies

Plan Bay Area 2050 is defined by four **elements**: housing, economy, transportation, and environment. Within each, there are two or three central **themes** (totaling 11 across the entire Plan) under which several **strategies** (totaling 35 across the entire Plan) are nested. Equity and resilience—the cross-cutting themes of Plan Bay Area 2050—are integrated into each element, theme, and strategy. As part of the Implementation Plan currently under development, MTC and ABAG are identifying one or more **implementation actions** for each strategy, currently totaling just under 70 implementation actions across the entire Plan. Whereas the strategies described below are envisioned to be implemented over the next three decades by local, regional, or State government, the Implementation Plan specifies MTC's and ABAG's role in advancing each strategy through specific implementation actions over the next 5 years.

The strategies detailed below are the proposed Plan's 35 integrated strategies that will enable the Bay Area to accommodate future growth and make the region more equitable and resilient in the face of unexpected challenges, such as the uncertainties posed by rising sea levels, economic cycles, and new technologies. Strategies, in the context of the proposed Plan, are defined as either a public policy or a set of investments that can be implemented in the Bay Area over the next 30 years.

HOUSING

The proposed Plan's 8 housing strategies detail how the region can accommodate the region's forecasted 1.5 million new housing units over the next 30 years. The housing strategies continue the region's commitment to "focused growth" but also are intended to protect current residents from displacement, preserve existing affordable housing, and produce new housing to secure long-term affordability to address the Bay Area's housing crisis (the "three Ps").

The strategies were selected to move the region toward its adopted vision of a more affordable, connected, diverse, healthy, and vibrant Bay Area for all, and to exceed the State-mandated target for GHG emissions reductions. This is generally accomplished by some of the strategies' ability to shape the region's forecasted land use development pattern and focus new housing in TRAs and HRAs.

Protect and Preserve Affordable Housing | $239 Billion | 51%

The depth of the Bay Area's housing crisis is so great that it is unlikely that increased housing construction alone will be sufficient to ensure every Bay Area resident has access to a safe and affordable home. Protecting and preserving existing affordable housing is critical to advancing the proposed Plan's vision for a more affordable region. Policies and investments that ensure today's affordable housing is not converted into market-rate housing are a key component. Additionally, action will be needed to reverse the decades-long trend of displacement—affecting both renters and owners in the Bay Area—including legal protections and prohibition of exploitative landlord behaviors.

Final Blueprint strategies build upon existing State and local legislation to protect renters from discriminatory action from landlords or untenable rent increases, creating a standard of tenant protections and services available regionwide to limit displacement. Furthermore, the Final Blueprint includes an investment to ensure that today's affordable housing remains affordable into the future.

Below are the proposed Plan strategies to protect and preserve affordable housing:

- H01. Further Strengthen Renter Protections Beyond State Legislation | $2 Billion | Building upon recent tenant protection laws, limit annual rent increases to the rate of inflation while exempting units less than 10 years old.
- H02. Preserve Existing Affordable Housing | $237 Billion | Acquire homes currently affordable to low- and middle-income residents for preservation as permanently deed-restricted affordable housing.

Spur Housing Production at All Income Levels | $219 Billion | 47%

The third prong of the three Ps (protection, preservation, and production) framework is to produce more housing at every affordability level. The Bay Area has historically fallen short of producing housing for all income levels, particularly for low- and moderate-income households. Many factors feed into this lagging production, including overly restrictive zoning that places a cap on the number of new units that can be built on a site, rising construction costs and land values, a long permitting process for units of all affordability levels, and a lack of financing and subsidies for homes affordable to households with low-and moderate incomes.

Spurring housing production at all income levels will likely require a mix of land use reforms, new requirements for housing developers, and financial incentives to make it more easily financially viable to produce housing affordable to low- and moderate-Income families. The proposed Plan includes strategies for each of these areas, implemented regionwide to ensure that the region produces enough housing to accommodate all future population growth, as required by law.

Below are the proposed Plan strategies to spur housing production at all income levels:

- **H03. Allow a Greater Mix of Housing Densities and Types in Growth Geographies | Negligible Cost |** Allow a variety of housing types at a range of densities to be built in PDAs, select TRAs, and select HRAs.

- **H04. Build Adequate Affordable Housing to Ensure Homes for All | $219 Billion |** Construct enough deed-restricted affordable homes to fill the existing gap in housing for the unhoused community and to meet the needs of low-income households.

- **H05. Integrate Affordable Housing into All Major Housing Projects | Negligible Cost |** Require a baseline of 10–20 percent of new market-rate housing developments of five units or more to be affordable to low-income households.

- **H06. Transform Aging Malls and Office Parks into Neighborhoods | Negligible Cost |** Permit and promote the reuse of shopping malls and office parks with limited commercial viability as neighborhoods with housing for residents at all income levels.

Create Inclusive Communities | $10 Billion | 2%

In addition to strategies related to housing supply and stability, an additional suite of strategies works to move the Bay Area toward higher degrees of inclusivity and equity for all residents. The 3 Ps of protection, preservation, and production alone are not sufficient to reverse centuries of exclusionary race-based policies that have affected everything from access to wealth-building opportunities like homeownership to where people of color still live today. Strategies that increase access to wealth-building opportunities like home ownership or owning a personal business, as well as strategic leveraging of public and community-owned land for housing and service provision, are intended to directly improve conditions for Black, indigenous, and Latinx people who have been historically excluded from such opportunities.

Below are the proposed Plan strategies to create inclusive communities:

- **H07. Provide Targeted Mortgage, Rental, and Small Business Assistance to Communities of Concern | $10 Billion |** Provide assistance to low-income communities and communities of color to address the legacy of exclusion and predatory lending, while helping to grow locally owned businesses.

- **H08. Accelerate Reuse of Public and Community-Owned Land for Mixed-Income Housing and Essential Services | Negligible Cost |** Help public agencies, community land trusts and other nonprofit landowners accelerate development of mixed-income affordable housing.

ECONOMY

The proposed Plan's 6 economic strategies detail how the region can accommodate the region's forecasted 1.4 million new jobs over the next 30 years. The economic strategies continue the region's commitment to "focused growth," concentrating development of new employment centers within the existing urban development footprint ("developed" land) and close to housing and transit stations.

The strategies were selected to move the region toward its adopted vision of a more affordable, connected, diverse, healthy, and vibrant Bay Area for all, and to exceed the State-mandated target for GHG emissions reductions. This is generally accomplished by the strategies' ability to shape the regional forecasted development pattern and focus new jobs in TRAs and PPAs.

Improve Economic Mobility | $220 Billion | 94%

As the types of jobs available to Bay Area residents continue to shift, fewer and fewer middle-wage jobs become available. Over the past few decades, the traditional path to middle class through a blue-

collar industry like manufacturing has become ever more elusive as automation grows and wages sharply diverge. Over the same period, the cost of living in the Bay Area has risen substantially, buoyed by a self-reinforcing cycle of higher-wage job growth and rising housing costs.

A stronger safety net, coupled with a concerted effort to open more pathways to middle-wage jobs, is critical to ensuring that no one is priced out of the Bay Area. Improving economic mobility is a complex undertaking beyond MTC's and ABAG's jurisdictional sphere that will require a coordinated, multipronged approach, as well as further growing key partnerships.

Below are the proposed Plan strategies to Improve economic mobility:

- **EC01. Implement a Statewide Universal Basic Income | $205 Billion |** Provide an average $500 per month payment to all Bay Area households to improve family stability, promote economic mobility, and increase consumer spending.
- **EC02. Expand Job Training and Incubator Programs | $5 Billion |** Fund assistance programs for establishing new businesses, as well as job training programs, primarily in historically disinvested communities.
- **EC03. Invest in High-Speed Internet in Underserved Low-Income Communities | $10 Billion |** Provide direct subsidies and construct public infrastructure to ensure all communities have affordable access to high-speed internet.

Shift the Location of Jobs | $14 Billion | 6%

The Bay Area must also address its imbalance of the location of jobs and housing in order to support continued economic growth. The region's jobs-to-housing imbalance is decades in the making, a result of land use policies focusing on local needs and a transportation system that was historically able to grow just enough to meet increased peak period demand. It is also a product of the power of economic agglomeration, where like industries locate together (for example, information sector jobs clustered in the West Bay and South Bay). The Bay Area has reached a point where transportation can no longer address this imbalance, requiring strategies to shift the location of jobs.

Below are the proposed Plan strategies to shift the location of jobs:

- **EC04. Allow Greater Commercial Densities in Growth Geographies | Negligible Cost** | Allow greater densities for new commercial development in select PDAs and select TRAs to encourage more jobs to locate near public transit.
- **EC05. Provide Incentives to Employers to Shift Jobs to HRAs Well Served by Transit | $10 Billion |** Provide subsidies to encourage employers to relocate offices to housing-rich areas near regional rail stations.
- **EC06. Retain and Invest in Key Industrial Lands | $4 Billion |** Implement local land use policies to protect key industrial lands identified as PPAs, while funding key infrastructure improvements in these areas.

TRANSPORTATION

The proposed Plan's 12 transportation strategies detail how the region intends to invest the region's $579 billion in committed and forecasted transportation revenues over the next 30 years. The transportation strategies continue the region's long-standing commitment to a "fix-it-first" strategy to maintain, optimize, and restore the existing transportation system. Additionally, the transportation strategies are designed to create healthy and safe streets for pedestrians, cyclists, car drivers, and

transit users and to build a next-generation transit network that is coordinated, consistent, and convenient across the region.

The strategies were selected to move the region toward its adopted vision of a more affordable, connected, diverse, healthy, and vibrant Bay Area for all and to exceed the State-mandated target for GHG emissions reductions. This is generally accomplished by the strategies' ability to increase travel mode choices and accessibility while reducing travel times and costs.

Maintain and Optimize the Existing System | $441 Billion | 78%

Over three-fourths of the proposed Plan's transportation revenues are reinvested toward maintaining and optimizing the existing transportation system. Nearly two-thirds of the forecasted revenues are dedicated to maintaining existing roads, bridges, and transit vehicles and providing transit service. The proposed Plan is designed to promote a seamless mobility experience, meaning that travel options are convenient and easy to understand. The proposed Plan includes standardizing transit fares across the region's 27 transit operators, with one local fare across all operators and free transfers between local routes. The proposed Plan includes implementing per-mile tolling on select congested freeways where parallel transit options exist. To support equity goals and reduce the regressive impact of this pricing measure, the strategy would be means-based; households earning below the median income would receive a 50-percent discount. The generated revenue would be directly reinvested in improving transit alternatives. An estimated $25 billion in funding for transportation projects could be generated between 2030 and 2050, helping to fund transit investments proposed for the latter years of the proposed Plan. The proposed Plan proposes addressing highway bottlenecks and improving interchanges through a limited selection of roadway widenings, local road extensions to serve new developments, and interchange redesigns that improve safety and operations.

Below are the proposed Plan strategies to maintain and optimize the Bay Area's existing transportation system:

- **T01. Restore, Operate, and Maintain the Existing System | $390 Billion |** Commit to operate and maintain the Bay Area's roads and transit infrastructure while restoring transit service hours to 2019 levels.
- **T02. Support Community-Led Transportation Enhancements in Equity Priority Communities | $8 Billion |** Provide direct funding to historically marginalized communities for locally identified transportation needs.
- **T03. Enable a Seamless Mobility Experience | $3 Billion |** Eliminate barriers to multi-operator transit trips by streamlining fare payment and trip planning while requiring schedule coordination at timed transfer hubs.
- **T04. Reform Regional Transit Fare Policy | $10 Billion |** Streamline fare payment and replace existing operator-specific discounted fare programs with an integrated fare structure across all transit operators.
- **T05. Implement Per-Mile Tolling on Congested Freeways with Transit Alternatives | $1 Billion |** Apply a per-mile charge on auto travel on select congested freeway corridors where transit alternatives exist, with discounts for carpoolers, low-income residents, and off-peak travel, and reinvest excess revenues into transit alternatives in the corridor.
- **T06. Improve Interchanges and Address Highway Bottlenecks | $11 Billion |** Rebuild interchanges and widen key highway bottlenecks to achieve short- to-medium term congestion relief.

- **T07. Advance Other Regional Programs and Local Priorities | $18 Billion |** Fund regional programs like 511 while supporting local transportation investments on arterials and local streets.

Create Healthy and Safe Streets | $17 Billion | 3%

The second major theme of the transportation strategies is the creation of healthy and safe streets. Active modes are particularly important for local trips like shopping at nearby businesses and for recreation, as well as for accessing transit for longer-distance trips. Active transportation benefits both public health, through increased physical activity, and the environment, through zero-emissions travel.

Below are the proposed Plan strategies to create healthy and safe Bay Area streets:

- **T08. Build a Complete Streets Network | $13 Billion |** Enhance streets to promote walking, biking, and other micromobility through sidewalk improvements, car-free slow streets, and 10,000 miles of bike lanes or multi-use paths.
- **T09. Advance Regional Vision Zero Policy through Street Design and Reduced Speeds | $4 Billion |** Reduce speed limits to 20–35 miles per hour on local streets and 55 miles per hour on freeways, relying on design elements on local streets and automated speed enforcement on freeways.

Build a Next Generation Transit Network | $121 Billion | 19%

The proposed Plan dedicates over $30 billion over the next 30 years to expanding local transit, increasing its frequency, and installing infrastructure that enables local transit to operate faster, more reliably, and under less crowded conditions. The proposed Plan also envisions an enhanced regional rail network, with a set of investments totaling over $80 billion that put the Bay Area on the path toward a world-class rail system. The anchor of a plan for rail in the Bay Area, looking out to 2050, is a new transbay rail crossing connecting downtown Oakland and San Francisco.

The proposed Plan responds to the challenge of in-commuters, or people who live outside of the nine-county Bay Area but commute in each day to work. For those commuting into the region from the south, the proposed Plan includes investments that lay the foundation for the arrival of California High-Speed Rail into the region.

The proposed Plan recognizes the need for a flexible, multimodal transportation system and plans for a robust regional express bus service plan that complements regional rail and local transit. Investments in express buses total $9 billion, which is paired with an investment to build out the Bay Area Express Lane Network, to ensure that express bus service is time-competitive with driving while also providing drivers with an option to bypass congestion by paying an added toll.

Below are the proposed Plan strategies to build the Bay Area's next generation transit network:

- **T10. Enhance Local Transit Frequency, Capacity, and Reliability | $31 Billion |** Improve the quality and availability of local bus and light rail service, with new bus rapid transit lines, South Bay light rail extensions, and frequency increases focused in lower-income communities.
- **T11. Expand and Modernize the Regional Rail Network | $81 Billion |** Better connect communities while increasing frequencies by advancing the Link21 new transbay rail crossing, BART to Silicon Valley Phase 2, Valley Link, Caltrain Downtown Rail Extension, and Caltrain/High-Speed Rail grade separations, among other projects.
- **T12. Build an Integrated Regional Express Lane and Express Bus Network | $9 Billion |** Complete the buildout of the regional express lanes network to provide uncongested freeway lanes for new and improved express bus services, carpools, and toll-paying solo drivers.

ENVIRONMENT

The proposed Plan's 9 environmental strategies promote conservation, adaptation, and climate mitigation. Strategies that fall under the three themes of reducing risks from hazards, expanding access to parks and open space, and reducing climate emissions are crucial to ensuring that the Bay Area is environmentally—and equitably—thriving in 2050.

The strategies were selected to move the region toward its adopted vision of a more affordable, connected, diverse, healthy, and vibrant Bay Area for all, and to exceed the State-mandated target for GHG emissions reductions. This is generally accomplished by the strategies' ability to protect from sea level rise, shape the region's forecasted land pattern and focus growth (housing and jobs) away from hazards, and reduce GHG emissions.

Reduce Risks from Hazards | $52 Billion | 51%

By 2050, according to many climate scientists, major U.S. cities, including San Francisco, will have unprecedented weather events. Wildfires that destroy hundreds of homes in a single night are becoming an annual occurrence, and traffic is currently routinely rerouted on several low-lying roads because of flooding from heavy rains. The threat of a major earthquake has always existed in the Bay Area, and with the last major seismic event in the region occurring in 1989 with the Loma Prieta earthquake, the region is due for another major event, based on scientific forecasts.

There is considerable uncertainty as to how natural hazards will shape life in the Bay Area over the next 30 years and beyond. The proposed Plan takes these risks into account, discouraging growth in high-risk wildfire areas; planning to protect homes, businesses, and transportation infrastructure from flooding; and considering avenues to minimize damage from a major earthquake.

Below are the proposed Plan strategies to reduce risks from hazards:

- **EN01. Adapt to Sea Level Rise | $19 Billion |** Protect shoreline communities affected by sea level rise, prioritizing low-cost, high-benefit solutions and providing additional support to vulnerable populations.
- **EN02. Provide Means-Based Financial Support to Retrofit Existing Residential Buildings | $15 Billion |** Adopt building ordinances and incentivize retrofits to existing buildings to meet higher seismic, wildfire, water, and energy standards, providing means-based subsidies to offset associated costs.
- **EN03. Fund Energy Upgrades to Enable Carbon-Neutrality in All Existing Commercial and Public Buildings | $18 Billion |** Support electrification and resilient power system upgrades in all public and commercial buildings.

Expand Access to Parks and Open Space | $45 Billion | 44%

The proposed Plan's environmental strategies chart the course for a future Bay Area where development is focused within the existing urban development footprint, ringed by natural lands that are well-maintained and dotted with parks and trails that provide easy access to open space, regardless of where a person lives. Support for locally adopted land use policies that limit new construction outside of the existing footprint, combined with investments in natural lands that serve vital ecological purposes and parks and recreation facilities essential to population health and well-being are packaged together to advance this vision, with a specific emphasis on improving access to parks and open space and promoting a sustainable development pattern.

Below are the proposed Plan strategies to expand access to parks and open space:

- **EN04. Maintain Urban Growth Boundaries | Negligible Cost |** Using urban growth boundaries and other existing environmental protections, focus new development within the existing urban footprint or areas otherwise suitable for growth, as established by local jurisdictions.
- **EN05. Protect and Manage High-Value Conservation Lands | $15 Billion |** Provide strategic matching funds to help conserve and maintain high-priority natural and agricultural lands, including but not limited to PCAs and wildland-urban interface lands.
- **EN06. Modernize and Expand Parks, Trails, and Recreation Facilities | $30 Billion |** Invest in quality parks, trails, and open spaces that provide inclusive recreation opportunities for people from all backgrounds, abilities, and ages to enjoy.

Reduce Climate Emissions | $5 Billion | 5%

The importance of addressing climate change in the face of ever-worsening climate events like fires, drought, extreme heat, and flooding calls for a swift and sustained reduction in GHG emissions across multiple sectors. SB 375, a State mandate to reduce GHG emissions from transportation, codified this importance in 2008, calling on regions across the State to work together toward the goal of reducing global warming and combating climate change.

Strategies recognize that action is needed at a variety of scales and on different timelines. For individuals, policies that encourage more sustainable transportation choices and promote access to zero-emissions vehicles are critical. Employers contribute by compelling their employees to commute sustainably through a menu of incentives and disincentives. Outside of the realm of transportation, buildings are retrofit to be more efficient and emit less pollution. Together, these strategies reduce the Bay Area's climate emissions, exceeding State-mandated targets without sacrificing equitable outcomes.

While many proposed Plan strategies across the transportation, housing, and economy chapters help to reduce climate emissions, below are the proposed Plan strategies to reduce climate emissions included in the environment chapter:

- **EN07. Expand Commute Trip Reduction Programs at Major Employers | Negligible Cost** | Set a sustainable commute target for major employers as part of an expanded Bay Area Commuter Benefits Program, with employers responsible for funding incentives and disincentives to shift auto commuters to any combination of telecommuting, transit, walking, and/or bicycling.
- **EN08. Expand Clean Vehicle Initiatives | $4 Billion |** Expand investments in clean vehicles, including more fuel-efficient vehicles and electric vehicle subsidies and chargers.
- **EN09. Expand Transportation Demand Management Initiatives | $1 Billion |** Expand investments in programs like vanpools, bikeshare, carshare, and parking fees to discourage solo driving.

2.2.3 Conditions Under the Proposed Plan

This section details outcomes of implementation of the proposed Plan's 35 integrated strategies.

LAND USE DEVELOPMENT

Building upon past iterations of Plan Bay Area, the proposed Plan's core strategy remains "focused growth" in existing communities along the existing transportation network, as well as communities with well-resourced schools and easy access to jobs, parks, and other amenities. This strategy helps to

achieve key regional economic, environmental, and equity goals by building upon existing community characteristics and leveraging existing infrastructure while reducing effects on areas with less development. To plan for future growth and meet the GHG emissions reduction target established by CARB pursuant to SB 375, the proposed Plan designates specific geographic areas—known as growth geographies (see Section 2.3.4, "Proposed Plan Growth Geographies")—as areas prioritized to accommodate the regional growth forecast (see Section 2.3.1, "Regional Growth Forecast").

The proposed Plan prioritizes these designated growth geographies to accommodate the regional growth forecast by applying a series of land use strategies (a subset of the housing, economic, and environmental strategies discussed in Section 2.2.2, "Proposed Plan Strategies") to these select geographies to make individual parcels of land more attractive for both development and redevelopment. The proposed Plan uses the growth geographies and land use strategies to influence the forecasted development pattern by affecting the location, use, intensity, and density of forecasted development. Many of the land use strategies are aimed at achieving the proposed Plan's focused growth strategy to comply with SB 375's GHG emissions reduction mandate, whereas other land use strategies are aimed at the affordability of the region's housing to take on SB 375's other mandate to ensure that a mix of housing types are available to households of all income types across the region.

The proposed Plan's forecasted development pattern, also referred to as the "land use growth footprint," represents the development or redevelopment of parcels of land simulated to accommodate the region's forecasted growth of households and jobs from 2015 through 2050 through the development of new building(s). The forecasted development pattern is a result of existing zoning and other land use policies, the regional growth forecast, and the proposed Plan's growth geographies and 35 integrated strategies. The forecasted development pattern is simulated from the Bay Area UrbanSim 2.0 land use model (see Section 2.3.3, "Analysis Tools") by forecasting future land use changes (e.g., development or redevelopment) in 5-year increments starting from base year conditions.

The forecasted development pattern of households and employment is provided in **Table 2-1**. Overall, the regional development pattern in 2050 is not substantially different from the pattern observed in 2015. The South Bay (Santa Clara County) is projected to see substantial growth—73-percent growth in households and 46-percent growth in employment relative to 2015—leading to an increased share of the region's households and employment. While the South Bay increases its share, the North Bay (Marin, Napa, Solano, and Sonoma Counties) decreases its collective share of the region's households and employment. The East and West Bay maintain their respective shares of the region's households and employment. **Figure 2-1** and **Figure 2-2**, on the following pages, depict the general locations and intensity of household and employment growth.

Table 2-1: Forecasted Household and Employment Growth, 2015-2050, by County

County	Households			Employment		
	Base Year, 2015	Proposed Plan, 2050	Change, 2015 to 2050	Base Year, 2015	Proposed Plan, 2050	Change, 2015 to 2050
Alameda	552,000	847,000	+295,000	867,000	1,182,000	+315,000
Contra Costa	383,000	551,000	+169,000	404,000	534,000	+130,000
Marin	109,000	146,000	+37,000	135,000	116,000	-19,000
Napa	50,000	56,000	+5,000	72,000	87,000	+15,000
San Francisco	366,000	578,000	+213,000	682,000	918,000	+236,000
San Mateo	265,000	394,000	+129,000	393,000	507,000	+114,000
Santa Clara	623,000	1,075,000	+453,000	1,099,000	1,610,000	+511,000
Solano	142,000	177,000	+35,000	132,000	201,000	+69,000
Sonoma	188,000	220,000	+32,000	221,000	251,000	+30,000
Regional Total	2,677,000	4,043,000	+1,367,000	4,005,000	5,408,000	+1,403,000

Notes: Whole numbers have been rounded (between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.
Source: Data compiled by MTC and ABAG in 2021

Forecasted changes in potential jobs-housing ratios are summarized in Table 2-2. In this context, the potential jobs-housing ratio is measured as the ratio of jobs ("workers") to households. This measure gives some insight to potential effects on worker travel patterns. The regional jobs-housing ratio is expected to decrease from 1.50 to 1.34 between 2015 and 2050, meaning that households are anticipated to grow more than jobs, resulting in less workers per household in the future. A county jobs-housing ratio of 1.34 would suggest that workers would not have to leave their county of residence to access a job, whereas a county ratio of less than 1.34 would suggest the county exports workers, and a county ratio greater than 1.34 would suggest the county imports workers. This ratio is referred to as "potential" because it does not incorporate the complex decisions people make when choosing where to live and work. Some of the proposed Plan's 35 integrated strategies alter the potential jobs-housing ratios across counties. Overall, the proposed Plan results in regional subareas and subarea counties converging toward the regional jobs-housing ratio of 1.34. The north and east bay subareas, while still below the regional average, are both moving closer to regional average. Similarly, the traditional job-rich peninsula and south bay subareas remain job-rich, but are moving closer to the regional jobs-housing ratio.

Table 2-2: Potential Jobs-Housing Ratio

County	Base Year, 2015	Proposed Plan, 2050	Change, 2015 to 2050	
			Numerical	Percent
Alameda	1.58	1.40	-0.18	-11%
Contra Costa	1.06	0.97	-0.09	-8%
Marin	1.25	0.80	-0.45	-36%
Napa	1.42	1.56	+0.14	+10%
San Francisco	1.86	1.59	-0.27	-15%
San Mateo	1.47	1.28	-0.19	-13%
Santa Clara	1.78	1.51	-0.27	-15%
Solano	0.93	1.14	+0.21	+23%
Sonoma	1.18	1.14	-0.04	-3%
Regional Total	1.50	1.34	-0.16	-11%

Source: Data compiled by MTC and ABAG in 2021

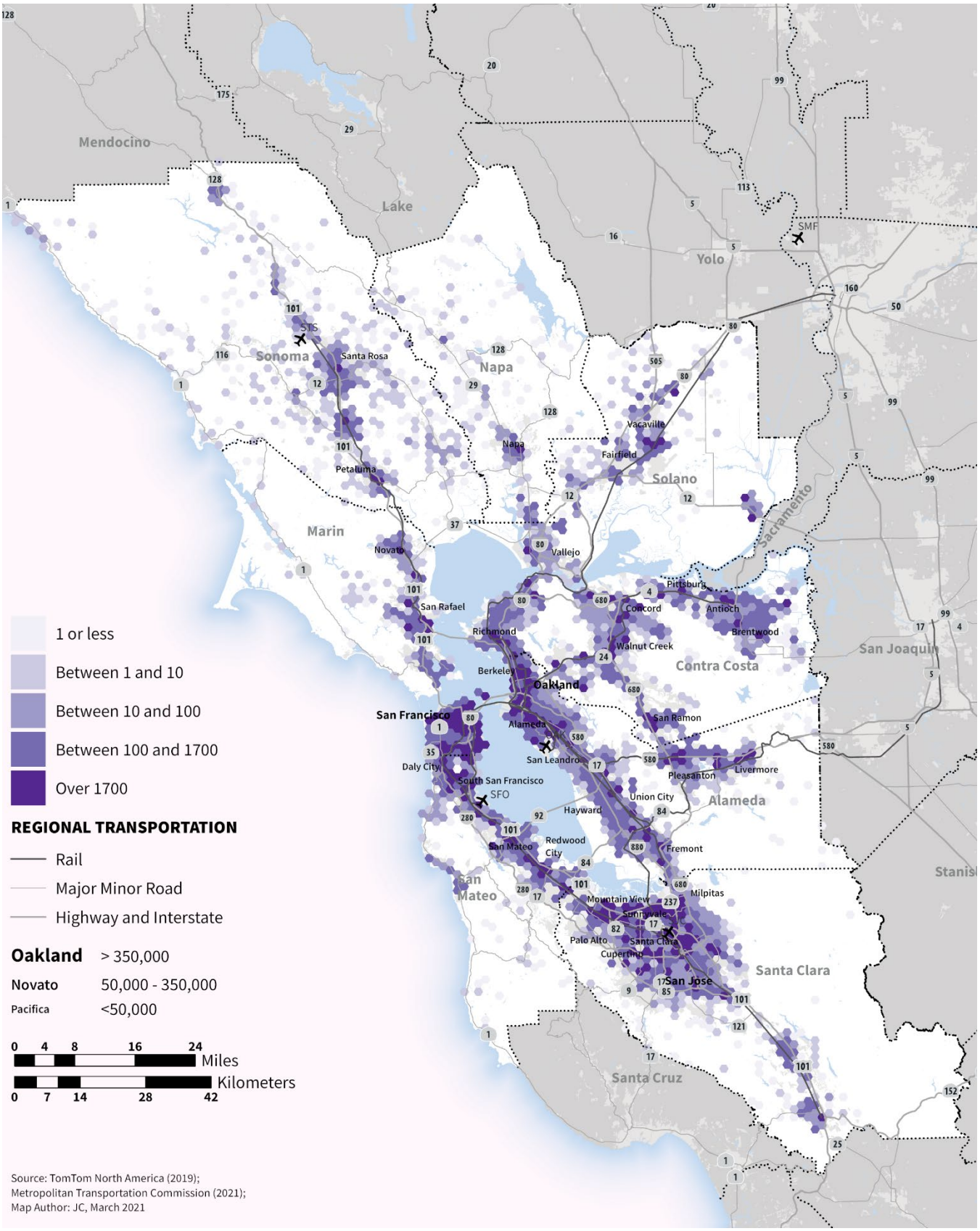

Figure 2-1: Change in Households, 2015 through 2050

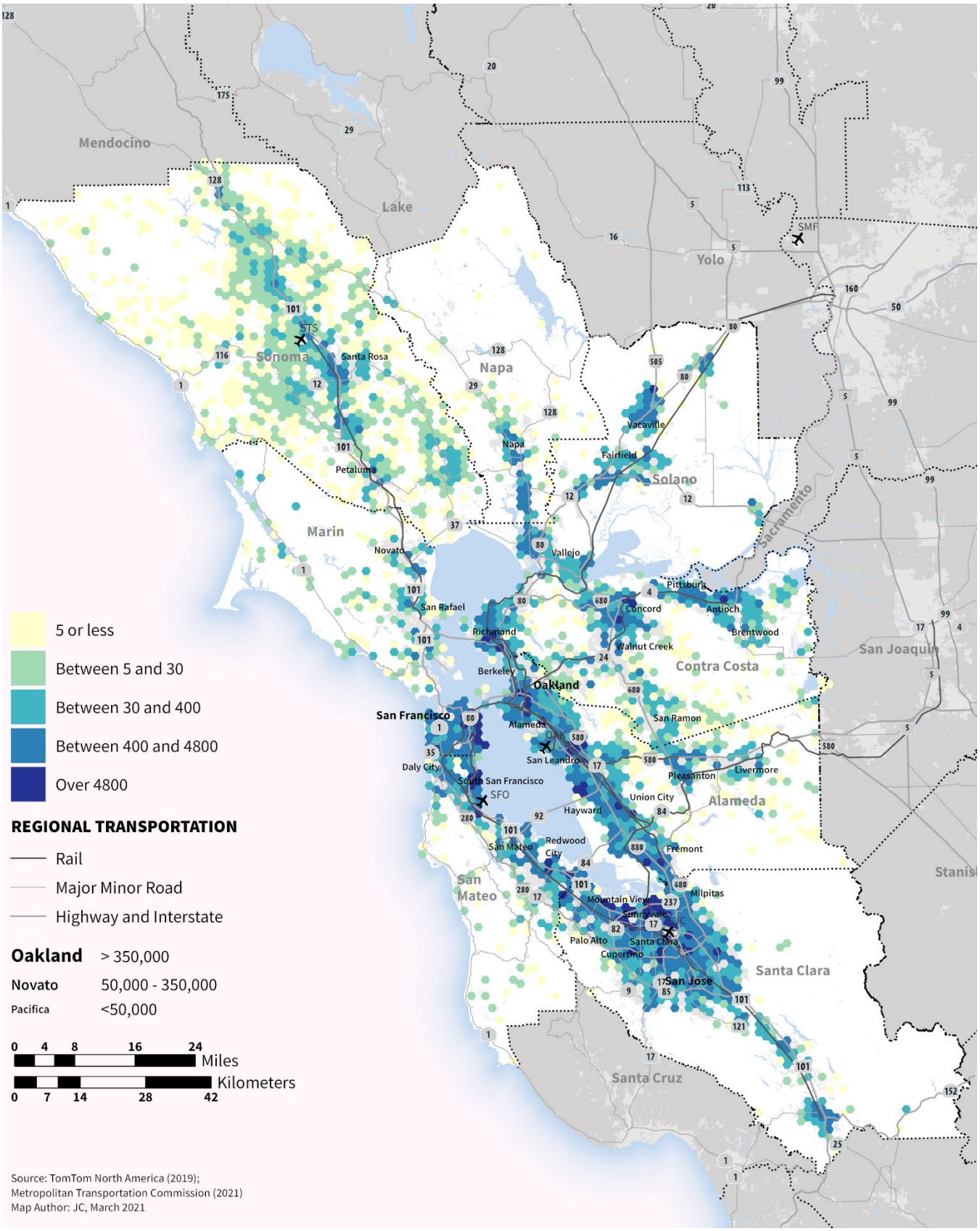

Figure 2-2: Change in Employment, 2015 through 2050

The forecasted shares of housing units by type and nonresidential square feet by type are broken down by county and provided in Table 2-3, below. The majority (88 percent) of regional housing unit growth is forecasted as multifamily housing units. All counties, apart from San Francisco County, are forecasted to see growth in both single-family and multifamily housing units, whereas San Francisco County is forecasted to see multifamily units replace some single-family units. Similarly, most (75 percent) of the region's growth in nonresidential square feet is related to adding new office space to accommodate the forecasted growth in Bay Area employment. Commercial space is forecasted to see an overall decline as some commercial spaces make way for new housing units.

Table 2-3: Shares of New Housing Units and New Nonresidential Square Foot Growth by County

County	Share of New Housing Units (2015 to 2050)		Share of Nonresidential Square Feet (2015 to 2050)			
	Single-Family	Multifamily	Office	Retail	Industrial	Commercial
Alameda	7%	93%	91%	-26%	36%	-1%
Contra Costa	41%	59%	-36%	0%	137%	-2%
Marin	38%	62%	41%	31%	23%	5%
Napa	65%	35%	0%	-29%	130%	-2%
San Francisco	-3%	103%	25%	50%	20%	5%
San Mateo	2%	98%	119%	1%	-11%	-8%
Santa Clara	4%	96%	72%	34%	-6%	0%
Solano	83%	17%	14%	7%	79%	0%
Sonoma	26%	74%	32%	18%	52%	-1%
Regional Total	12%	88%	75%	6%	22%	-3%

Source: Data compiled by MTC and ABAG in 2021

The land use growth footprint can include both new development and redevelopment sites. As shown in Table 2-4, the land use growth footprint covers 39,400 acres of land in the Bay Area. The proposed Plan's focused growth strategy results in less than 1 percent of the region's total land area being affected by the land use growth footprint. While the greatest growth in households and employment is forecasted to occur in Santa Clara County, as reflected in Table 2-1, the county anticipated to have the greatest amount of land acres affected by growth is Contra Costa County, followed by Santa Clara, Alameda, Solano, San Francisco, San Mateo, Sonoma, Marin, and Napa Counties.

Table 2-4: Land Use Growth Footprint by County and Growth Geography Designation

County	Total Land (acres)	Within Designated Plan Bay Area 2050 Growth Geography					
		Priority Development Area (acres)	Priority Production Area (acres)	High-Resource Area (acres)	High-Resource Area and Transit-Rich Area (acres)	Transit-Rich Area (acres)	Subtotal (acres)
Alameda	7,100	3,600	960	120	570	450	5,700
Contra Costa	9,700	3,000	970	470	30	280	4,700
Marin	1,300	460	0	150	210	170	990
Napa	790	150	270	0	0	0	420
San Francisco	3,400	3,200	240	0	8	1	3,400
San Mateo	2,700	1,300	6	110	260	210	1,900
Santa Clara	8,500	4,600	530	370	380	380	6,200

County	Total Land (acres)	Within Designated Plan Bay Area 2050 Growth Geography					
		Priority Development Area (acres)	Priority Production Area (acres)	High-Resource Area (acres)	High-Resource Area and Transit-Rich Area (acres)	Transit-Rich Area (acres)	Subtotal (acres)
Solano	4,100	1,300	970	0	0	<1	2,300
Sonoma	1,900	780	20	5	0	20	820
Regional Total	39,400	18,300	4,000	1,200	1,400	1,500	26,500

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Source: Data compiled by MTC and ABAG in 2021

Table 2-4 also details that 67 percent (26,500 acres out of 39,400 acres) of the land use growth footprint would be in one of the proposed Plan's designated growth geographies, described in Section 2.3.4. Growth in Priority Development Areas (PDAs), one of the proposed Plan's designated growth geography classifications, represents 46 percent of the land use growth footprint, followed by growth in Priority Production Areas (PPAs), Transit-Rich Areas (TRAs), and High-Resource Areas (HRAs).

Urbanization—growth on land not designated as urban built-up land as defined by California's Department of Conservation through the Farmland Mapping and Monitoring Program (FMMP)—is forecasted to occur on approximately 12,300 acres, or 31 percent of the land use growth footprint (Table 2-5). The remaining 69 percent of the land use growth footprint would be within land designated as urban built-up—which FMMP defines as "land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel"—reflective of the proposed Plan's core focused growth strategy to leverage existing infrastructure. The greatest amount of urbanization is forecasted to occur in Contra Costa County (5,300 acres), followed by Solano and Alameda Counties. Regionally, the share of land forecasted to be urban built-up in 2050 (18 percent) is the same as the observed conditions in 2018 (18 percent).

Table 2-5: Acreages of Urban Built-Up Land by County, Region, and TPA

County	Total (acres)	2018 Urban Built-Up (acres)	2018 Urban Built-Up (%)	Forecasted Development on Land not Designated as Urban Built-Up (acres)		Proposed Plan 2050 Potential Urban Built-Up (acres)	Proposed Plan 2050 Potential Urban Built-Up (%)
Alameda	470,500	147,500	31%	County Total	1,500	149,000	32%
				Within TPAs	350		
Contra Costa	459,600	151,400	33%	County Total	5,300	156,700	34%
				Within TPAs	370		
Marin	331,800	41,100	12%	County Total	130	41,200	12%
				Within TPAs	50		
Napa	483,600	23,400	5%	County Total	490	23,900	5%
				Within TPAs	5		
San Francisco	29,800	29,200	98%	County Total-	<1	29,200	98%
				Within TPAs	<1		
San Mateo	287,500	74,200	26%	County Total	360	74,600	26%
				Within TPAs	70		
Santa Clara	817,300	189,000	23%	County Total	920	189,900	23%
				Within TPAs	230		

County	Total (acres)	2018 Urban Built-Up (acres)	2018 Urban Built-Up (%)	Forecasted Development on Land not Designated as Urban Built-Up (acres)		Proposed Plan 2050 Potential Urban Built-Up (acres)	Proposed Plan 2050 Potential Urban Built-Up (%)
Solano	529,300	60,400	11%	County Total	3,100	63,500	12%
				Within TPAs	90		
Sonoma	1,009,000	75,300	7%	County Total	510	75,800	8%
				Within TPAs	1		
Regional Total	4,419,000	791,400	18%	County Total	12,300	803,700	18%
				Within TPAs	1,200		

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.

Sources: Data compiled by MTC and ABAG in 2021 based on data from California Department of Conservation 2018

SEA LEVEL RISE ADAPTATION INFRASTRUCTURE

The proposed Plan has integrated the issue of sea level rise inundation and identifies a strategy to adapt the shoreline of the San Francisco Bay. Environmental strategy EN1, "Adapt to Sea Level Rise," was included to protect shoreline communities affected by sea level rise by identifying a series of adaptation infrastructure strategies (see Section 2.2.2, "Proposed Plan Strategies"). The adaptation infrastructure was informed by conclusions in the Plan Bay Area 2040 EIR that found significant and unavoidable impacts as a result of land use development or transportation projects being regularly inundated by 24 inches of sea level rise at mean higher high-water conditions. The Plan Bay Area 2040 EIR concluded that a range of adaptation strategies could be appropriate to reduce the impact associated with sea level rise inundation to a less-than-significant level. As a result, archetypes adaptation infrastructure was identified for regularly inundated shoreline areas. Archetypes included elevated roadways, a variety of levees, seawalls, tidal gates, and marsh restoration. These archetypes include both green (i.e., natural systems) and gray (i.e., human-made systems) infrastructure.

The sea level rise adaptation infrastructure archetypes are described below. See **Table 2-6** and **Figure 2-3** for a summary of the following sea level rise adaptation infrastructure archetypes:

- **Elevated Highway/Roadways**—reconstruction of roadways or rail infrastructure to elevate higher than the projected inundation level, potentially allowing for ecosystem connections under the structure.
- **Levees:**
  - **Horizontal**—also known as an "ecotone" levee, this archetype is proposed as a greener alternative to a traditional levee. The horizontal levee's gentle slope can attenuate waves and provide a wetland-upland transition zone for marshland and species to migrate upslope.
  - **Traditional**—construction of a physical barrier with natural materials to deter inundation. Natural materials allow for potential vegetation, and a wider footprint can support other features for public access to the shoreline, such as paths or roadways.
- **Seawalls**—construction of a physical barrier with human-made materials, typically steel sheet pile, to deter erosion and inundation, often used on highly developed shorelines because of its narrow footprint.
- **Tidal Gates**—human-made gates that span tidal sloughs and stormwater discharge channels to control the flow of tides and storm surges upstream.

- **Marsh Restoration**—rehabilitation or reestablishment of marsh areas to return to their natural functions and to restore wetland habitat.

Table 2-6: Sea Level Rise Adaptation Footprint by Archetype and County

County	Total (acres)	Sea Level Rise Adaptation Footprint Archetypes				
		Elevated Highway/Roadway	Levee – Horizontal	Levee – Traditional	Sea Wall	Tidal Gate
Alameda	1,300	<1%	17%	4%	<1%	<1%
Contra Costa	300	<1%	3%	2%	<1%	<1%
Marin	910	1%	7%	7%	1%	<1%
Napa	<1	<1%	0%	0%	0%	0%
San Francisco	80	0%	0%	<1%	1%	0%
San Mateo	870	0%	8%	4%	1%	<1%
Santa Clara	1,100	<1%	18%	1%	0%	<1%
Solano	760	3%	1%	8%	<1%	0%
Sonoma	180	1%	0%	2%	0%	0%
Regional Total	5,500	5%	58%	30%	6%	<1%

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Source: Data compiled by MTC and ABAG in 2021

Not all the proposed Plan's sea level rise adaptation infrastructure would be expected to require earthmoving activities and/or have a footprint associated with implementation. For example, marsh restoration was not included in the sea level rise adaptation footprint, whereas elevated highway/roadways, levees, sea walls, and tidal gates have been included in the footprint. The actual footprint and other design details of sea level rise adaptation infrastructure is not known because it is in the early stages of planning. The proposed Plan's sea level rise adaptation footprint was developed by adding buffer areas around the proposed sea level rise adaptation infrastructure. See Section 3.1, "Approach to the Analysis," for more discussion on the development of the sea level rise adaptation footprint. As shown in **Table 2-6**, the total footprint associated with sea level rise adaptation infrastructure is approximately 5,500 acres. Horizontal levees considered a greener ("natural") infrastructure strategy, account for 58 percent of the sea level rise adaptation footprint, followed by traditional levees, elevated highway/roadways, and sea walls. Tidal gates are anticipated to make up a small portion of the footprint. As summarized in **Table 2-6** and depicted in **Figure 2-3**, sea level rise adaptation infrastructure is clustered in Alameda County, followed by Marin, Santa Clara, San Mateo, and Solano Counties. The sea level rise adaptation footprint is relatively small in Contra Costa, Sonoma, San Francisco, and Napa Counties.

While the Plan has incorporated sea level rise adaptation infrastructure as a Plan component, it is important to note the effects of the environment on a project are generally outside the scope of CEQA unless the project would exacerbate these conditions, as concluded by the California Supreme Court (see ***California Building Industry Association v. Bay Area Air Quality Management District*** [2015] 62 Cal.4th 369, 377 ["we conclude that agencies generally subject to CEQA are not required to analyze the impact of existing environmental conditions on a project's future users or residents. But when a project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users."]). Changes to the State CEQA Guidelines to reflect this decision were adopted on December 28, 2018. Accordingly, while the proposed Plan contains elements that would reduce the effects of sea level rise, the EIR analysis generally does not address the impacts of existing environmental conditions on a project's future users or residents. However, when a proposed project risks exacerbating environmental hazards or conditions that already exist, the EIR analyzes the potential impact of such hazards on future residents or users.

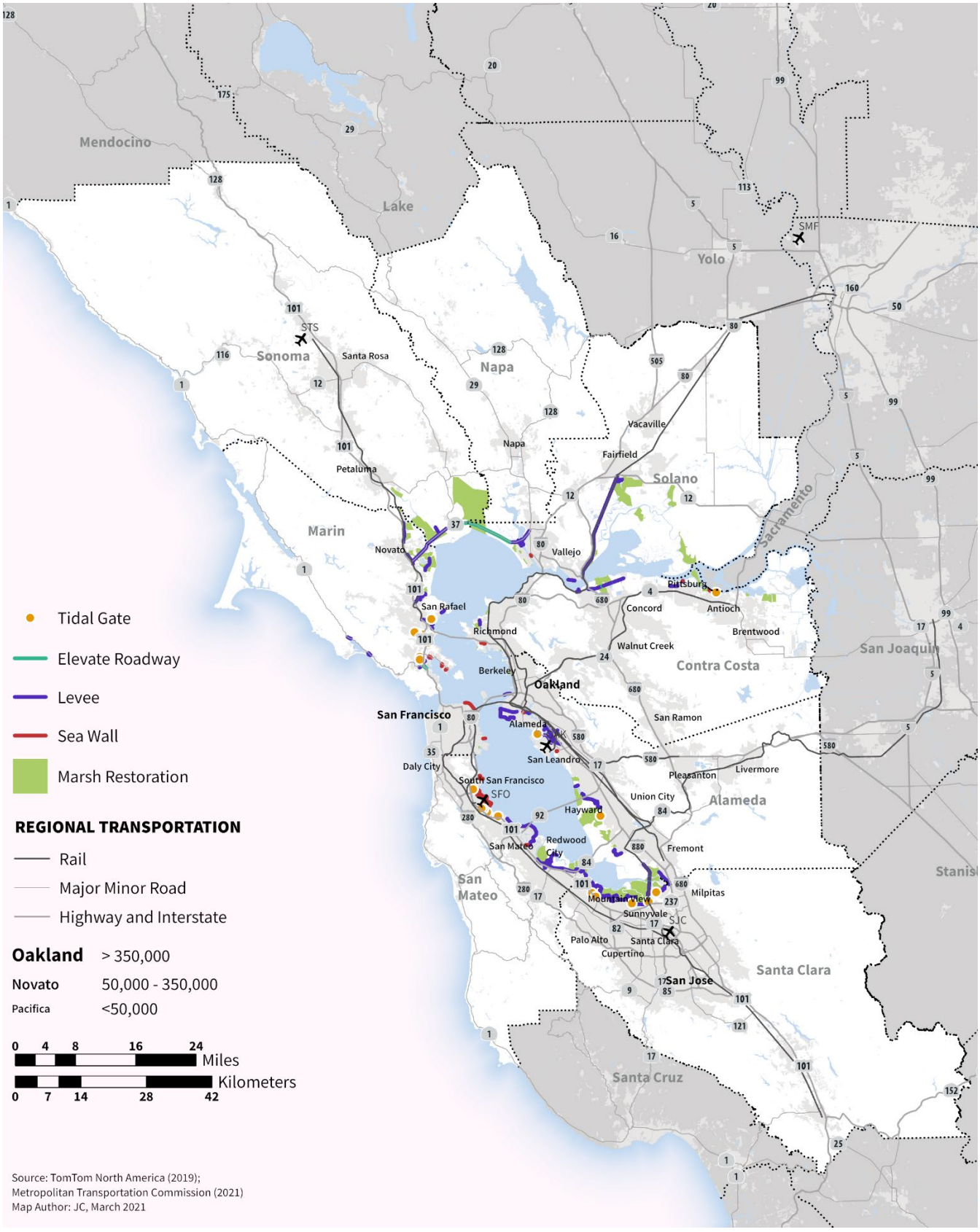

Figure 2-3: Sea Level Rise Adaptation Infrastructure Archetypes

TRANSPORTATION SYSTEM

Projects and Programs

The transportation strategies discussed in Section 2.2.2, "Proposed Plan Strategies," generally consist of strategies intended to alter the demand on the transportation system or alter the supply of the transportation system. The transportation strategies and a subset of the environmental strategies intended to alter the demand require little to no capital projects and include policies such as user fees (e.g., tolls and transit fares). The strategies aimed at altering the supply include capital projects listed in the proposed Plan's fiscally constrained transportation project list. These major projects can alter the supply or "capacity" of the transportation system by adding new travel lanes or new transit services. The transportation project list, constrained by expected transportation revenues discussed in Section 2.3.2, "Financial Forecasts," is fundamental to the RTP and required per federal and State regulations.

The project list can be grouped into two general investment categories: (1) group listings of projects exempt from regional air quality conformity analysis (i.e., programmatic categories) and (2) nonexempt, capacity-increasing projects (i.e., major transportation projects). Generally, major transportation projects are those that add travel lanes to freeways, expressways, and highways or add new routes to fixed guideway transit facilities (e.g., rail, ferry, bus rapid transit), whereas group listings or programmatic categories do not alter capacity and include investments such as general operations and maintenance, replacement or preservation of system assets (e.g., pavement and transit vehicles), bicycle/pedestrian facilities, and intersection improvements. See **Table 2-7** for a list of the proposed Plan's major transportation investments. A complete list of the proposed Plan's investments can be found at the Plan Bay Area 2050 website: planbayarea.org/reports.

Table 2-7: Major Investments by Strategy (Greater Than $250 Million in Cost)

Strategy	System	Title	Location
T04	Public Transit	Regional Transit Fare Policy	REG
T05	Roadway	Per-Mile Tolling | Region	REG
T06	Roadway	Corridor & Interchange Improvements | I-80	SF, SOL
	Roadway	Corridor & Interchange Improvements | I-280	SCL
	Roadway	Corridor & Interchange Improvements | I-580	ALA
	Roadway	Corridor & Interchange Improvements | I-680	CC
	Roadway	Corridor & Interchange Improvements | I-880	ALA
	Roadway	Corridor & Interchange Improvements | US-101	MRN, SM, SCL, SON
	Roadway	Corridor & Interchange Improvements | SR-4	CC
	Roadway	Corridor & Interchange Improvements | SR-29	NAP
	Roadway	Corridor & Interchange Improvements | SR-37	NAP, SOL, SON
	Roadway	Corridor & Interchange Improvements | SR-84	ALA
	Roadway	Corridor & Interchange Improvements | SR-237	SCL
	Roadway	Corridor & Interchange Improvements | SR-262	ALA
	Roadway	Corridor & Interchange Improvements | New Freeway	CC
	Roadway	Other Investments to Improve Interchanges & Address Highway Bottlenecks	REG
	Roadway	Bay Area Forward Program	REG
T07	Other	Minor Freight Improvements	REG
	Roadway	Minor Roadway Improvements	REG
	Other	Technology Improvements	REG

Strategy	System	Title	Location
T08	Bike/Ped	Complete Streets Network	REG
T09	Bike/Ped	Regional Vision Zero Policy through Street Design and Reduced Speeds	REG
T10	Public Transit	Multimodal Transportation Enhancements | AC Transit and WETA | Alameda Point	ALA
	Public Transit	Multimodal Transportation Enhancements | SFMTA | Southeast San Francisco	SF
	Public Transit	Local Bus | Modernization | VTA | Systemwide	SCL
	Public Transit	Local Bus | Service Frequency Boost | AC Transit | Systemwide	ALA, CC
	Public Transit	Local Bus | Service Frequency Boost | NVTA	NAP
	Public Transit	Local Bus | Service Frequency Boost | SFMTA | Systemwide	SF
	Public Transit	Local Bus | Service Frequency Boost | VTA | Systemwide	SCL
	Public Transit	Local Bus | Service Frequency Boost | PDAs	REG
	Public Transit	Local Bus | Service Frequency Boost | Sonoma County	SON
	Public Transit	Rapid Bus | Modernization | AC Transit | E 14th St/Mission St/Fremont Blvd	ALA
	Public Transit	Rapid Bus | AC Transit | Modernization	ALA, CC
	Public Transit	Rapid Bus | Contra Costa Co | Service Expansion | Antioch-Brentwood	CC
	Public Transit	BRT | Modernization | AC Transit | 23rd St	CC
	Public Transit	BRT | Modernization | AC Transit | San Pablo Ave	ALA, CC
	Public Transit	BRT | Modernization | SamTrans | El Camino Real	SM
	Public Transit	BRT | Modernization | SFMTA | Geary Blvd	SF
	Public Transit	Light Rail | Service Expansion | SFMTA | to Chinatown ("Central Subway")	SF
	Public Transit	Light Rail | Grade Separations & Modernization | VTA | Downtown San Jose	SCL
	Public Transit	Light Rail | Grade Separations & Modernization | VTA | North San Jose	SCL
	Public Transit	Light Rail | Service Expansion | VTA | Eastridge	SCL
	Public Transit	Light Rail | Service Expansion | VTA | Stevens Creek Blvd	SCL
	Public Transit	Light Rail | Service Expansion | VTA | Vasona	SCL
	Public Transit	Automated People Mover | Service Expansion | VTA | Mineta San Jose International Airport Connector	SCL
	Public Transit	Congestion Pricing | Downtown San Francisco	SF
	Public Transit	Congestion Pricing | Treasure Island	SF
	Public Transit	Other Investments to Enhance Local Transit Frequency, Capacity & Reliability	REG
T11	Public Transit	Ferry | Service Frequency Boost | GGBHTD | Larkspur-San Francisco	MRN, SF
	Public Transit	Ferry | Service Frequency Boost | WETA	REG
	Public Transit	Ferry | Service Expansion | WETA | Berkeley-San Francisco	ALA, SF
	Public Transit	Ferry | Service Expansion | WETA | San Francisco-Alameda-Richmond-Vallejo	ALA, CC, SF
	Public Transit	Ferry | Service Expansion | WETA | Redwood City-San Francisco-Oakland	ALA, SF, SM
	Public Transit	Rail | Modernization & Electrification | Caltrain/High Speed Rail | San Francisco to San Jose	SF, SM, SCL
	Public Transit	Rail | Service Frequency Boost | ACE | System	ALA, SCL
	Public Transit	Rail | Service Frequency Boost | BART | System ("Core Capacity")	ALA, CC, SF, SM, SCL
	Public Transit	Rail | Service Frequency Boost | Caltrain | System	SF, SM, SCL
	Public Transit	Group Rapid Transit | Service Expansion | Redwood City-Newark ("Dumbarton Rail")	ALA, SM
	Public Transit	Rail | Service Expansion | BART | to Santa Clara ("Silicon Valley Phase II")	SCL

Strategy	System	Title	Location
	Public Transit	Rail | Service Expansion | Caltrain/High Speed Rail | to Downtown San Francisco ("DTX")	SF
	Public Transit	Rail | Service Expansion | Capitol Corridor | to Coast Subdivision ("South Bay Connect")	ALA, SCL
	Public Transit	Rail | Service Expansion | Oakland-San Francisco ("Link21")	ALA, SF
	Public Transit	Rail | Service Expansion | San Joaquin County-Dublin/ Pleasanton ("Valley Link")	ALA
	Public Transit	Other Investments to Expand & Modernize the Regional Rail Network | Regional	REG
T12	Roadway	Express Lanes	ALA, CC, SF, SM, SCL, SOL
	Public Transit	Express Bus | Service Expansion | GGBHTD	MRN, SF
	Public Transit	Express Bus | Service Expansion | SamTrans	SM
	Public Transit	Express Bus | Service Expansion | I-80	CC
	Public Transit	Express Bus | Service Expansion | I-680	ALA, CC, SCL
	Public Transit	Express Bus | Service Expansion | ReX (Basic) | Blue Line (San Francisco to San Jose)	SF, SM, SCL
	Public Transit	Express Bus | Service Expansion | ReX (Basic) | Red Line (Oakland to Redwood City)	ALA, SM
	Public Transit	Express Bus | Service Expansion | ReX (Premium) | Green Line (Vallejo to SFO Airport)	CC, SOL, SF, SM

Notes: ALA = Alameda; CC = Contra Costa; MAR = Marin; NAP = Napa; SF = San Francisco; SM = San Mateo; SCL = Santa Clara; SOL = Solano; SON = Sonoma; REG = regional.
Source: Data compiled by MTC and ABAG in 2020

System Capacity

The implementation of major transportation projects, discussed above, would add new travel lanes and transit services, resulting in changes to the Bay Area's transportation system capacity. As shown in Table 2-8, implementing the proposed Plan would result in a net increase in travel lane-miles and daily transit seat miles to accommodate future travelers.

Table 2-8: Transportation System Capacity (2015–2050)

Facility Type	Base Year, 2015	Proposed Plan, 2050	Change, 2015 to 2050	
			Numerical	Percent
Freeway Lane-Miles	5,440	5,880	+440	+8%
Expressway Lane-Miles	1,080	1,120	+40	+4%
Arterial Lane-Miles	8,670	8,640	-30	-< 1%
Collector Lane-Miles	5,690	5,690	0	0%
Total Roadway Lane-Miles	20,880	21,340	+460	+2%
Daily Local Bus Seat-Miles	9,124,000	13,213,000	+4,089,000	+45%
Daily Express Bus Seat-Miles	1,987,000	4,759,000	+2,772,000	+140%
Daily Light Rail Seat-Miles	2,065,000	3,304,000	+1,239,000	+60%
Daily Heavy Rail Seat-Miles	12,113,000	21,343,000	+9,230,000	+76%
Daily Commuter Rail Seat-Miles	4,995,000	19,593,000	+14,598,000	+292%
Daily Ferry Seat-Miles	688,000	2,884,000	+2,196,000	+319%
Total Daily Transit Seat-Miles	30,972,000	65,097,000	+34,125,000	+110%

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.
Source: Data compiled by MTC and ABAG in 2021

Roadway Network: The region's base year roadway network (2015 conditions) is composed of about 20,900 lane-miles, with approximately one third of the lane-miles designated as freeways and expressways and two thirds as arterials and collectors. Compared to 2015 conditions, implementing the proposed Plan would add approximately 460 lane-miles, an increase of 2 percent to the region's total roadway lane-miles. New freeway lane-miles would account for about 96 percent of the 460 new lane-miles. A major component of these new lane-miles is related to Transportation Strategy T12, "Build an Integrated Regional Express Land and Express Bus Network." Implementing the proposed Plan would result in a net decrease of arterial lane-miles, in part the result of a Transportation Strategy T09, "Advance Regional Vision Zero Policy through Street Design and Reduced Speeds," through actions such as the removal of travel lanes.

Public Transit Systems: Transit seat-miles, a measure of transit capacity, are the miles that transit vehicles travel multiplied by the number of seats in each vehicle. The base year transit network (2015 conditions) consists of three dominant modes: heavy rail (e.g., 39 percent of seat-miles), local bus (29 percent of seat-miles), and commuter rail (e.g., 16 percent of seat-miles). Daily transit seat-miles would increase by 110 percent from 2015 conditions as a result of the transportation strategies:

- T10. Enhance Local Transit Frequency, Capacity, and Reliability;
- T11. Expand and Modernize the Regional Rail Network; and
- T12. Build an Integrated Regional Express Lane and Bus Network.

The largest increase in seat-miles would be for commuter rail transit, which would add 14,598,000 seat-miles from 2015 conditions (a 292-percent increase), and for heavy rail transit, which would add 9,230,000 seat-miles from 2015 conditions (a 76-percent increase). These increases would be a result of major rail expansion projects (Transportation Strategy T11), including system improvements and extensions to the Altamont Corridor Express (ACE), Bay Area Rapid Transit (BART), Caltrain, and Sonoma-Marin Area Rail Transit (SMART), and new services, such as a New Transbay Rail link between San Francisco and Oakland, Valley Link, and Dumbarton Rail.

Bicycle and Pedestrian Network: A goal of the proposed Plan is to enhance the region's bicycle and pedestrian network and promote growth and land use that maximize the potential for shorter trips, which are more likely to be made by nonmotorized modes. To support this goal, the proposed Plan includes Strategy T08, "Build a Complete Streets Network," which would fund the implementation of 10,000 miles of new bike lanes and/or multiuse paths to promote walking, biking, and other micromobility through sidewalk improvements and car-free slow streets, and also includes Strategy T09, "Advance Regional Vision Zero Policy through Street Design and Reduced Speeds."

Transportation Projects Footprint

Not all the proposed Plan's transportation strategies would be expected to require earthmoving activities and/or have a footprint associated with implementation. The transportation projects footprint includes proposed major transportation projects that have the greatest potential for physical impacts, generally limited to capacity increasing projects that add travel lanes to freeways, expressways, and highways or add new rail, ferry, or bus rapid transit routes and stations. Projects that are included in the transportation projects footprint are major transportation projects associated with Strategy T06, "Improve Interchanges and Address Highway Bottlenecks"; Strategy T07, "Advance Other Regional Programs and Local Priorities": Strategy T10, "Enhance Local Transit Frequency, Capacity and Reliability"; Strategy T11, "Expand and Modernize the Regional Rail Network"; and Strategy T12, "Build an Integrated Regional Express Land and Express Bus Network."

The actual footprints and other design details of most proposed transportation projects are not known because the projects are in the early stages of planning. The proposed Plan's transportation projects footprint was developed by adding buffer areas around the center line of proposed roadway and

public transit projects. See Section 3.1, "Approach to the Analysis," for more discussion on the development of the transportation projects footprint. As shown in **Table 2-9**, the total footprint associated with these major transportation projects is approximately 14,300 acres. Acreages by county and strategy are provided in **Table 2-9**, below.

Table 2-9: Major Transportation Projects Footprint by County and Strategy

County	Total (acres)	Transportation Projects Footprint by Strategy				
		Strategy T06, Improve Interchanges & Address Highway Bottlenecks	Strategy T07, Advance Other Regional Programs & Local Priorities	Strategy T10, Enhance Local Transit Frequency, Capacity & Reliability	Strategy T11, Expand & Modernize the Regional Rail Network	Strategy T12, Build an Integrated Regional Express Land & Express Bus Network
Alameda	3,000	4%	2%	2%	7%	6%
Contra Costa	2,000	6%	2%	2%	< 1%	3%
Marin	180	1%	< 1%	< 1%	0%	0%
Napa	160	1%	< 1%	< 1%	0%	0%
San Francisco	750	< 1%	0%	1%	2%	2%
San Mateo	1,600	2%	< 1%	1%	3%	7%
Santa Clara	4,900	5%	2%	5%	10%	12%
Solano	1,500	3%	1%	< 1%	0%	5%
Sonoma	130	1%	0%	0%	< 1%	0%
Regional Total	14,300	22%	8%	12%	24%	35%

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Source: Data compiled by MTC and ABAG in 2021

As summarized in **Table 2-9** and depicted in **Figure 2-4**, the transportation projects footprint is clustered in Santa Clara County, followed by Alameda, Contra Costa, San Mateo, and Solano Counties. The transportation projects footprint is relatively small in Sonoma, Napa, and Marin Counties.

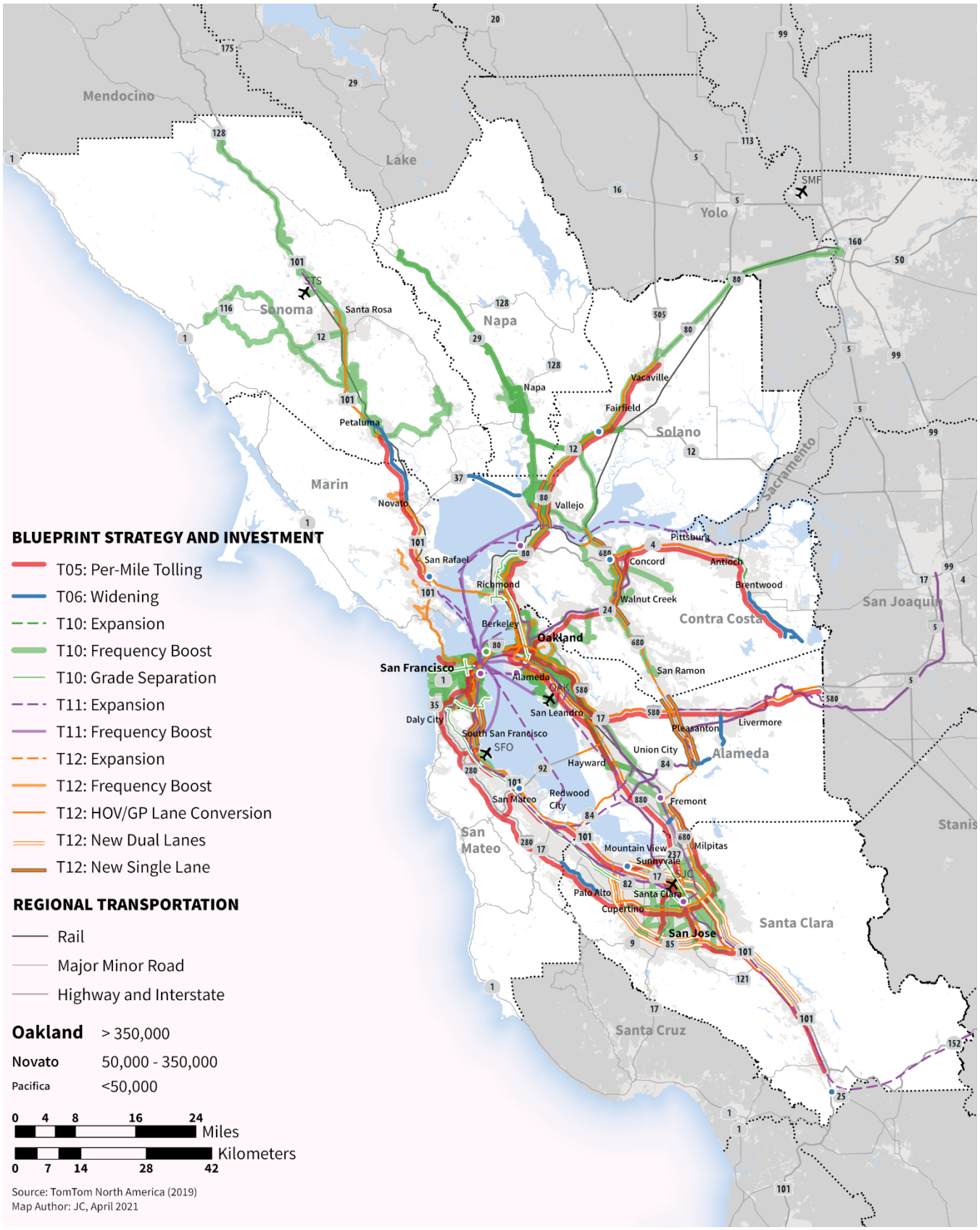

Figure 2-4: Transportation Projects Footprint by Strategy

Regional Travel Forecasts

The regional growth forecast has the most significant effect on transportation trends and impacts over the Plan horizon. The 1.4 million new households and 1.4 million new jobs forecasted between 2015 and 2050 would inevitably lead to more demand on the region's transportation systems. As previously discussed, some of the proposed Plan's transportation and environmental strategies are intended to alter this demand. These strategies include T3, "Enable a Seamless Mobility Experience"; T4, "Reform Regional Transit Fare Policy"; T5, "Implement Per-Mile Tolling on Congested Freeways with Transit Alternatives"; EN07, "Expand Commute Trip Reduction Programs at Major Employers"; and EN09, "Expand Transportation Demand Management Strategies." See Section 2.2.2, "Proposed Plan Strategies," for more detail. The MTC travel demand model, Travel Model 1.5, simulates travel forecasts for the Bay Area (see Section 2.3.3, "Analysis Tools"). Travel Model 1.5 simulates that the regional growth forecast, coupled with the proposed Plan's forecasted development pattern and strategies, would lead to a shift from automobile travel to public transit and nonmotorized modes over the Plan horizon (2050) in order to achieve SB 375's mandate to reduce GHG emissions.

Travel Model 1.5 is not sensitive to the full range of strategies in the proposed Plan, specifically Strategy EN09, "Expand Travel Demand Management Strategies." Consequently, implementation of Strategy EN09 is not reflected in travel model outputs due to the modeling limitation. For limited metrics (i.e., VMT and GHG emissions) an "off-model" approach was used to quantify the effects of implementation of Strategy EN09.

Demographic Trends

The region's population is expected to grow by 37 percent from 2015 to 2050 conditions, while the number of employed residents is forecasted to increase by 42 percent over the same period, meaning there would be more workers per capita in 2050 than in 2015. The expected growth of population and employed residents would lead to an increase in commute and non-commute trips over the Plan horizon. The proposed Plan's forecasted development pattern and strategies have some effect on household auto ownership, as summarized in **Table 2-10**. The type and location of forecasted household growth results in households shedding vehicles. The share of households with one car or less is forecasted to increase between 2015 and 2050, from 40 percent to 47 percent, and overall average auto ownership per household is expected to decline by 4 percent.

Table 2-10: Summary of Population, Employed Residents, and Auto Ownership

	Base Year, 2015	Proposed Plan, 2050	Change, 2015 to 2050	
			Numerical	Percent
Total Population	7,581,000	10,368,000	+2,786,000	+37%
Total Employed Residents	2,841,000	4,027,000	+1,186,000	+42%
Share of Households with Zero Autos	9%	13%	+4%	+44%
Share of Households with One Auto	31%	34%	+3%	+10%
Share of Households with Multiple Autos	59%	53%	-7%	-10%
Average Number of Vehicles by Household	1.54	1.48	-0.06	-4%

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 1,000 and 1,000,000 to the nearest 100).
Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations, such as prison inmates.
Source: Data compiled by MTC and ABAG in 2021

Regional Travel

Table 2-11 summarizes the changes in average daily travel metrics from 2015 to proposed Plan conditions. As previously noted, according to the regional growth forecast, demand on the transportation systems would increase. Total trips are forecasted to grow by 27 percent, which is a smaller amount of growth than that forecasted for population growth, meaning there would be fewer trips per capita in the 2050. Furthermore, commute trips are forecasted to grow by 12 percent, which is less than the growth in employed residents noted in Table 2-11.

The daily number of vehicle trips and vehicle miles traveled (VMT)—a key metric for this program EIR and discussed in more detail in Section 3.15, "Transportation"—are forecasted to increase from 2015, albeit at a rate slower than forecasted population growth. As a result, daily VMT per capita is forecasted to decrease over time, meaning that in 2050, people and workers are forecasted to drive less, either by reducing the length of their trips and/or by making less auto trips by using alternative modes, such as transit, walking, or biking. Transit boardings and transit passenger miles are forecasted to increase by 133 and 168 percent, respectively, in part because of the proposed Plan's integrated strategies that change land use activity (forecasted development pattern) and invest in transit systems. Finally, minimal changes to roadway capacity, discussed in the prior section, coupled with a growing region, would lead to more hours of vehicle delay forecasted on the region's roadway systems.

Table 2-11: Summary of Daily Travel Metrics

	Base Year, 2015	Proposed Plan, 2050	Change, 2015 to 2050	
			Numerical	Percent
Daily Commute Trips	8,360,000	9,324,000	+964,000	+12%
Daily Non-commute Trips	17,939,000	24,197,000	+6,258,000	+35%
Daily Trips Subtotal	26,299,000	33,521,000	+7,222,000	+27%
Daily Vehicle Trips	20,896,000	23,487,000	+2,591,000	+12%
Daily Vehicle Trips with Strategy EN09	20,896,000	23,222,000	+2,326,000	+11%
Daily VMT	155,006,000	181,917,000	+26,911,000	+17%
Daily VMT with Strategy EN09	155,006,000	175,497,000	+20,491,000	+13%
Daily VMT per Capita	20.4	17.5	-2.9	-14%
Daily VMT per Capita with Strategy EN09	20.4	16.9	-3.5	-17%
Daily Vehicle Hours of Recurring Delay	264,500	644,200	+379,800	+144%
Daily Transit Boardings	1,703,000	3,964,000	+2,261,000	+133%
Daily Transit Passenger Miles	11,292,000	30,245,000	+18,953,000	+168%

Notes: Whole numbers have been rounded (between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000).
Unless specified, daily travel metrics do not account for effects from the implementation of Strategy EN09 because of modeling limitations.
Source: Data compiled by MTC and ABAG in 2021

Table 2-12 compares average trip characteristics for commute and non-commute trips between 2015 and proposed Plan 2050 conditions. Implementation of the proposed Plan's integrated strategies results in a more compact forecasted development pattern, where regional subareas (e.g., North Bay) and subarea counties converge toward the regional jobs-housing ratio. Changes to the forecasted development pattern result in an 8-percent reduction in average trip lengths, for both commute and non-commute trips.

Table 2-12: Average Trip Length (Miles) by Purpose

	Base Year, 2015	Proposed Plan, 2050	Change, 2015 to 2050	
			Numerical	Percent
Commute	9.8	9.6	-0.3	-3%
Non-commute	4.7	4.3	-0.3	-7%
Regional Total	6.3	5.8	-0.5	-8%

Source: Data compiled by MTC and ABAG in 2021

Conversely, the average trip time is forecasted to increase by 11 percent between 2015 and proposed Plan 2050 conditions. This increase is not uniform across modes, as summarized in Table 2-13. The average auto trip time is forecasted to increase by 10% over the baseline, whereas walk and bike trip times are forecasted to decrease by 3 and 4 percent, respectively. Transit trip times, which have trip times more than double the regional average, are also forecasted to increase, but at a rate less than for auto trips.

Table 2-13: Average Trip Time (Minutes) by Mode

	Base Year, 2015	Proposed Plan, 2050	Change, 2015 to 2050	
			Numerical	Percent
Auto ("Vehicle")	13.5	14.9	+1.4	+10%
Transit	36.1	36.5	+0.5	+1%
Bike	11.0	10.5	-0.5	-4%
Walk	17.0	16.5	-0.4	-3%
Regional Total	15.2	16.8	+1.7	+11%

Notes: Average trip times do not account for effects from the implementation of Strategy EN09 because of modeling limitations.
Source: Data compiled by MTC and ABAG in 2021

Daily Trips by Mode

The transportation strategies discussed in Section 2.2.2, "Proposed Plan Strategies," generally consist of strategies intended to alter the demand on the transportation system or alter the supply of the transportation system. Collectively, these strategies, along with changes from the forecasted development pattern, have the potential to influence mode choice decisions. Implementation of the proposed Plan's integrated strategies facilitate a 300-percent growth in bike trips and a 110-percent growth in transit trips by 2050. Table 2-14 compares the number and share of trips by mode in 2015and under proposed Plan 2050 conditions. While the forecasted shares of the various travel modes remain similar to 2015 conditions, an increase in transit and bike share modes is evident. Transit mode share is forecasted to increase from 6 percent to 9 percent of total trips by 2050, while bike mode share is forecasted to increase from 2 percent to 7 percent by 2050. The auto mode shares—drive alone, carpool and ride hail—are forecasted to decrease their collective share over time, from 79 percent in the baseline to 70 percent in 2050.

Table 2-14: Summary of All Trips by Mode

	Base Year 2015		Proposed Plan, 2050		Change, 2015 to 2050	
	Trips	% of Total	Trips	% of Total	Numerical	Percent
Drive Alone	12,030,000	46%	13,417,000	40%	+1,387,000	+12%
Carpool	8,318,000	32%	9,190,000	27%	+872,800	+10%
Ride Hail	548,100	2%	879,300	3%	+331,200	+60%
Auto ("Vehicle") Subtotal	20,896,000	79%	23,487,000	70%	+2,591,000	+12%
Transit	1,472,000	6%	3,087,000	9%	+1,615,000	+110%
Bike	583,800	2%	2,336,000	7%	+1,753,000	+300%
Walk	3,348,000	13%	4,611,000	14%	+1,263,000	+38%
Regional Total	26,299,000	100%	33,521,000	100%	+7,222,000	+27%

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding. Trips and mode share do not account for the effect from the implementation of Strategy EN09 because of modeling limitations.
Source: Data compiled by MTC and ABAG in 2021

Under the proposed Plan, commute trips represent approximately 28 percent of all regional trips (see **Table 2-11**), yet the average distance of commute trips is double the average distance of non-commute trips (see **Table 2-12**). **Table 2-15** summarizes how Bay Area workers get to their place of work and includes those workers who work from home ("telecommute"). Overall, workers are forecasted to rely less on autos to get to their places of employment. The proposed Plan would result in a net reduction in auto modes, from 71 percent to 53 percent of all commute trips. The number of commuters driving alone is forecasted to fall by 15 percent as a share of all commute trips. Telecommuting is forecasted to see the greatest growth from baseline conditions, followed by workers using transit. The increase in telecommuting, both in absolute terms and as a share of total trips, is a direct result of Strategy EN07, "Expand Commute Trip Reduction Programs at Major Employers." Similar to the findings summarized in **Table 2-15**, implementation of the proposed Plan's integrated strategies would lead to fewer workers relying on autos to access their places of work and would facilitate an increase in trips across alternative modes with bike and transit modes forecasted to experience the most growth.

Table 2-15: Summary of Journey to Work by Mode

	2015 Baseline	2050 Proposed Plan	Change, 2015 to 2050
	% of Total	% of Total	Percent
Drive Alone	51%	36%	-15%
Carpool	19%	17%	-2%
Ride Hail	1%	< 1%	< -1%
Auto ("Vehicle") Subtotal	71%	53%	-18%
Transit	13%	20%	+7%
Bike	3%	7%	+4%
Walk	2%	3%	+1%
Telecommute	10%	17%	+7%

Notes: Workers and mode share do not account for the effect from the implementation of Strategy EN09 because of modeling limitations.
Source: Data compiled by MTC and ABAG in 2021

2.3 PLANNING ASSUMPTIONS

Economic, demographic, and financial planning assumptions are central to the proposed Plan and serve as constraints during the Plan's development. These assumptions are described in detail below. As noted in Chapter 1, "Introduction," the proposed Plan development process was composed of several key phases: Horizon was a predecessor initiative to the proposed Plan; the draft Blueprint integrated the recommendations from Horizon and served as a "first draft" of the proposed Plan; and the Final Blueprint refined and expanded strategies producing the final 35 strategies of the proposed Plan.

2.3.1 Regional Growth Forecast

The regional growth forecast identifies how much the Bay Area might grow between 2015 and the proposed Plan's horizon year (2050), including population, jobs, households, and associated housing units. During the Blueprint planning phase from fall 2019 to summer 2020, the Draft Blueprint served as a "first draft" of the proposed Plan. At that time, the regional growth forecast was used to identify the total amount of growth for the region. The draft regional growth forecast was released in spring 2020 and subsequently revised to integrate the effects of the coronavirus pandemic and 2020 recession on the first decade of the planning period. In September 2020, MTC and ABAG approved the regional growth forecast.

The regional growth forecast projects the region's employment to grow by 1.4 million to just over 5.4 million total jobs between 2015 and 2050. Population is forecasted to grow by 2.7 million people to 10.3 million. This population will comprise over 4.0 million households, for an increase of nearly 1.4 million households from 2015. Total population, employment, households, and associated housing units are included in **Table 2-16**. The number of housing units reflects a plan for no net growth in the in-commute into the region, consistent with State law and MTC's and ABAG's legal settlement with the Building Industry Association. The projection includes housing for all projected households plus the number of units that would be needed to house the increased number of workers estimated to otherwise commute into the region. For more information, see the Plan Bay Area 2050 website: wwwplanbayarea.org.

Table 2-16: Regional Growth Forecast of Population, Employment, Households and Housing Units

	2015	Regional Growth Forecast								
		2020	2025	2030	2035	2040	2045	2050	Change 2015 to 2050	Change 2015 to 2050 (%)
Population	7,660,000	7,930,000	8,230,000	8,550,000	9,000,000	9,490,000	9,930,000	10,330,000	2,670,000	35%
Employment	4,010,000	4,080,000	4,150,000	4,640,000	4,830,000	5,050,000	5,230,000	5,410,000	1,400,000	35%
Households	2,680,000	2,760,000	2,950,000	3,210,000	3,500,000	3,710,000	3,890,000	4,040,000	1,360,000	51%
Housing Units	2,710,000	2,840,000	3,060,000	3,370,000	3,670,000	3,900,000	4,080,000	4,250,000	1,540,000	57%

Notes: Whole numbers have been rounded to the nearest 1,000.
Source: Data compiled by MTC and ABAG in 2021

2.3.2 Financial Forecasts

The proposed Plan includes a financially constrained transportation investment strategy pursuant to RTP/SCS requirements as defined by State and federal planning regulations. It includes transportation projects and programs that would be funded through existing and future revenues that are projected to be reasonably available to the region over the 30-year Plan horizon (2021–2050). A total of $463 billion is forecasted to be available for the financially constrained transportation investment strategy from existing revenue sources, $19 billion from already secured project specific funding, and at least $110 billion in new revenues have also been identified.

Although not required by State and federal RTP/SCS requirements, the proposed Plan has also identified funding needs and revenues for affordable housing, as well as revenues to support select economic development and environmental resilience strategies as follows:

- **Housing Element**: $122 billion in existing funding and $346 billion in new revenues
- **Economy Element**: $234 billion in new revenues
- **Environment Element**: $15 billion in existing funding and $87 billion in new revenues

For more information, see the Draft Technical Assumptions Report found at the Plan Bay Area 2050 website: www.planbayarea.org/reports.

Whereas the revenues and strategy costs for the housing and economy elements of the proposed Plan are self-contained (e.g., housing revenues pay for housing strategies) there is a connection between the transportation and environment elements. This is because a handful of transportation investments are nested within environment strategies.

Included in the $591 billion are $13 billion in revenues forecasted to be generated from increased parking pricing, brought about through implementation of Strategy EN09, "Expand Transportation Demand Management Initiatives." The bulk of these parking pricing revenues are transferred to the transportation element and fund transportation strategies in the latter half of the proposed Plan.

In turn, $12 billion in forecasted transportation revenues are directed toward environmental strategies. These revenues fund strategies that increase adoption of electric vehicles and support expanded transportation demand management initiatives, two high-impact strategies for GHG emissions reductions. Additionally, some transportation revenues are expected to support Strategy EN01, "Adapt to Sea Level Rise."

TRANSPORTATION ELEMENT REVENUE FORECAST

MTC worked with partner agencies and used financial models to estimate how much revenue will be available to fund transportation investments across the 30-year Plan horizon (2021–2050). Like other metropolitan regions, the Bay Area receives transportation funding from multiple federal, State, regional, and local sources. As shown in **Table 2-17**, below, the total funding envelope for the proposed Plan's transportation project list is $591 billion. Approximately two-thirds of forecasted revenues are from regional and local sources, such as transit fares, dedicated sales tax programs, and bridge tolls. The remainder of the total are State and federal revenues (mainly derived from fuel taxes) and "anticipated" revenues (unspecified revenues from various sources that can reasonably be expected to become available within the Plan horizon). New revenues are forecasted to be generated from a variety or regional and local sources, including a regional funding measure and user fee revenues from new transit fares, tolls, and parking fees.

Table 2-17: Forecasted Transportation Revenue Envelope

	Billions of Dollars
Federal	$51
State	$103
Regional	$58
Local	$230
Anticipated	$21
Existing Revenues Subtotal	$463
New Revenues	$110
Secured and Other Local Revenues	$19
Regional Total	$591

Source: Data compiled by MTC and ABAG in 2021

Near-term revenue estimates were updated in June 2020 to reflect a decrease in projected revenue related to the coronavirus pandemic (COVID-19). While the extent of the unprecedented impact of COVID-19 cannot yet be known for certain, the near-term revenue forecasts were revised, estimating $11 billion in transportation revenue loss primarily over the next 5 years.

TRANSPORTATION ELEMENT SYSTEM NEEDS

MTC worked with local jurisdictions, transit operators, and the California Department of Transportation (Caltrans) to develop cost estimates for operating and maintaining the Bay Area's transit system, local street and road network, the State highway system, and local and regional bridges. The costs to operate and maintain the highway system also reflect a growing need to maintain the hardware required for traffic management projects like ramp meters and dynamic signs. As shown in **Table 2-18**, below, to reach a state of good repair—meaning that roads are maintained at their optimum levels, transit assets are replaced at the end of their useful lives, and existing service levels for public transit are maintained—the Bay Area will need to spend an estimated total of $381 billion over the Plan horizon (2021–2050).

Table 2-18: Costs to Operate and Maintain Existing System (in Billions)

	Cost to Maintain Existing Asset Condition	Cost to Achieve Ideal Asset Condition
Transit Operating	$211	$211
Transit Capital	$59	$82
State Highways	$24	$24
Local Streets and Roads	$62	$68
Regional ("Toll") Bridges	$22	$22
Local Bridges	$3	$3
Total	$381	$410

Notes: Costs associated with maintaining existing conditions are not available for highways and bridges. Transit operating costs are only for maintaining existing conditions.
Source: Data compiled by MTC and ABAG in 2021

2.3.3 Analysis Tools

The California Transportation Commission's (CTC's) 2017 RTP Guidelines recommend that the largest metropolitan areas integrate regional economic and land use models and activity-based travel demand models into a single modeling system. The integrated model framework allows planners to analyze the complex interactions between land use and the transportation strategies. For more information, see the Draft Forecasting and Modeling Report found at the Plan Bay Area 2050 website: www.planbayarea.org/reports.

As required under SB 375, MTC must submit to CARB a description of its proposed technical methodology to estimate GHG emissions resulting from implementation of the proposed Plan. The initial methodology was submitted May 6, 2019, and reviewed by CARB staff. After CARB staff's review, ongoing consultation between MTC and CARB staff led to revisions to the technical methodology. Consultation will be ongoing until the adoption of the RTP/SCS by MTC and ABAG and its official submittal of the adopted RTP/SCS to CARB.

BAY AREA URBANSIM 2.0

Bay Area UrbanSim 2.0, MTC's regional land use forecasting model, is a spatially explicit economic model that forecasts future business ("employment") and household locations. MTC and ABAG used a version of the Bay Area UrbanSim 1.0 model to inform the EIR for Plan Bay Area and the EIR for Bay Area 2040. An updated version of Bay Area UrbanSim (Version 1.5) was also used for the Horizon initiative.

Bay Area UrbanSim 2.0 forecasts future land use change (e.g., development or redevelopment) starting from an integrated (across different source data) base year (2010) database containing information on the buildings, households, businesses, and land use policies within the region. Running in 5-year steps, the model predicts that some households will relocate and that a number of new households will be formed or enter the region (as determined by the adopted regional growth forecasts). The model system microsimulates the behavior of both these types of currently unplaced households and assigns each of them to a currently empty housing unit. A similar process is undertaken for businesses. During the simulation, Bay Area UrbanSim 2.0 microsimulates the choices real estate developers make on how much, what, and where to build. This adds additional housing units and commercial space in profitable locations (i.e., land use policies at the site allow the construction of a building that is profitable under forecast demand).

In this way, the preferences of households, businesses, and real estate developers are combined with the existing landscape of building and policies to generate a forecast of the overall land use pattern in future years. The land use policies in place in the base year can be changed (e.g., allowable zoned residential density could be increased), and Bay Area UrbanSim 2.0 responds by forecasting a different land use pattern consistent with the constraints or opportunities resulting from the change. After each 5-year step, the model produces a zonal output file for the transportation model that contains household counts and employee counts by sector. This provides the travel model with information on land use intensity in different locations and the spatial distribution of potential origins and destinations within the region.

UrbanSim 2.0 produced all the key outputs used in assessing the significance of the forecasted land use development pattern. The parcel-level simulations were also aggregated to generate land use data at the Traffic Analysis Zone, subcounty, and county level.

TRAVEL MODEL 1.5

The MTC travel demand model, Travel Model 1.5, is a regional activity–based travel model for the Bay Area. This model is composed of a set of individual models that perform different functions, leading to projections of future Bay Area travel. Travel Model 1.5, released in 2020, updates Travel Model One with the inclusion of ride-hailing, taxis, and autonomous vehicles. Travel Model 1.5 has been extensively reviewed by federal and State agencies. Vehicle activity forecasts are correlated to changes in land use data and transportation strategies. Travel Model 1.5 divides the region into 1,454 Traffic Analysis Zones, which contain key land use data (from UrbanSim 2.0) to inform travel patterns. Various transportation strategies were analyzed using this model. To analyze the proposed Plan, strategies (made up of both capital projects and policies) were implemented in the model on top of the region's existing transportation infrastructure. By adding these strategies into the model framework, it is possible to forecast the impacts of strategies on regional travel patterns. Travel Model 1.5 produces key outputs for assessing the significance of the transportation, air quality, GHG, and noise chapters. Key model outputs include total daily vehicle trips, VMT, and distribution of VMT by speed.

Travel Model 1.5 is not sensitive to the full range of strategies in the proposed Plan. Marketing and education campaigns, as well as non-capacity-increasing transportation investments like bikeshare programs (i.e., Strategy EN09, "Expand Travel Demand Management Strategies"), are examples of strategies with the potential to change behavior in ways that result in reduced vehicle emissions. Travel Model 1.5 and EMFAC do not estimate reductions in emissions in response to these types of changes in traveler behavior. As such, an "off-model" approach was used to quantify the VMT and GHG reduction benefits of these important programs.

2.3.4 Proposed Plan Growth Geographies

The proposed Plan designates specific geographic areas—known as growth geographies—in order to guide where future household and job growth would be focused under the proposed Plan's strategies over the next 30 years. The growth geographies are a mix of a) Areas designated by local jurisdictions—Priority Development Areas (PDAs) and Priority Production Areas (PPAs); and b) areas defined by criteria related to transit service and access to opportunity—Transit-Rich Areas (TRAs) and High-Resource Areas (HRAs). The proposed Plan's core strategy remains "focused growth" in existing communities along the existing transportation network, as evidenced by the descriptions and general locations of the growth geographies described below. This focused growth strategy helps to achieve key regional economic, environmental, and equity goals by building upon existing community characteristics and leveraging existing infrastructure while reducing effects on areas with less development.

The proposed Plan includes the designation of new growth geographies for both housing and jobs. For housing, growth geographies include PDAs and the newly added HRAs and TRAs. For jobs, growth geographies include PDAs and newly added PPAs and TRAs. HRAs identified by the State of California were included as a new housing growth geography to counterbalance housing policies that have historically led to limited housing development, particularly housing affordable to low-income households. TRAs, areas close to rail, ferry, or frequent bus service, were also included as growth geographies to support climate emissions goals, with more housing near transit allowing more people to have access to sustainable transportation options. These growth geographies build on local and regional planning efforts and include 216 locally designated PDAs and 36 locally designated PPAs within the nine-county Bay Area.

Some growth geographies are a combination of categories. Most locally designated PDAs also meet the TRA criteria, and many meet the HRA criteria. A smaller number of PDAs are served by less frequent bus service that does not meet the TRA criteria but is above the minimum transit service requirement for PDAs. PPAs, meanwhile, do not overlap with TRAs served by regional rail, but may

overlap with bus-served TRAs, and may also overlap with HRAs. The mix of growth geographies in each local jurisdiction is determined by whether or not the jurisdiction designated PDAs on at least 50 percent of the land in its boundaries eligible for PDA designation. In jurisdictions that designated at least 50 percent of this land as a PDA, the growth geographies are limited to PDAs and PPAs. As a result, in these jurisdictions TRAs and HRAs within PDAs and PPAs are included as growth geographies, while TRAs and HRAs outside of PDAs and PPAs are not. In jurisdictions that designated PDAs on less than 50 percent of eligible land, growth geographies include: 1) any locally nominated PDAs and PPAs; 2) TRAs outside PDAs and PPAs; and 3) HRAs that are outside PDAs and PPAs, and either within a TRA or within a quarter mile of a bus stop served by one or more route with peak headways of 30 minutes or less.

The following growth geography criteria were adopted by MTC and ABAG (see **Table 2-19** and **Figure 2-5** for more detail):

- Growth geographies designated by local jurisdictions:
  - **Priority Development Areas (PDAs)**—Areas generally near existing job centers or frequent transit that are local identified (i.e., identified by towns, cities, or counties) for housing and job growth.
  - **Priority Production Areas (PPAs)**—Locally identified places for job growth in middle-wage industries like manufacturing, logistics or other trades. An area must be zoned for industrial use or have a predominantly industrial use to be a PPA.
- Growth geographies in local jurisdictions that have designated less than 50 percent of the PDA eligible areas as PDAs:
  - **Transit-Rich Areas (TRAs)**—Areas near rail, ferry, or frequent bus service that were not already identified as a PDA. Specifically, these are areas where at least 50 percent of the area is within ½ mile of either an existing rail station or ferry terminal (with bus or rail service), a bus stop with peak service frequency of 15 minutes or less, or a planned rail station or planner ferry terminal (with bus rail service).
  - **High-Resource Areas (HRAs)**—State identified places with well-resourced schools and access to jobs and open space, among other advantages, that have historically rejected more housing growth. This designation only includes places that meet a baseline transit service threshold of bus service with peak headways of 30 minutes or better. Some HRAs also meet the designation of TRAs, meaning they are both well-resourced and transit-rich.
- Exceptions and Exclusions:
  - Areas within ½ mile of a rail station, regardless of whether the local jurisdiction nominated more than 50 percent of the PDA eligible areas as PDA, are **included** in the TRA growth geography.
  - Very High and High Fire Hazard Severity Areas identified by the California Department of Forestry and Fire Protection or locations within a county-adopted wildland-urban interface area are **excluded** from growth geographies.
  - Areas of sea level rise inundation (i.e., areas at risk from sea level rise through year 2050 that lack adaptation strategies in the proposed Plan's Environment Element) are **excluded** from growth geographies.
  - Areas outside locally adopted urban growth boundaries are **excluded** from growth geographies.

Table 2-19: Growth Geography Designations by County and Class

County	Total Land (acres)	Designated Growth Geography					
		PDA (acres)	PPA (acres)	HRA (acres)	HRA and TRA (acres)	TRA (acres)	Subtotal (acres)
Alameda	470,500	29,400	16,300	2,600	6,500	7,800	62,500
Contra Costa	459,600	15,800	8,000	7,700	650	4,600	36,800
Marin	331,800	2,100	0	1,400	1,800	1,400	6,600
Napa	483,600	930	1,100	0	0	<1	2,000
San Francisco	29,800	18,400	960	<1	140	30	19,500
San Mateo	287,500	9,700	9	3,700	4,100	2,300	19,800
Santa Clara	817,300	27,700	2,800	10,500	11,500	4,800	57,400
Solano	529,300	8,300	5,100	0	0	140	13,600
Sonoma	1,009,000	11,200	140	490	0	570	12,400
Regional Total	4,419,000	123,600	34,500	26,400	24,600	21,700	230,600

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.
Source: Data compiled by MTC and ABAG in 2021

In total, the proposed Plan designates 5 percent of the region's land area to a growth geography. Alameda County has the most land designated as a growth geography, followed by Santa Clara and Contra Costa Counties. San Francisco County has the highest percentage of its land area (65 percent) designated as a growth geography. Alternatively, Napa County has the fewest land acres designated as a growth geography. Locally designated PDAs make up the majority (54 percent) of the growth geography designation acres. The newly created PPAs account for 15 percent of the growth geography area and generally occur in Alameda County. There are two types of HRAs: those that are transit-rich and those with basic transit service. Collectively, HRAs account for 22 percent of the growth geography area and are predominately found in Santa Clara County. TRAs account for 20 percent of the growth geography area. The majority of TRA designations occur in Alameda and Santa Clara Counties.

The proposed Plan also includes 184 locally nominated Priority Conservation Areas (PCAs). Although not a designated growth geography, PCAs are areas of regional significance that have broad community support for conservation and need environmental protection. They provide important agricultural, natural resource, scenic, cultural, recreational, and/or ecological values, and ecosystem functions.

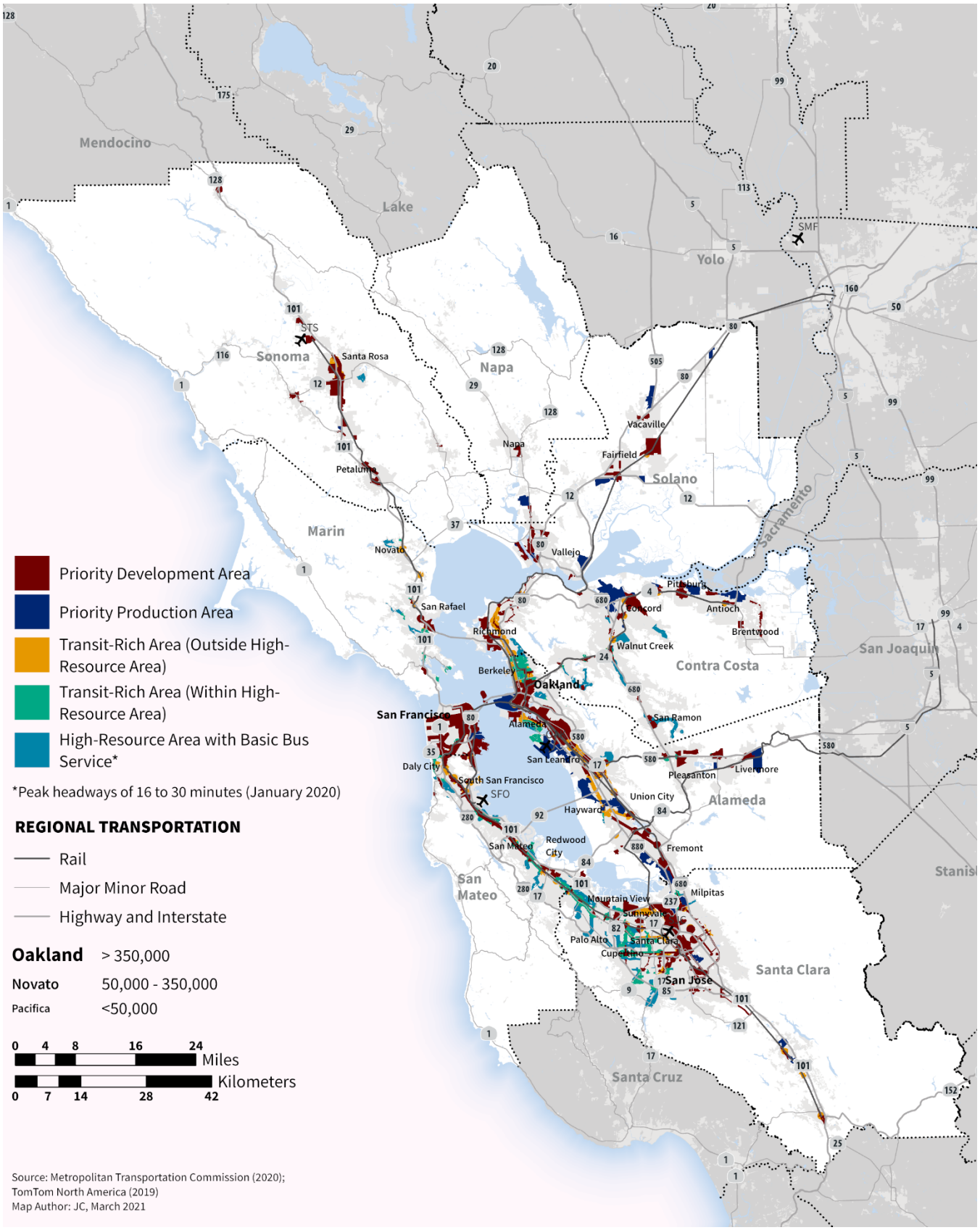

Figure 2-5: Growth Geography Designations by Type

TRANSIT PRIORITY AREAS

Approval of an adopted SCS by CARB allows for CEQA streamlining benefits for transit priority projects (TPPs). Please see Section 1.9, "CEQA Streamlining Opportunities," for more information regarding CEQA streamlining opportunities. A TPP is defined by statute, based on consistency with the following requirements:

- consistent with the general land use designation, density, building intensity, and applicable policies specified for the project area in the SCS;
- located within a half-mile of a major transit stop or high-quality transit corridor;
- made up of at least 50-percent residential use based on total building square footage or as little as 26-percent residential use if the project has a floor area ratio of not less than 0.75; and
- built out with a minimum of 20 dwelling units per acre (PRC Section 21155).

For the purposes of this EIR, geographic areas eligible to meet the TPP requirements are referred to as TPAs.

RELATIONSHIP BETWEEN GROWTH GEOGRAPHIES AND TPAS

The proposed Plan's growth geographies promote compact development in established communities with high-quality transportation access while placing less development pressure on the region's vast and varied open spaces and agricultural lands. The major difference between TPAs and the proposed Plan's growth geographies is how they are designated. As discussed above, a PDA and PPA are identified by a local agency for adoption by ABAG, while HRAs are defined by the State of California. TPAs are akin to TRAs, in that they are areas that meet specific considerations; however, TPAs are more narrowly defined than TRAs by the series of requirements described above. The growth geographies and TPAs are similar in that they emphasize access to transit service and are appropriately planned for growth.

Within the Bay Area, TPAs and the proposed Plan's designated growth geographies cover approximately 144,100 and 230,600 acres, respectively. Approximately 98,800 acres of land is designated as both a TPA and a growth geography. **Figure 2-6** shows the general locations of designated TPAs and growth geographies within the region. **Table 2-20** shows county-by-county total acreage of TPAs and the proposed Plan's growth geographies, and the extent to which they do and do not overlap. As noted in Section 1.4.2, "Level of Analysis," because of potential future CEQA streamlining benefits, only TPAs are reported separately in the EIR impact analyses, where feasible, rather than reporting separately by all the growth geographies.

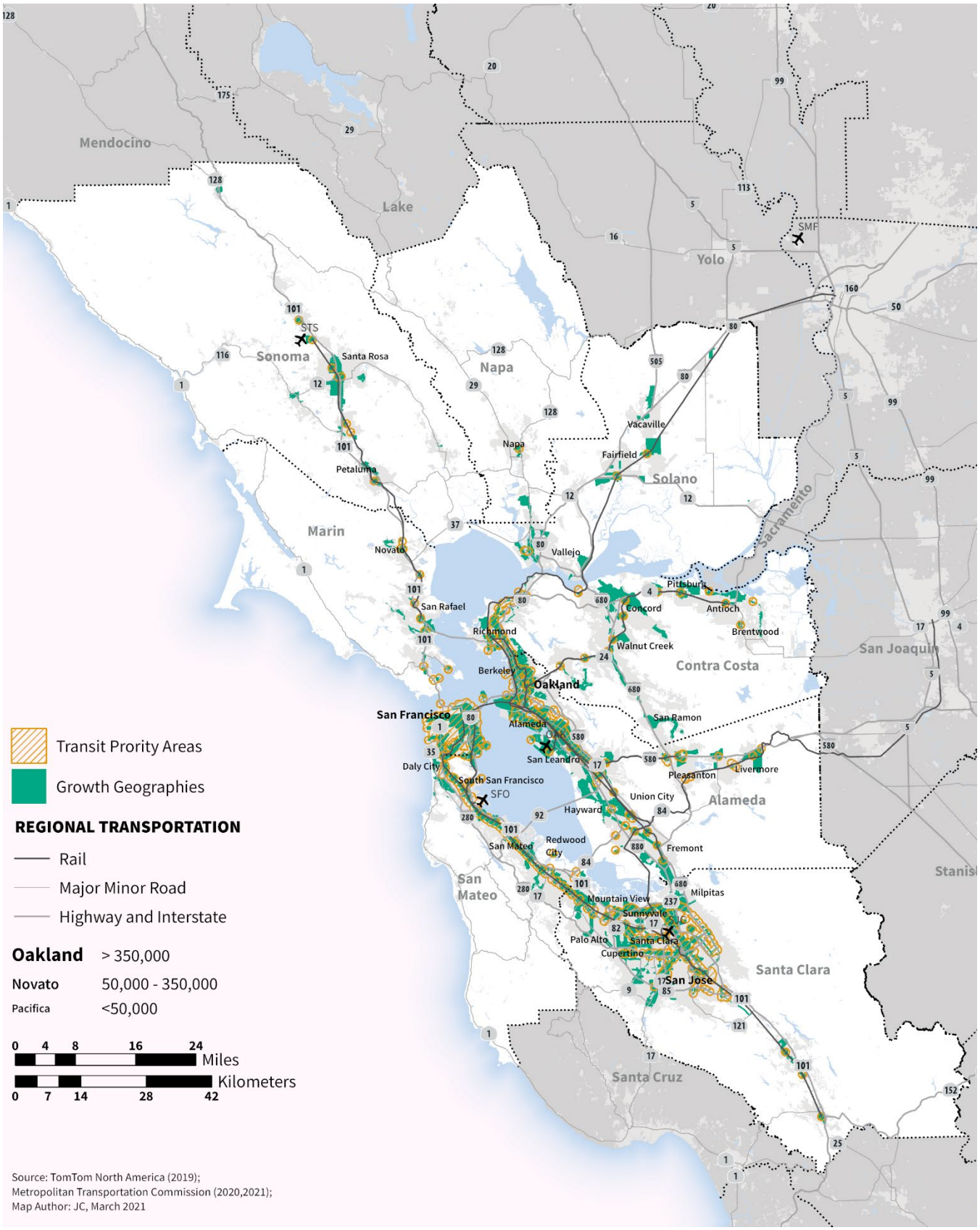

Figure 2-6: Growth Geography Designations and TPAs

Table 2-20: Distribution of Growth Geographies and TPAs by County

County	Total Land (acres)	Designated TPA (acres)	Designated Growth Geography (acres)	Designated both TPA and Growth Geography (acres)	Designated TPA but Not Growth Geography (acres)	Designated Growth Geography but Not TPA (acres)	Designated Neither TPA nor Growth Geography (acres)
Alameda	470,500	31,900	62,500	23,800	8,200	38,800	399,700
Contra Costa	459,600	9,500	36,800	7,000	2,500	29,800	420,400
Marin	331,800	4,700	6,600	2,900	1,800	3,800	323,300
Napa	483,600	460	2,000	300	160	1,700	481,500
San Francisco	29,800	25,300	19,500	17,800	7,500	1,700	2,700
San Mateo	287,500	14,900	19,800	9,700	5,100	10,100	262,600
Santa Clara	817,300	52,000	57,400	33,200	18,800	24,100	741,200
Solano	529,300	1,600	13,600	1,400	230	12,100	515,500
Sonoma	1,009,000	3,800	12,400	2,600	1,100	9,700	996,000
Regional Total	4,419,000	144,100	230,600	98,800	45,300	131,800	4,143,000

Notes: Whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.
Source: Data compiled by MTC and ABAG in 2021

2.4 PLAN BAY AREA 2050 DOCUMENT

2.4.1 Document Framework

The proposed Plan document is organized into six chapters, plus a stand-alone Implementation Plan, which are listed and briefly summarized as follows:

- **Introduction:** This chapter provides an overview of current challenges facing the Bay Area and summarizes the historical policy and planning context that laid the groundwork for these challenges to emerge and intensify. Additionally, the Introduction chapter recaps the role of the long-range Plan, introduces the reader to the present and future demographics of the Bay Area, and highlights relevant local and regional planning initiatives as appropriate.

- **Housing:** This chapter summarizes recommended strategies, including a set of geographies identified for intensified housing development at the local level and policies that seek to support housing affordability and access. The strategies are grouped into three themes: protect and preserve affordable housing, spur housing production at all income levels, and create inclusive communities.

- **Economy:** This chapter summarizes the recommended strategies, including a set of geographies identified for intensified job site development and strategies aimed at creating a more equitable economy and addressing the entrenched geographic imbalances between housing and jobs. The strategies are grouped into two themes: improve economic mobility and shift the location of jobs.

- **Transportation:** This chapter summarizes recommended strategies, including transportation policies and bundles of investments, that seek to improve transportation conditions in the Bay Area. The strategies are grouped into three themes: maintain and optimize the existing system, create healthy and safe streets, and build a next-generation transit network.

- **Environment:** This chapter summarizes the recommended strategies, including policies and bundles of investments, that seek to advance sustainability and resilience to earthquakes, sea level rise, and other natural hazards. The strategies are grouped into three themes: reduce risks from hazards, expand access to parks and open space, and reduce climate emissions.

- **Outcomes:** This chapter summarizes the performance of the entire suite of 35 integrated strategies included in the proposed Plan, organized around the five guiding principles.

- **Implementation Plan:** This plan identifies implementation actions for MTC, ABAG, and other stakeholders to make meaningful progress toward implementing each of the proposed Plan's 35 strategies over the next 5 years.

- **Supplemental Reports:** In addition to this EIR, the proposed Plan also includes the following supplementary documents that will be made available at planbayarea.org/reports.

  - Air Quality Conformity and Consistency Report,
  - Equity Analysis Report,
  - Forecasting and Modeling Report,
  - Implementation Plan Briefs,
  - Native American Tribal Engagement and Government-to-Government Consultation Report,
  - Performance Report,
  - Public Engagement Report,
  - Technical Assumptions Report,
  - Transportation Project List, and
  - Statutorily Required Plan Maps.

  As noted in Section 1.7.3, "Federal and State Requirements," the RTP must comply with Section 65080 of the California Government Code. The State requirements largely mirror the federal requirements and require each transportation planning agency in urban areas to adopt and submit an updated RTP to CTC and Caltrans every 4 years. To ensure a degree of Statewide consistency in the development of RTPs, CTC adopted RTP Guidelines pursuant to Government Code Section 14522.The RTP Guidelines are intended to assist MPOs and RTPAs with developing RTPs that are consistent with federal and State planning requirements. The RTP Guidelines include a requirement for program-level performance measures, which include objective criteria that reflect the goals and objectives of the RTP. These goals and objectives are featured in the Draft Performance supplemental report to Plan Bay Area 2050. The proposed Plan follows the 2017 RTP Guidelines, which were adopted on January 18, 2017.

The 2017 RTP guidelines identify four elements that should be included in an RTP/SCS and have been included as part of the proposed Plan:

1. **Policy Element** that describes the transportation issues in the region, identifies and quantifies regional needs, and describes the desired short-range and long-range transportation goals, and objectives and policy statements. This element is included in the Plan Bay Area 2050 document, specifically in the Introduction chapter and the Transportation chapter.

2. **Sustainable Communities Strategy (SCS)** that identifies a forecasted development pattern that, when integrated with the transportation network, and other transportation measures and policies, will reduce regional GHG emissions from automobiles and light trucks, if there is a feasible way to do so. This information is included in the Plan Bay Area 2050 document through components of each of the four element chapters.

3. **Action Element** that describes the programs and actions necessary to implement the Plan and assigns implementation responsibilities. This information is included in the Implementation Plan chapter of the Plan Bay Area 2050 document, with further information included in the Implementation Plan Briefs supplemental report.

4. **Financial Element** that summarizes the cost of Plan implementation constrained by a realistic projection of available revenues. This information is included in the Financial Assumptions Report, with a summary featured in the Implementation Plan chapter of the Plan Bay Area 2050 document.

2.4.2 Intended Uses of This EIR

The CEQA Guidelines (Section 15124[d]) require EIRs to identify the agencies that are expected to use the EIR in their decision making and the approvals for which the EIR will be used. This EIR will inform MTC and ABAG, in addition to other responsible agencies, persons, and the general public, of the potential environmental effects of the proposed Plan and the identified alternatives. MTC and ABAG will use this EIR for the purposes of review and approval of the proposed Plan.

This program EIR is a first-tier document that addresses the environmental impacts that may affect the nine-county Bay Area as a result of adoption and implementation of Plan Bay Area 2050. Therefore, future programs or projects may "tier" from this program EIR, as stipulated in CEQA. "Tiering" refers to the coverage of general environmental analysis in broad, program-level EIRs, with subsequent focused environmental documents for individual projects that implement the program. If the potential environmental effects of consistent subsequent actions are adequately addressed by a certified program EIR, additional environmental analysis may be unnecessary. This finding can be substantiated using an initial study that evaluates whether the environmental effects of the subsequent project have already been adequately covered.

The lead agencies for projects analyzed in this program EIR may use it as the basis for cumulative analysis of specific project impacts, together with the projected growth in the region. Cities and counties may use information in this EIR in their future housing elements. Bay Area congestion management agencies may incorporate information provided in this EIR into future county transportation plans, such as congestion management programs, countywide transportation plans, and county bike and pedestrian plans. Other agencies expected to use this EIR include the California Department of Transportation, county transportation authorities, transit providers in the region (such as Muni, BART, AC Transit, SamTrans, Caltrain, SolTrans, WestCAT, Altamont Corridor Express, and Water Emergency Transit Authority), the Bay Conservation and Development Commission, the Bay Area Air Quality Management District, and cities and counties.

Mitigation measures described in this EIR may be incorporated into project-level environmental impact analyses by project sponsors or local agencies as appropriate to mitigate identified project-level impacts.

This EIR is also intended to help activate the CEQA streamlining benefits of SB 375 for local jurisdictions and private development, described in Section 1.9.1, "Streamlining under SB 375."

2.4.3 Actions to Adopt and Implement the Proposed Plan

MTC and ABAG are the lead agencies for approval of the proposed Plan and the associated environmental review (this EIR). Approval consists of three actions among MTC and ABAG:

- **Final Air Quality Conformity Determination for Plan Bay Area 2050 | MTC:** As the first action, MTC must make a conformity determination under federal Clean Air Act Section 176(c). The Federal Highway Administration and the Federal Transit Administration make the final determination of conformity determination implementation.
- **Final Program Environmental Impact Report for Plan Bay Area 2050 | MTC and ABAG:** The second action requires MTC and ABAG, as lead agencies, to certify the EIR is adequate under CEQA.
- **Final Plan Bay Area 2050 | MTC and ABAG:** As the third and final action, the proposed Plan requires joint approval by the MTC Commission and the ABAG Board.

Following adoption by MTC and ABAG, MTC and ABAG must submit the Plan to CARB. CARB must review the adopted SCS ("Plan Bay Area 2050") to confirm and accept the MPO's determination that the SCS, if implemented, would meet the regional GHG emissions reduction target. If the combination of strategies in the SCS would not meet the regional targets, MTC and ABAG must prepare an "alternative planning strategy" to meet the regional GHG emissions reduction target.

Once adopted by MTC and ABAG, Plan Bay Area 2050 will guide regional housing, economic, transportation, and environmental strategies and investments for the region.

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3.1 APPROACH TO THE ANALYSIS

3.1.1 Introduction

This chapter is organized by environmental resource topic. Each resource topic is addressed in a separate section that presents an integrated discussion of the existing conditions (including environmental setting and regulatory setting) associated with the resource, significance criteria, method of analysis, potential environmental effects of the project (including direct and indirect impacts) on the resource, and mitigation measures to reduce significant effects.

Cumulative and growth-inducing impacts are discussed in Chapter 5, "Other CEQA-Mandated Sections."

3.1.2 Approach to the Environmental Analysis

In accordance with the State CEQA Guidelines (CCR Section 15126.2), this Draft EIR identifies and focuses on the significant direct and indirect environmental effects from the adoption and implementation of the proposed Plan. The analysis considers the short-term and long-term effects of the project based on construction and operational assumptions described below.

As described in Chapter 1, "Introduction," this analysis focuses on those environmental resource topics for which potentially significant impacts were identified based on review of comments received during project scoping and additional research and analysis of relevant project data.

The remainder of this chapter addresses the following resource topics:

- Section 3.2, "Aesthetics and Visual Resources"
- Section 3.3, "Agriculture and Forestry Resources"
- Section 3.4, "Air Quality"
- Section 3.5, "Biological Resources"
- Section 3.6, "Climate Change, Greenhouse Gases, and Energy"
- Section 3.7, "Cultural Resources and Tribal Cultural Resources"
- Section 3.8, "Geology, Seismicity, and Mineral Resources"
- Section 3.9, "Hazards and Wildfire"
- Section 3.10, "Hydrology and Water Quality"
- Section 3.11, "Land Use, Population, and Housing"
- Section 3.12, "Noise"
- Section 3.13, "Public Services and Recreation"
- Section 3.14, "Public Utilities and Facilities"
- Section 3.15, "Transportation"

Sections 3.2 through 3.15 follow the same general format:

- **"Environmental Setting":** This subsection presents the existing environmental conditions within the Plan area and in the surrounding area as appropriate, in accordance with State CEQA Guidelines Section 15125. The discussions of the environmental setting focus on information relevant to the issue under evaluation. The extent of the environmental setting area evaluated differs among resources, depending on the locations where impacts would be expected.

- **"Regulatory Setting":** This subsection presents information on the laws, regulations, plans, and policies that relate to the issue area being discussed. Regulations originating from the federal, State, and local levels are each discussed as appropriate.

- **"Impact Analysis":** This subsection presents significance criteria and discusses the potentially significant effects of the proposed Plan on the existing environment in accordance with State CEQA Guidelines Section 15126.2. The methodology for impact analysis, along with any technical study upon which the analysis relies, is described in each section. The significance criteria are defined, and criteria for which the project would have no impact are disclosed and dismissed from further evaluation. Project impacts are organized by environmental topic abbreviation in each subsection (e.g., Impact AES-1, Impact AES-2, Impact AES-3, etc.).

  Each impact discussion presents the analysis, rationale, and substantial evidence upon which the conclusion is based. The determination of the impact's level of significance is shown in bold text. A "less-than-significant" impact is one that would not result in a substantial adverse change in the physical environment. A "potentially significant" impact or "significant" impact is one that would result in a substantial adverse change in the physical environment; both are treated the same under CEQA in terms of procedural requirements and the need to identify feasible mitigation. Mitigation measures are identified, as feasible, to avoid, minimize, rectify, reduce, or compensate for significant or potentially significant impacts, in accordance with the State CEQA Guidelines Section 15126.4.

  Where an existing law, regulation, or permit specifies mandatory and prescriptive actions about how to fulfill a regulatory requirement of the project, leaving little discretion in its implementation, and would avoid an impact or maintain it at a less-than-significant level, the environmental protection afforded by the regulation is considered before determining impact significance. In other words, where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume they would be implemented, thereby reducing impacts. Where existing laws or regulations specify a mandatory permit process for future projects, performance standards without prescriptive actions to accomplish them, or other requirements that allow substantial discretion in how they are accomplished, or have a substantial compensatory component, the level of significance is determined before applying the influence of the regulatory requirements. In this circumstance, the impact would be potentially significant or significant, and the regulatory requirements would be included as a mitigation measure.

  Mitigation is proposed, where feasible, to reduce potentially significant environmental impacts. For some impacts, mitigation measures are commitments by MTC and ABAG. For most impacts, MTC and ABAG do not have regulatory or approval authority over future projects. In those cases, MTC and ABAG identify specific mitigation measures for application by the lead agency. In order to rely on this EIR to streamline environmental review for an individual project, the lead agency must require the applicable mitigation measures as a part of the project-level environmental review. These commitments would obligate project sponsors to implement measures that would minimize or eliminate significant impacts pursuant to CEQA. The project sponsor or lead agency would be responsible for ensuring adherence to the mitigation measures during construction and operation of the project.

  Throughout the impact analysis, it is noted where projects using the CEQA streamlining provisions of Senate Bill 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures, as feasible, to address site-specific conditions. MTC and ABAG cannot require local implementing agencies to adopt mitigation measures. It is ultimately the responsibility of a lead agency to adopt mitigation. Therefore, this EIR makes a distinction in characterizing impact significance after

mitigation to reflect whether MTC and ABAG are able to assume implementation of identified mitigation measures because they have the authority to impose the measures.

3.1.3 General Methodology and Assumptions

BASELINE AND PLAN TIMEFRAME

Under CEQA, the impacts of a proposed project must be evaluated by comparing expected environmental conditions after project implementation to conditions at a point in time referred to as the baseline. Additionally, in order to assess the environmental impacts of the proposed Plan, it is necessary to make assumptions about future environmental conditions at the time it is fully implemented. The changes in environmental conditions between those two scenarios represent the environmental impacts of the proposed Plan. The State CEQA Guidelines Section 15125 states that an EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant.

As the CEQA Guidelines make clear, ordinarily the appropriate baseline will be the actual environmental conditions existing at the time of CEQA analysis (typically when the Notice of Preparation [NOP] is published). In many cases, establishing this "existing conditions" baseline is a straightforward task. However, there may be times when a deviation from the use of the NOP date to establish the baseline is appropriate in order to present a fair and accurate description of the expected environmental impacts of a proposed project. In the case of the proposed Plan, the NOP was released on September 28, 2020, during a global pandemic caused by the COVID-19 coronavirus. From March 2020 up to, and beyond, the release of the NOP the nine-county Bay Area was in varying stages of compliance with shelter-in-place orders directed by various county health officers. These orders affected such things as commercial and office business operations, employee commutes, and travel behavior, resulting in secondary effects related to traffic and congestion, air quality, and energy use. In some cases in the following technical sections, the environmental baseline is more accurately represented as prior to March 2020. For physical conditions that were not altered by the global pandemic and shelter-in-place orders, the existing conditions for the analysis are generally September 2020. See the discussion under "Method of Analysis" for each technical section for a description of the baseline for the analysis.

The horizon year for the proposed Plan is 2050. For comparisons where 2020 data are not available, the closest available year with comprehensive datasets is used. This includes using a baseline year of 2015 in the transportation and transportation-related analyses because it is the year with the most recent data readily available from public sources or using transportation outputs from the regional travel model. An exception to this approach appears in Section 3.6, "Climate Change, Greenhouse Gases, and Energy," which includes a 2005 baseline to satisfy statutory requirements of Senate Bill 375 for benchmarking the year used for comparison to the proposed Plan's greenhouse gas reduction targets, and a 1990 baseline for an assessment of the proposed Plan's consistency with SB 32, which calls for a statewide reduction of GHG emissions to 40 percent from 1990 levels by 2030.

As described in Chapter 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050, the region will support an additional 2.7 million residents and 1.4 million jobs, resulting in 1.4 million new households. The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that result in focused housing and job growth concentrated primarily in or adjacent to existing communities and along existing transit corridors. This analysis does not consider phasing of improvements or interim stages of the proposed

Plan between 2020 and 2050, because the required 4-year update cycle of the RTP/SCS results in regular, short-term adjustments to the Plan. The one exception to this approach is Section 3.6, "Climate Change, Greenhouse Gases, and Energy," which includes an examination of impacts in 2020, 2030, 2035, 2040, and 2050, to satisfy requirements of Senate Bill 375, the Global Warming Solutions Act of 2006 (Assembly Bill 32 [2006], Senate Bill 32 [2016]), and Executive Orders B 30-15 and EO-05-03, among other requirements.

LEVEL OF DETAIL

As a program-level EIR that addresses the entire nine-county, 101-city region, this document does not address the impacts of individual land use and transportation projects in detail; the focus of this analysis is on addressing the impacts of implementation of the Plan's 35 strategies as a whole. The analysis considers the impacts of the proposed Plan in terms of the forecasted land use development pattern ("land use growth footprint"), sea level rise adaptation infrastructure ("sea level rise adaptation footprint"), and transportation projects and programs ("transportation projects footprint"). The impact discussions generally disclose the potential effects of the proposed Plan at three levels of geography: (1) at the regional level, which covers the Bay Area as a whole; (2) at the county level, which covers each Bay Area county; and (3) at the Transit Priority Area (TPA) level, which covers the TPAs. County totals include incorporated and unincorporated areas in each county. The portion of the land use growth footprint located outside of a TPA is captured in the county totals. The analysis is intended to assist areawide issue identification as it relates to regional transportation and land use planning and to provide a basis for future CEQA streamlined project-level environmental analysis for projects implemented under the proposed Plan. Therefore, only TPAs were isolated for reporting in this EIR.

QUANTITATIVE ANALYSES

This program-level EIR includes quantification of impacts when feasible. Quantifications are generally location based, while some quantifications result from travel patterns and corresponding emissions. Where quantitative impact analyses rely on specific industry-standard methodology and modeling (i.e., MTC's Travel Model 1.5, CalEEMod, or EMFAC), the relevant sections include a description of the method of analysis. This section describes location-based analyses in more detail below.

Location-Based Analysis

Quantitative results are presented for the region (i.e., the entire footprint, often summarized by county) and for the portions of the land use growth footprint specifically within transit priority areas (TPAs). TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county.

For quantitative impact assessments, a geographic information system (GIS) was used to digitally overlay the proposed Plan's footprints associated with forecasted land use development, sea level rise adaptation infrastructure, and transportation projects onto resource-specific data.

The land use growth footprint is derived from the UrbanSim 2.0 land use model and represents the development or redevelopment of parcels of land simulated to accommodate the region's forecasted growth of households and jobs from 2015 through 2050 through new building(s). Precise building site(s) on the parcels are not known, therefore the land use growth footprint incorporates the entire parcel. Because of this assumption, the area of potential effects tends to be overstated when considering the land use growth footprint. It should be noted that this footprint includes some areas identified for development in local land use plans that are outside of the growth geographies (See Table 2-4 in Chapter 2, "Project Description").

The proposed Plan identifies several adaptation archetypes for regularly inundated shoreline areas, including a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. Not all of the archetypes would be expected to require earthmoving activities and/or have a footprint associated with implementation. For example, marsh restoration is not included in the sea level rise adaptation footprint, whereas elevated roadways, levees, sea walls, and tidal gates are included in the footprint. In addition, the precise footprints and other design details of most sea level rise adaptation infrastructure are unknown because it is in the early stages of planning. Thus, sea level rise adaptation infrastructure was spatially analyzed by estimating the potential area of effects around the center line or center point of proposed infrastructure, and includes both land and water areas. Because of these estimation assumptions, the area of potential effects tends to be overstated when considering sea level rise adaptation infrastructure.

The transportation projects footprint includes the proposed transportation projects and programs that have the greatest potential for physical impacts based on characteristics such as expansion, widening, new construction, or new configurations. The precise footprints and other design details of most proposed transportation projects are unknown because the projects are in the early stages of planning. Thus, transportation projects (e.g., road widenings, new roads, new or expanded interchanges, and new rail transit infrastructure) were spatially analyzed by estimating the potential area of effects around the center line of proposed roadway and transit projects. Because of these estimation assumptions, the area of potential effects tends to be overstated when considering transportation projects. In addition, some transportation project footprints overlap where projects are located within close proximity of each other or where alignments coincide. The transportation projects acreage reported in this EIR reflects the footprint of each project and does not discount these areas of overlap. In addition, portions of the three footprints (land use growth, sea level rise adaptation, and transportation projects) overlap because the areas of potential effects are imprecise. This overlap is relatively insignificant, ranging from 110 to 420 acres. To provide a more accurate interpretation of the potential environmental impacts, the acreages of the land use growth footprint and transportation projects footprint are not combined or analyzed as one total and instead are presented independently throughout the analysis. This could result in an overestimation of impacts.

3.1.4 Standard Terminology

This Draft EIR uses the following standard terminology:

"No impact" ("NI") means no change from existing conditions (no mitigation is needed).

"Less-than-significant impact" ("LTS") means no substantial adverse change in the physical environment (no mitigation is required).

"Potentially significant impact" ("PS") means an impact that might cause a substantial adverse change in the environment (mitigation is required because potentially significant impacts are treated as significant).

"Significant impact" ("S") means an impact that would cause a substantial adverse change in the physical environment (mitigation is required).

"Less than significant with mitigation ("LTS-M") means an impact that would cause a substantial adverse change in the physical environment, but the impact would be reduced to a less-than-significant level with the incorporation of mitigation measures identified in this EIR.

"Significant and unavoidable impact" ("SU") means an impact that would cause a substantial adverse change in the physical environment and that cannot be avoided, even with the implementation of all feasible mitigation.

3.1.5 Local Control

The region's cities, towns, and counties retain local land use authority, and local jurisdictions will continue to determine where future development occurs. The proposed Plan is supported through implementation efforts, such as neighborhood-level planning grants for Priority Development Areas and local technical assistance. The proposed Plan does not mandate any changes to local zoning rules, general plans, or processes for reviewing projects, nor does the Plan provide an enforceable direct or indirect cap on development locations or targets in the region. As is the case across California, the Bay Area's cities, towns, and counties maintain control of all decisions to adopt plans and to permit or deny development projects.

The proposed Plan also does not establish new State-mandated Regional Housing Needs Allocation (RHNA) numbers for any jurisdiction, but the RHNA is consistent with the proposed Plan. The RHNA process is conducted on an 8-year cycle, which currently coincides with this update to the region's long-range plan.

3.2 AESTHETICS AND VISUAL RESOURCES

This section describes the aesthetic and visual resources of the Bay Area and assesses the potential of the proposed Plan to affect the region's aesthetic environment. Aesthetic value is subjective, but it is typically used as a criterion for evaluating those elements that contribute to the visual quality that distinguishes an area. Most communities identify scenic resources as an important asset, although what is considered "scenic" may vary according to its environmental setting. It is useful to think of scenic resources in terms of "typical views" seen throughout the Bay Area because scenic resources are rarely encountered in isolation. A typical view may include several types of scenic resources, including both natural elements and built spaces. Typical views seen in the Bay Area are described in the "Physical Setting" section, below.

Comments received in response to the Notice of Preparation expressed concerns about impacts on views and vistas in the wildland-urban interface in Santa Clara and San Mateo Counties. Potential impacts on visual resources from the proposed Plan are addressed in this section. Effects of alternatives are addressed in Chapter 4, "Alternatives. "

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." (CEQA Guidelines Section 15083.) Neither the CEQA Guidelines nor Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require they be considered. Consistent with these requirements, these comments have been carefully reviewed and considered by MTC in the preparation of impacts in this chapter. Appendix B includes all NOP comments received.

3.2.1 Environmental Setting

PHYSICAL SETTING

The Bay Area is characterized by the diversity of urban development and the combination of rural and agricultural landscapes, as well as the natural beauty and wildlife provided by the surrounding mountain ranges and rich wildlife habitats. It stretches along the central northern Pacific coast of California, with several branches of the Coast Ranges dividing it into valleys, plains, and water bodies. The largest of these valleys contains San Francisco Bay, whereas at the eastern edge of the region is the great Central Valley, a flat plain lying between the Coast Ranges and the Sierra Nevada. The hills of the Coast Ranges provide expansive views of the valleys and plains below, revealing a variety of development types, including urban areas along the bay plains and inland valleys, agricultural lands, and protected open space, and natural areas.

The landscapes of the San Francisco Bay Area are varied, unique, and recognized by many in the region and beyond. The basin formed by the Coast Ranges, East Bay hills, and the Bay itself are prominent physical features of the region. To the west, the Pacific Ocean and the Coast Ranges dominate the visual setting, stretching from Mount Tamalpais in the north to the Santa Cruz Mountains in the south. To the east, the Diablo Range, punctuated by Mount Diablo, provides a view of a different character. In the north, the vineyards of Napa and Sonoma Counties are unique and draw visitors from around the world. Many built features in the Bay Area—the Golden Gate and Bay Bridge and the San Francisco skyline in particular—are also of international renown. Bay Area

residents and tourists alike value the variety and quality of the visual experiences that are found throughout the Bay Area, including urban and rural public spaces, regional parks, and transportation corridors in the region, including heavily traveled freeways, transit lines, and ferries, and narrow country roads through secluded forests and agricultural areas. **Figure 3.2-1** depicts the locations of major scenic resources found in the Bay Area. Major land use and/or transportation projects may affect the visual experiences of travelers and the distinctive visual environment of the region.

Hills and Valleys

The Bay Area contains several distinct mountain ranges and hills. Along the peninsula between the Pacific Ocean and San Francisco Bay lie the coastal hills of San Mateo and Santa Clara Counties and, north of the Golden Gate, the hills of Marin County. The East Bay hills rise steeply from the urbanized plain along the eastern edge of the Bay, forming a several mile–wide band that also defines the western edge of the Diablo and Livermore Valleys of Contra Costa and Alameda Counties. The rolling hills of the Diablo Range separate these valleys from the lowlands of the Central Valley. These hills converge at the south end of the Bay Area in Santa Clara County. To the north, several ranges frame the Napa and Sonoma valleys.

Between these ranges and hills are numerous valleys, both broad and narrow. San Francisco Bay, for example, is bordered along the east and west by a narrow, heavily urbanized plain. This plain widens in the south into the Santa Clara Valley, which, until World War II, was primarily agricultural. The East Bay and coastal hills, which are visible throughout these lowlands, orient viewers and give a sense of scale to the surrounding urban areas. Likewise, to the north, the hills forming the Sonoma and Napa valleys enclose these agricultural areas with urban pockets.

Landmarks and Gateways

Certain features of the Bay Area stand out as symbols and points of orientation (see **Figure 3.2-1**). These landmarks include the Golden Gate and Bay Bridges, Alcatraz and Angel Islands, San Francisco skyline, several large buildings in the East Bay hills (the Campanile on the University of California, Berkeley, campus; the Claremont Hotel; and the Mormon Temple in Oakland, for example), and Mount Saint Helena at the northern end of the Napa Valley. These landmarks help visitors and residents locate themselves within the region and, in the case of the Golden Gate Bridge, symbolize the Bay Area for the rest of the world.

Waterways

The Bay Area is home to a number of bodies of water and waterways that flow through or are located in the region. Estuaries, creeks, and built waterways are found throughout the region, as well as the dominant body of water, the San Francisco Bay, which reaches out to the northern and southernmost counties of the Bay Area. Most rivers and streams originating in each of the nine counties of the Bay Area flow into the San Francisco Bay, which provides access to the Pacific Ocean. There are also many smaller built reservoirs in the Bay Area that provide notable landscape features, as well as a few larger reservoirs, notably Lake Berryessa in Napa County and Lake Sonoma in Sonoma County.

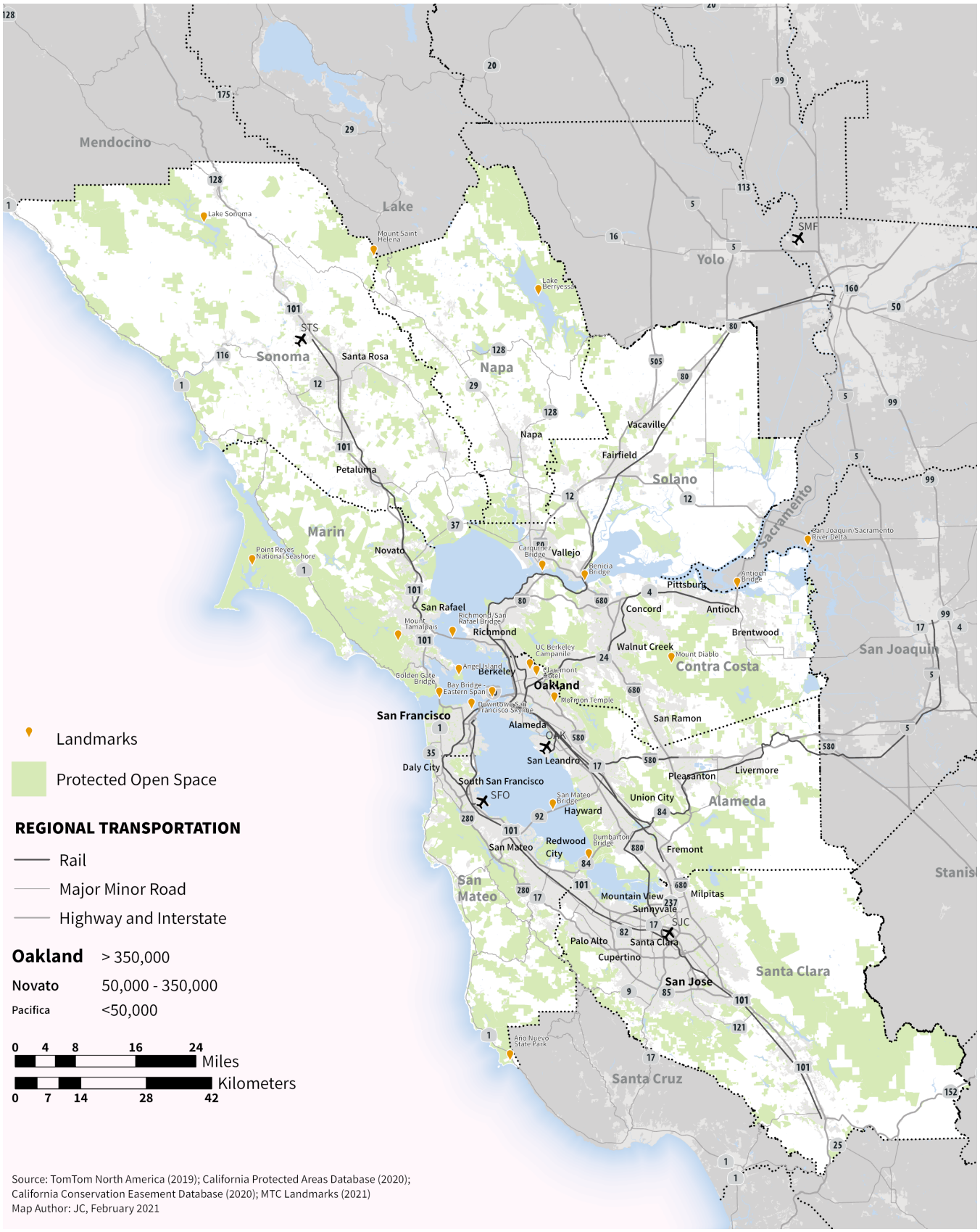

Figure 3.2-1: Major Bay Area Scenic Resources

Views from Travel Corridors

Many roadways and rail lines that intersect the landscapes of the Bay Area provide expansive, regional views of surrounding areas, often because of their wide rights-of-way, location along high points, the elevation of the facilities, or a combination of these factors. Examples include Interstate (I-) 280 along the peninsula, State Route (SR) 92 as it crosses the Coastal Ranges, I-80 near Rodeo, I-580 over the Altamont Pass and above Oakland, and the SR 24 corridor. Similarly, the rest area on I-80 above Vallejo, the west end of the Caldecott Tunnel, southbound U.S. 101 in Marin County, and portions of U.S. 101 in San Francisco offer dramatic views of notable Bay Area landscapes. The bridges crossing San Francisco Bay and the Carquinez Strait offer similar experiences. Both the Bay and Golden Gate Bridges provide world-famous views of San Francisco, whereas the Richmond-San Rafael Bridge provides sweeping views of the North Bay, including Mount Tamalpais and Angel Island. The Antioch Bridge allows views over the Sacramento–San Joaquin Delta.

Similarly, rail facilities (including Bay Area Rapid Transit [BART]) can provide travelers with broad views of the region or portions of it. The elevated BART lines through the East Bay, for example, provide views of the East Bay hills and the neighborhoods of Oakland, Berkeley, and El Cerrito. The Amtrak rail lines along San Pablo Bay and the San Joaquin River also provide broad views of the water with the hills beyond.

Roads and rail lines also provide more intimate views of forested hills or narrow valleys. SR 35 (along the crest of the San Mateo Peninsula) and SR 84 (through the narrows of Niles Canyon) are examples of such views. Similarly, SR 1 and Sir Francis Drake Boulevard run through the forests and grasslands of Marin County to the beaches, parks, and open space areas along the coast, up to and through Sonoma County. SR 29 and the Silverado Trail through the Napa Valley and SR 12 through the Sonoma Valley provide dramatic views of enclosing hills, adjoining vineyards, and wineries.

Finally, although carrying only a small proportion of the region's travelers, the Bay ferries provide unique viewing experiences of the Bay Area.

Views of Roads, Rail, and Buildings

Because the Bay Area contains a wide variety of densely populated metropolitan and urban centers, along with more rural communities, roads, buildings, and railways are also a part of the existing aesthetic landscape. Rural and natural landscapes can be dramatically altered by the placement of roads, rail lines, and buildings. Although roads and rail lines can provide access to views for travelers, these facilities can detract from or block public views. A new or expanded roadway along a hillside can be visible from a great distance, changing the impression of the hillside for the viewer, particularly if the hillside is undeveloped. Also, new roads and rail lines are sometimes built at elevations above the level of existing development, which can overshadow nearby homes and businesses and limit views of the surrounding hills and valleys. Similarly, buildings can enhance or detract from the overall visual environment depending on their design, location, and relationship to other structures and natural features.

3.2.2 Regulatory Setting

FEDERAL REGULATIONS

U.S. Department of Transportation Act, Section 4(f)

The U.S. Department of Transportation Act (DOT Act) (49 U.S. Code Section 303) was enacted to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites. Section 4(f) of the DOT Act requires a comprehensive evaluation of all environmental impacts resulting from federal-aid transportation projects administered by the Federal Highway Administration, Federal Transit Administration, and Federal Aviation Administration that involve the use, or interference with use, of the following types of land:

- public park lands;
- recreation areas;
- wildlife and waterfowl refuges; and
- publicly or privately owned historic properties of federal, State, or local significance.

This evaluation, called the Section 4(f) statement, must be sufficiently detailed to permit the U.S. Secretary of Transportation to determine whether:

- there is no feasible and prudent alternative to the use of such land or
- the program includes all possible planning to minimize harm to any park, recreation area, wildlife and waterfowl refuge, or historic site that would result from the use of such lands.

If there is a feasible and prudent alternative, a proposed project using Section 4(f) lands cannot be approved by the Secretary; or if there is no feasible and prudent alternative, the proposed project must include all possible planning to minimize harm to the affected lands.

Detailed inventories of the locations and likely impacts on resources that fall into the Section 4(f) category are required in project-level environmental assessments.

In August 2005, Section 4(f) was amended to simplify the process for approval of projects that have only minimal impacts on lands affected by Section 4(f). Under the new provisions, the U.S. Secretary of Transportation may find such a minimal impact if consultation with the State Historic Preservation Officer results in a determination that a transportation project would have no adverse effect on a historic site or that no historic properties would be affected by the proposed action. In that instance, analysis of avoidance alternatives is not required, and the Section 4(f) evaluation process is complete.

STATE REGULATIONS

California Scenic Highway Program

Recognizing the value of scenic areas and views from roads in such areas, the State Legislature established the California Scenic Highway Program in 1963. and is managed by the California Department of Transportation (Caltrans) This legislation preserves and protects scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to highways. The goal of the Scenic Highway Program is to preserve and enhance the natural beauty of California. Under this program, portions of a number of State highways have been designated as eligible for inclusion as scenic routes. To nominate a scenic highway the local jurisdictions through which the roadway passes must conduct a visual assessment, submit a Scenic Highway Proposal, and prepare

and adopt a corridor protection program (CPP). After Caltrans and the State Scenic Highway Coordinators review the nomination and recommend designation of the roadway., the State may officially designate roadways as scenic routes. Interstate highways, State highways, and county roads may be designated as scenic under the program (Caltrans 2020a).

As noted, a CPP must be adopted by the local governments with land use jurisdiction over the area through which the roadway passes as the first step in moving a road from "eligible" to "designated" status. Each designated corridor is monitored by the State, and designation may be revoked if a local government fails to enforce the provisions of the corridor protection program. Although there are no restrictions on scenic highway projects, local agencies and Caltrans must work together to coordinate transportation and development projects and ensure the protection of the corridor's scenic value to the greatest extent possible, including undergrounding all visible electric distribution and communication utilities within 1,000 feet of a scenic highway. In some cases, local governments have their own land use and site planning regulations in place to protect scenic values along a designated corridor. At a minimum, each corridor protection program must include:

- regulation of land use and density of development,
- detailed land and site planning,
- control of outdoor advertising devices,
- control of earthmoving and landscaping, and
- regulation of the design and appearance of structures and equipment.

The Bay Area includes numerous designated or eligible State scenic highways. Officially designated State scenic highways are illustrated in **Figure 3.2-2**. All officially designated and eligible State scenic highways in the Bay Area are listed in **Table 3.2-1**.

Open Space Easement Act of 1974

Cities and counties can use open space easements as a mechanism to preserve scenic resources if they have adopted open space plans, as provided by the Open Space Easement Act of 1974 (Government Code, Sections 51070, 51097). According to this act, a city or county may acquire or approve an open space easement through a variety of means, including use of public money.

California Code of Regulations Title 24 Part 6

The California Energy Code (24 CCR 6) creates standards in an effort to reduce energy consumption. The type of luminaries and the allowable wattage of certain outdoor lighting applications are regulated.

Senate Bill 743 (Statutes of 2013)

Senate Bill 743 provides that aesthetics impacts of a residential, mixed-use residential, or employment center project on an infill site are not considered significant environment impacts if three criteria are met: (1) the project is in a Transit Priority Area (TPA); (2) the project is on an infill site; and (3) the project is residential, mixed-use residential, or an employment center. These statutes are included in CEQA (PRC Section 21099).

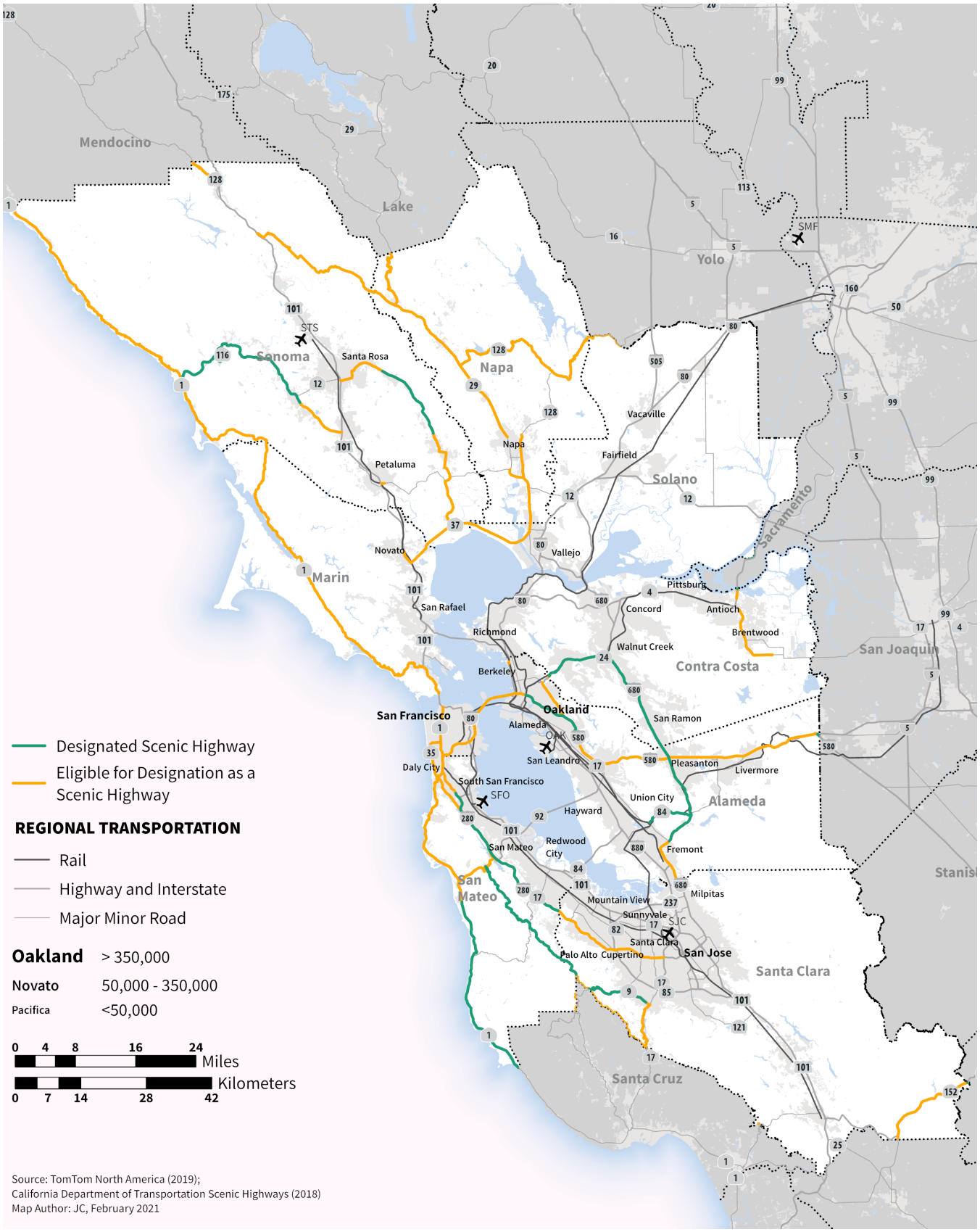
Designated Scenic Highway
Eligible for Designation as a Scenic Highway
REGIONAL TRANSPORTATION
Rail
Highway and Interstate
Major Minor Road
Oakland > 350,000
Novato 50,000 - 350,000
Pacifica <50,000
0 4 8 16 24 Miles
0 7 14 28 42 Kilometers
Source: TomTom North America (2019);
California Department of Transportation Scenic Highways (2018)
Map Author: JC, February 2021
Mendocino
Lake
Sonoma
Napa
Yolo
Solano
Marin
Contra Costa
Alameda
San Joaquin
Santa Clara
San Mateo
Santa Cruz
Sacramento
Stanis
Santa Rosa
Petaluma
Novato
Vacaville
Fairfield
Vallejo
Pittsburg
Concord
Antioch
Brentwood
San Rafael
Richmond
Walnut Creek
Berkeley
Oakland
San Francisco
Alameda
San Leandro
San Ramon
Pleasanton
Livermore
Daly City
South San Francisco
Union City
Hayward
San Mateo
Redwood City
Fremont
Milpitas
Mountain View
Sunnyvale
Santa Clara
San Jose
Palo Alto
Cupertino
STS
SFO
OAK
SJC
SMF

Figure 3.2-2: State-Designated and Eligible Scenic Highways

Table 3.2-1: California State Scenic Highway System Officially Designated and Eligible Routes in the Bay Area

Designation	Route	County	Location
OD	1	San Mateo	Santa Cruz County line to southern city limit of Half Moon Bay
OD	9	Santa Clara	Santa Cruz County line/Saratoga Gap to Blaney Plaza in Saratoga
OD	9	Santa Clara	Blaney Plaza in Saratoga to Los Gatos city limit
OD	12	Sonoma	Danielli Avenue east of Santa Rosa to London Way north of Agua Caliente
OD	24	Contra Costa	East portal of Caldecott Tunnel to I-680 north of Walnut Creek
OD	35	San Mateo	Santa Cruz County line to Santa Clara County line
OD	35	San Mateo	Santa Clara County line to SR 92 in Half Moon Bay
OD	84	Alameda	SR 238 (Mission Boulevard) to I-680 near Sunol
OD	116	Sonoma	SR 1 to southern city limit of Sebastopol
OD	280	San Mateo	Santa Clara County line to northern city limit of San Bruno
OD	580	Alameda	San Joaquin County line to SR 205
OD	580	Alameda	San Leandro city limit to SR 24 in Oakland
OD	680	Alameda	Mission Boulevard in Fremont to Bernal Avenue near Pleasanton
OD	680	Alameda	Bernal Avenue near Pleasanton to Contra Costa County line
OD	680	Contra Costa	Alameda County line to SR 24
E	1	Marin/ Sonoma/Mendocino	SR 101 near Marin City to SR 101 near Leggett
E	1	San Francisco	SR 35 in San Francisco to SR 101 near Golden Gate Bridge in San Francisco
E	1	San Luis Obispo/San Mateo/ San Francisco	SR 101 near San Luis Obispo to SR 35 near Daly City
E	4	Contra Costa	SR 160 near Antioch to SR 84 near Brentwood
E	9	Santa Clara	SR 35 to SR 17 near Los Gatos
E	12	Sonoma	SR 101 near Santa Rosa to SR 121 near Sonoma
E	13	Alameda	SR 24 to I-580
E	17	Santa Cruz/Santa Clara	SR 1 near Santa Cruz to SR 9 near Los Gatos
E	24	Contra Costa	Alameda/Contra Costa County line to I-680 in Walnut Creek
E	29	Napa/Lake	Trancas Street in Napa to SR 20 near Upper Lake
E	29	Solano/Napa	SR 37 near Vallejo to SR 221 near Napa
E	35	Santa Clara/Santa Cruz/ San Mateo/San Francisco	SR 17 to SR 92/I-280/SR 1 in San Francisco
E	37	Marin	SR 251 near Nicasio to SR 101 near Novato
E	37	Marin/ Sonoma/Solano	SR 101 near Ignacio to SR 29 near Vallejo
E	80	San Francisco/Alameda	I-280 near First Street in San Francisco to SR 61 in Oakland
E	84	Alameda	SR 238 to I-680 near Sunol
E	92	San Mateo	SR 1 north of Half Moon Bay to I-280 north of Crystal Springs Lake
E	101	Marin	North of San Francisco across the Golden Gate Bridge to SR 1 in Marin City
E	101	Marin	SR 37 near Ignacio to SR 37 near Novato
E	116	Sonoma	SR 1 near Jenner to SR 101 near Cotati
E	121	Napa	SR 221 near Napa State Hospital to near Trancas Street in Napa
E	121	Sonoma	SR 37 near Sears Point to SR 12 near Sonoma
E	152	Santa Clara/Merced	SR 156 near San Felipe to I-5
E	156	Monterey/San Benito/Santa Clara	SR 1 near Castroville to SR 152 northeast of Hollister
E	160	Contra Costa/Sacramento	SR 4 near Antioch to Sacramento

Designation	Route	County	Location
E	221	Napa	SR 29 at Suscol Road to SR 121 in Napa
E	239	Alameda/Contra Costa	I-580 west of Tracy to SR 4 near Brentwood
E	251	Marin	SR 37 near Nicasio to SR 1 near Point Reyes
E	280	Santa Clara/San Mateo/ San Francisco	SR 17 to I-80 near First Street in San Francisco
E	580	San Joaquin/Alameda	I-5 southwest of Vernalis to I-80
E	680	Alameda/Contra Costa	Santa Clara County line to SR 24 in Walnut Creek

Notes: E = eligible; OD = officially designated; I- = Interstate; SR = State Route.
Source: Caltrans 2020b

REGIONAL AND LOCAL REGULATIONS

City and County General Plans

City and county general plans may include policies for protecting scenic resources, such as hillsides, natural areas, landmarks, roads, and historic districts. Such policies may restrict new development in areas that maintain scenic vistas or areas that contain important character-defining structures. Additionally, design guidelines established at the local level may establish specific standards for addressing development where local character and/or important visual resources may be affected.

Counties and municipalities also may have scenic route components within their individual general plans. Policies usually encourage the designation of scenic routes as scenic corridors, either by local action or through the State program. Counties and municipalities may also establish regulatory programs or recommend corridor studies to determine the appropriate regulatory program to preserve scenic quality.

Issues pertaining to visual resources are typically addressed in the land use elements of general plans, but policies can also be found in the conservation and open space elements. The *General Plan Guidelines*, prepared by the California Governor's Office of Planning and Research, recommend that the land use element address an inventory of scenic viewsheds and points of interest, definition of community scenic values, programs for protecting and promoting community aesthetics, and identification of scenic highways and byways (OPR 2017).

3.2.3 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the 2017 Plan Bay Area 2040 EIR, and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- have a substantial adverse effect on a scenic vista (Criterion AES-1);
- substantially damage scenic resources, including but not limited to trees, rock outcropping, and historical buildings within a state scenic highway (Criterion AES-2);
- in nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings and in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality. (Criterion AES-3); or

- create a new source of substantial light or glare which would adversely affect day or nighttime views in the area (Criterion AES-4).

METHOD OF ANALYSIS

Pursuant to PRC Section 21099, aesthetic impacts of residential, mixed-use residential, or employment center projects located within TPAs are not considered significant environmental impacts. This program-level EIR evaluates potential impacts on visual resources in non-TPAs based on the location of the footprints associated with the forecasted development pattern (i.e., the land use growth footprint), sea level rise adaptation infrastructure (i.e., sea level rise adaptation footprint), and transportation projects (i.e., transportation projects footprint) relative to the known distribution of visual resources throughout the Bay Area. A brief description of typical views found within the Plan area is provided above in the environmental setting. These typical views are the basis of the impact analysis, and the visual resources baseline. The baseline for the following analysis is the date of the EIR NOP release in September of 2020.

The proposed Plan includes different types of transportation projects that could have different effects on the aesthetic environment. This analysis examines categories of transportation investments for likely impacts. Similarly, future development projects in the land use growth footprint would vary in size and appearance. Generally, with regard to aesthetic impacts, the greater the change from existing conditions, the more noticeable the change to the aesthetic environment. For example, greenfield development usually has a greater visual impact on the surrounding area than infill development that occurs where similar land uses already exist or where long-range views are limited by existing development. The construction of a new roadway generally has a greater impact on scenic resources than the widening of an existing one. Therefore, the general approach in this impact analysis is to characterize how implementation of the proposed Plan could potentially change the aesthetic environment from existing conditions and whether that change would have a potentially significant adverse effect based on the significance criteria. Construction effects related to construction equipment and activity are assumed to be temporary with regard to changes in the visual environment.

IMPACTS AND MITIGATION MEASURES

Impact AES-1: Have a substantial adverse effect on a scenic vista (PS)

Land Use Impacts

Effects on scenic vistas associated with changes in land use would relate to changes to views of important landscape features, such as the Golden Gate Bridge, or landforms, such as mountains, which would be experienced regionally. This type of impact would occur as a result of construction and operation of projects that would directly alter a feature or be placed in a location such that the intensity and height of development would obscure views.

Construction

Construction activities in the Bay Area are common, particularly in the urban areas. The presence of construction equipment may cause changes to the existing physical environment by introducing elements that may be seen as visually intrusive (e.g., cranes, backhoes, staging areas, and stockpiling of materials). The use of cranes, backhoes, staging areas, and stockpiling of materials during construction related activities could temporarily affect views of a scenic vista. However, the presence

of construction equipment would be temporary and would be removed following construction; therefore construction would not result in a significant impact to scenic vistas (LTS).

Operation

The proposed Plan includes strategies that address protection of open space lands and concentration of development within already developed areas. Specifically, Strategy EN4 directs new growth to be located within the region's existing urban footprint or growth boundaries. This strategy would confine new development within areas of existing development and areas that are suitable for growth, as established by local jurisdictions. Strategy EN5 would provide funds to help conserve and manage high-priority agricultural and open space lands, including wildland-urban interface areas; lands that support biodiversity and natural resources; and Priority Conservation Areas (PCAs), which are regional open space areas for which there is broad consensus for long-term protection. Implementation of Strategies EN4 and EN5 would protect existing scenic resources, including scenic views, located within open space lands, agricultural lands, wildland-urban interface lands, and PCAs. Therefore, these areas are not expected to be subject to proposed Plan-related development.

As summarized in Table 2-5, urbanization—growth on land not designated as urban built-up land as defined by California's Department of Conservation through the Farmland Mapping and Monitoring Program (FMMP)—is forecasted to occur on approximately 12,300 acres, or 31 percent of the land use growth footprint. The remaining 69 percent of the land use growth footprint would be within land designated as urban built-up—which FMMP defines as "land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel"—reflective of the proposed Plan's core focused growth strategy to leverage existing infrastructure. This indicates that development and redevelopment would occur almost entirely within existing urban built-up lands. Thus, scenic vistas in the region would remain similar to the existing conditions. That is, long-range scenic vistas would not be substantially altered because landforms and areas of development would be similar to the existing conditions.

The potential to affect scenic vistas is related to the specific vantage point of a viewer and the types of development that currently exist. Important public views are protected based on locally adopted land use policies and/or regulations. Future development projects would be subject to the requirements of local policies and regulations. As required under Government Code Section 65302, all jurisdictions are assumed to have policies and regulations in place (e.g., general plan) that protect scenic resources, which can include scenic vistas identified to be important within the jurisdiction. However, denser or more compact development in the proposed Plan's growth geographies may block panoramic views or views of landscape features or landforms from public and individual properties because increasing densities on existing footprints could result in taller buildings and/or buildings placed more closely together. Thus, depending on the location of the viewer, scenic vistas may be substantially altered, and short-range impacts on views of scenic vistas would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

Construction

Implementation of sea level rise adaptation infrastructure could result in development of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. Construction-related activities such as cranes, backhoes, staging areas, and stockpiling of materials could temporarily affect views of a scenic vista. As discussed above under land use impacts, the presence of construction equipment could temporarily affect views of a scenic vista. However, the presence of construction equipment

would be temporary, and the equipment would be removed following construction; therefore, construction would result in a less-than-significant impact to scenic vistas (LTS).

Operation

Development of adaptation infrastructure such as horizontal levees, marsh restoration, seawalls, and tidal gates are unlikely to block or substantially alter views of scenic vistas because these types of structures would be located low to the ground and would not be of substantial height. However, development of adaptation infrastructure such as vertical levees and elevated roadways could be tall enough to alter views of scenic vistas. Thus, depending on the location of the viewer, scenic vistas may be substantially altered, and impacts on views of scenic vistas would be potentially significant (PS).

Transportation System Impacts

Implementation of the proposed Plan would include a variety of major transportation projects such as improvements to interchanges and highway widenings, local roadway widenings, increased transit frequency and capacity, expansion and modernization of passenger rail systems, and expansion of the regional express lane network. Transportation projects would generally be located within densely populated areas that are currently used as existing travel routes (see **Figure 2-4** in Chapter 2, "Project Description"). Not all transportation projects in the proposed Plan would result in substantial construction or operational impacts. For example, projects that involve transit route improvements, road operations and maintenance, and pedestrian and bicycle improvements would not result in physical changes to the environment.

Major transportation projects included in the proposed Plan that would alter approximately 15,100 acres are associated with the following strategies:

- T06. Improve Interchanges & Address Highway Bottlenecks;
- T07. Advance Other Regional Programs & Local Priorities;
- T10. Enhance Local Transit Frequency, Capacity & Reliability;
- T11. Expand and Modernize the Regional Rail Network; and
- T12. Build an Integrate Regional Express Lane and Express Bus Network.

These major transportation projects may include development of new transit centers, train stations, parking structures, rail line extensions, and bus service expansion, which are common throughout the region.

Construction

Construction of transportation projects included in the proposed Plan could take several months to several years, and have the potential to result in long-term effects on scenic views from discrete locations depending on the size of projects. As discussed above for land use projects, construction of projects could directly alter a feature or be placed in a location such that the intensity and height of development would obstruct views. Transportation projects included in the proposed Plan could require the removal of landscaping, temporary traffic changes, temporary signage, and construction staging areas. Larger projects, such as expansion of regional transit lines, and construction of train stations and parking structure could take long periods of time (e.g., several years) to complete, require substantial grading activities, and the prolonged presence of construction equipment and stockpiling of materials. As shown in **Figure 2-4** (see Chapter 2, "Project Description"), projects are clustered in Santa Clara County around the densely populated areas of Santa Clara, downtown San Jose, and Milpitas; in central and western Alameda County; and in San Francisco. Due to the size and duration of some projects, construction may result in significant temporary impacts to scenic vistas (PS).

Operation

Upon completion, the extent to which there would be impacts on scenic vistas from new transportation projects would depend on the type of project and its location relative to specific vantage point of viewers. For example, bicycle and pedestrian projects, such as sidewalk and roadway striping, are unlikely to have adverse impacts on scenic vistas because these types of projects would not require earth moving activities that would result in physical changes to the environment. Similarly, the new in-water Transbay rail crossing between Oakland and San Francisco would not substantially alter views. Many of the other major transportation projects would not substantially alter the Bay Area at a regional scale such that scenic views could be substantially altered because the expected appearance of arterials, highways, and local and regional transit systems would remain generally the same at a regional scale as under the existing conditions. However, new features such as rail lines, large signs, new intersections, and new transit centers could be placed in a location such that the intensity and height of development may block public views of landscape features or landforms. Thus, scenic vistas could be substantially altered because of new transportation infrastructure. This impact would be potentially significant (PS).

Conclusion

As discussed above, future development and infrastructure associated with the proposed Plan's land use growth footprint, sea level rise adaptation footprint, and transportation projects footprint would not substantially change long-range views of scenic vistas in the Bay Area because long-range views of landforms and man-made features would remain similar to the existing conditions. However, impacts to scenic vistas would be substantial from discrete locations because of the introduction of new features or obstruction of views in a localized viewshed. Thus, impacts on scenic views would be **potentially significant (PS)**. Mitigation Measure AES-1 addresses this impact and is described below. Per the requirements set forth in PRC Section 21099, visual impacts would not be considered significant in TPAs if projects are located in an infill site and consist of residential, mixed-use residential, or an employment center.

Mitigation Measure

Mitigation Measure AES-1: Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Reduce the visibility of construction staging areas by fencing and screening these areas with low contrast materials consistent with the surrounding environment, and by revegetating graded slopes and exposed earth surfaces at the earliest opportunity.
- Site or design projects to minimize their intrusion into important viewsheds. Measures to achieve this could include, but are not limited to, requiring that the scale and massing of new development in higher-density areas provide appropriate transitions in building height and bulk that are sensitive to the physical and visual character of adjoining neighborhoods that have lower development intensities and building heights, and ensuring building heights are stepped back from sensitive adjoining uses to maintain appropriate transitions in scale and to protect scenic vistas and scenic resources.
- Design projects to minimize the potential to obscure, detract from, or negatively affect the quality of views from State-designated scenic roadways or scenic highways.
- Use see-through safety barrier designs (e.g., railings rather than walls).
- Develop interchanges and transit lines at the grade of the surrounding land to limit view blockage.

- Design landscaping along State-designated scenic highways and highway corridors in rural and open space areas to add natural elements and visual interest to soften the hard-edged, linear travel experience that would otherwise occur. Retain or replace trees bordering highways so that clear-cutting is not evident.

- Identify, preserve, and enhance scenic vistas to and from hillside areas and other visual resources.

Significance after Mitigation

Mitigation Measure AES-1 would reduce significant impacts to scenic vistas because it would modify site design and provide development recommendations that would minimize visual intrusion on important viewsheds. Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, because site conditions are unique, it cannot be concluded with certainty that all significant viewshed impacts could be avoided. Therefore, there may still be instances in which viewshed impacts are substantially altered. This impact would remain **significant and unavoidable (SU)**.

Impact AES-2: Substantially damage scenic resources, including but not limited to trees, rock outcropping, and historical buildings within a state scenic highway (PS)

Land Use Impacts

Scenic resources that contribute to the visual character of scenic highways are, by nature, specific to their local context, and as such, impacts on these resources resulting from the development assumed as a part of the proposed Plan would occur at the local level. As shown in **Figure 3.2-2**, there are substantial stretches of roadways in the Bay Area that are designated as scenic highways or eligible for designation. The proposed Plan assumes that housing and employment growth in the region will occur primarily in existing urban areas, some of which are adjacent to designated and eligible scenic highways.

Construction

Development adjacent to scenic highways could cause short-term visual impacts resulting from construction equipment and scaffolding, temporary lighting, and exposed excavation and slope faces. In general, construction-related impacts to scenic highways would be the same as those under Impact AES-1 relating to the blockage of views. Large projects are most likely to have significant impacts on scenic highways, but small projects could have substantial impacts depending on their duration. Generally, construction impacts are less than significant because of their temporary nature, but, as noted, large or long duration projects could have significant impacts (PS).

Operation

Pursuant to PRC Section 21099, aesthetic impacts of residential, mixed-use residential, or employment center projects located within TPAs are not considered significant environmental impacts. Therefore, the potential for visual impacts on scenic highways would result from dense, compact development projects located in non-TPAs, and adjacent to scenic highways, which could damage scenic resources or create visual contrast between the project and existing conditions. The Scenic Highway Program managed by Caltrans to protect scenic highway corridors includes certain limits on land uses adjacent to the roadway, which are implemented at the local level. When nominating a scenic highway, Caltrans requires that the nominating agency adopt a CPP that includes regulation of land use and density of development; detailed land and site planning; control of outdoor advertising; careful attention to and control of earthmoving and landscaping; and the design and appearance of

structures and equipment. These programs are included as part of the scenic highway designation, and Caltrans can revoke the designation if these programs are not followed. Cities and counties also have policies (e.g., general plan), regulations (e.g., zoning), and other guidance (e.g., design guidelines) that control the size and scale of new development to maintain visual compatibility with the natural and built environments. However, development adjacent to scenic highways could result in short-term and long-term impacts on resources along scenic highways. This impact would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

Construction and Operation

The implementation of sea level rise adaptation infrastructure could result in development of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. This adaptation infrastructure would be clustered in Alameda County, followed by Marin, Santa Clara, San Mateo, and Solano Counties. Sea level rise adaptation infrastructure would be minimal in Contra Costa, Sonoma, San Francisco, and Napa Counties. As explained above, the presence of construction equipment would be temporary and would be removed following construction. Grading and earthwork for construction of adaptation infrastructure such as horizontal levees, marsh restoration, seawalls, tidal gates, vertical levees, and elevated roadways could result in the removal of trees and other vegetation and topographic disturbance. As noted above, the Scenic Highway Program managed by Caltrans to protect scenic highway corridors includes certain limits on land uses adjacent to the roadway, which are implemented at the local level. When nominating a scenic highway, Caltrans requires that the nominating agency adopt a CPP that includes regulation of land use and density of development; detailed land and site planning; control of outdoor advertising; careful attention to and control of earthmoving and landscaping; and the design and appearance of structures and equipment. These programs are included as part of the scenic highway designation, and Caltrans can revoke the designation if these programs are not followed. Cities and counties also have policies (e.g., general plan), regulations (e.g., zoning), and other guidance (e.g., design guidelines) that control the size and scale of new infrastructure to maintain visual compatibility with the natural and built environments. However, infrastructure placement adjacent to scenic highways could result in short-term and long-term impacts on resources along scenic highways. This impact would be potentially significant (PS).

Transportation System Impacts

Construction and Operation

Scenic resources that contribute to the visual character of scenic highways are, by nature, specific to their local context, and as such, impacts on these resources resulting from the transportation projects assumed as a part of the proposed Plan would occur at the local level. Many of the transportation projects in the proposed Plan would involve transit route improvements, road operations and maintenance, and pedestrian and bicycle improvements, which all involve minimal construction. However, major capital projects that would introduce new structures or facilities have the potential to result in substantial visual impacts during construction. Construction of such projects could take several months to several years.

Proposed transportation projects could impact portions of Bay Area highways that are designated as State scenic highways or that are eligible scenic highways. These projects could have adverse effects on the visual character of land adjacent to designated scenic highways or highways eligible for designation. Transportation projects subject to review by the Federal Transit Administration, Federal Railroad Administration, or Federal Highway Administration would be subject to NEPA review and compliance with guidance related to visual resources such as the FHWA Guidelines for the Visual

Impact Assessment of Highway Projects (USDOT 2015). Thus, because existing regulations protect resources along scenic highways, impacts would be less than significant after construction. However, because substantial visual impacts may occur during construction and because construction of some projects may take years, this impact is potentially significant (PS).

Conclusion

As discussed above, because implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects have the potential to affect visual resources within a State scenic highway impacts on resources along scenic highways would be **potentially significant (PS)**. Mitigation Measure AES-2 addresses this impact and is described below. Per the requirements set forth in PRC Section 21099, visual impacts would not be considered significant in TPAs if projects are located in an infill site and consist of residential development, mixed-use residential development, or an employment center.

Mitigation Measures

Mitigation Measure AES-2: Implement Mitigation Measure AES-1.

Significance after Mitigation

Mitigation Measure AES-2 would reduce significant impacts on visual resources within a State-designated scenic highway because it involves modifying site design and providing development recommendations that would minimize visual intrusion. Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, because site conditions are unique, it cannot be concluded with certainty that all significant visual resource impacts could be avoided. Therefore, there may still be instances in which visual resources along State-designated scenic highways are substantially altered. This impact would remain **significant and unavoidable (SU)**.

Impact AES-3: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings and in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality (PS)

Land Use Impacts

Construction and Operation

The proposed Plan's land use growth footprint accommodates the people, households, and jobs identified in the regional growth forecast. The land use growth footprint resulting from the proposed Plan could cause substantial visual impacts by creating or increasing contrasts with the visual character of an existing community. At the regional scale, the greatest impacts would result from high density residential development and high intensity non-residential projects located within existing communities where the visual contrast between the project and existing conditions would be the most apparent. Development outside of urban built-up lands could introduce dense compact development that would contrast with the existing character of the community. However, as summarized in **Table 2-12** (see Chapter 2, "Project Description") development and redevelopment would occur predominately within areas that are currently designated as urban built-up lands. In many cases, the existing visual character within urban built-up lands would not be substantially altered because dense compact development would be similar to existing conditions. Implementation of the proposed Plan's land use growth footprint could cause substantial localized visual impacts by disrupting the local character of the built environment if new development

intensity, densities, and heights are substantially higher than existing development. Local standards and design guidelines (discussed below) would ultimately be the primary tools in shaping neighborhood character.

In growth areas where density, intensity, and heights are anticipated to increase substantially, new development—and in some cases, new *types* of development—would be required to accommodate forecasted regional growth (see **Figures 2-8 and 2-10** in Chapter 2, "Project Description"). Development resulting from the proposed Plan could cast shadows that would substantially degrade the existing visual/aesthetic character or quality of a public place for a sustained period of time. This type of impact would be a tradeoff resulting from increased density and intensity of development in these areas, and is controlled and regulated through local regulations and design review.

As required under State law, all cities and counties have policies (e.g., general plan), regulations (e.g., zoning), and other guidance (e.g., design guidelines) that control the size and scale of new development, which serves to maintain its visual compatibility with the natural and built environments. Local jurisdictions maintain land use and design control over discretionary development projects and would be responsible for approving development plans. Local land use agencies are ultimately responsible for the approval of future urban development and would apply development standards and guidelines to maintain compatibility with existing communities, including site coverage, building height and massing, building materials and color, landscaping, and site grading in visually sensitive areas. However, implementation of the proposed Plan would increase density and intensity of growth in designated growth geographies to a level greater than currently planned, particularly in less urbanized areas. Therefore, the potential for impacts to visual character and quality is considered potentially significant (PS).

Sea Level Rise Adaptation Impacts

Construction

Implementation of sea level rise adaptation infrastructure could result in the construction of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. This infrastructure would be clustered in Alameda County, followed by Marin, Santa Clara, San Mateo, and Solano Counties. Adaptation infrastructure would be minimal in Contra Costa, Sonoma, San Francisco, and Napa Counties. Sea level rise adaptation projects would occur primarily in nonurbanized areas but could be located in areas subject to public views where viewer sensitivity is high. As explained above, grading and earthwork for construction of adaptation infrastructure could result in the removal of trees and other vegetation and topographic disturbance, which would alter the existing character of the project sites. Thus, this impact would be potentially significant (PS).

Operation

Development of adaptation infrastructure such as horizontal levees, marsh restoration, seawalls, and tidal gates are unlikely to substantially degrade visual quality because these types of structures would be located low to the ground and would not be of significant height. However, development of adaptation infrastructure such as vertical levees and elevated roadways could require greater tree removal or earthwork and could alter or degrade existing visual quality in the region depending on their location by introducing new built elements in existing natural landscapes or increasing the vertical profile of existing infrastructure. Therefore, the potential for impacts to visual character and quality is considered potentially significant (PS).

Transportation System Impacts

Construction and Operation

The Plan area includes a complex system of roadways and public transit that accommodates existing users. Roadway maintenance and roadway- and transit-related construction activities are common throughout the Plan area. As noted above, implementation of the proposed Plan would include major transportation projects that would include a variety of transportation modifications such as new express lanes, roadway widening, increased transit service and expansion, and other maintenance and rehabilitation projects. Generally, these projects would be located within areas that are currently used as existing travel routes. The majority of the transportation projects in the proposed Plan include operations, maintenance, minor rehabilitation, signal and signage improvements, and local arterial projects, for example. Following construction, the Transbay rail crossing portion that spans the Bay would not be visible. However, development of major above-ground transportation projects could result in substantial effects on the visual character in the region depending on their location and project type. As shown in **Figure 2-4** (see Chapter 2, "Project Description"), new projects span all nine Plan area counties but are especially clustered in Santa Clara County around the densely-populated areas of Santa Clara, Downtown San Jose, and Milpitas; in central and western Alameda County; and in San Francisco. Substantial regional projects that would add travel lanes to freeways, expressways, highways, or add new routes to fixed guideway transit facilities would be located in already developed areas and would not constitute a significant change in visual character. However, the proposed Plan's transportation projects that extend into non-urban areas or that expand existing rights-of-way could impact community character by increasing visual contrast within the community. Therefore, implementation of the proposed Plan's major transportation projects would constitute a potentially significant impact (PS).

Conclusion

As discussed above, implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects has the potential to produce significant impacts because changes could alter the visual character of a site. Impacts would be **potentially significant (PS).** Mitigation Measure AES-3 addresses this impact and is described below. Per the requirements set forth in PRC Section 21099, visual impacts would not be considered significant in TPAs if projects are located in an infill site and consist of residential, mixed-use residential, or employment center use.

Mitigation Measures

Mitigation Measure AES-3: Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Require that the scale, massing, and design of new development provide appropriate transitions in building height, bulk, and architectural style that are sensitive to the physical and visual character of surrounding areas.
- Contour the edges of major cut and fill slopes to provide a finished profile that is appropriate to the surrounding context, using shapes, textures, colors, and scale to minimize contrasts between the project and surrounding areas.
- Require project sponsors to conduct shadow studies for four-story high (and higher) buildings and roadway facilities to identify and implement development strategies for reducing the impact of shadows on public open space, where feasible. Study considerations shall include, but are not

limited to, the placement, massing, and height of structures, surrounding land uses, time of day and seasonal variation, and reflectivity of materials. Study recommendations for reducing shadow impacts shall be incorporated into the project design as feasible based on project- and site-specific considerations.

Significance after Mitigation

Mitigation Measure AES-3 would reduce significant impacts to visual character or quality because it would modify site design and provide development recommendations that would result in projects that would be consistent in appearance to their surroundings. Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, because site conditions are unique within urban and non-urban areas, it cannot be concluded with certainty that all significant impacts to existing visual character could be avoided. Therefore, there may still be instances in which impacts to visual character are **significant and unavoidable (SU)**.

Impact AES-4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area (PS)

Land Use Impacts

Construction and Operation

Implementation of the proposed Plan would result in the development of new residential or commercial structures that could create new sources of light and glare from the introduction and addition of indoor and outdoor lighting in new or redeveloped residential and non-residential buildings located in the land use growth footprint. These new structures could result in substantial sources of light at the regional scale that cause a public hazard, disrupt scenic vistas, and brighten the night sky. In portions of the region designated as urban built-up land, increases would not degrade the visual character or quality of the area because existing sources of glare and light are already a dominant feature of the landscape.

Development projects resulting from the proposed Plan could create new substantial sources of light and glare at the local scale. In addition, the introduction of new sources of light and glare could impact local visual resources by altering the local character of the built environment. High density residential and high intensity non-residential development, in particular, could have substantial increases in light and glare at the local level. Overall, the impact of new sources of light and glare would be less than significant (LTS) in urban areas and potentially significant (PS) in rural areas.

Sea Level Rise Adaptation Impacts

Construction and Operation

Implementation of sea level rise adaptation infrastructure could result in the construction of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. This infrastructure would be clustered in Alameda County, followed by Marin, Santa Clara, San Mateo, and Solano Counties. Adaptation infrastructure would be minimal in Contra Costa, Sonoma, San Francisco, and Napa Counties. Projects that would involve construction of levees, marsh restoration projects, and tidal gates could include limited lighting necessary for infrastructure maintenance, but would not introduce major new sources of light. The elevation of existing roadways would include similar sources of light as under existing conditions, and the projects would not introduce new sources of light or glare. Therefore, this impact would be less than significant (LTS).

Transportation System Impacts

Construction and Operation

It is not anticipated that transportation projects would substantially increase the amount of light and glare, because most improvements would take place on existing facilities that have existing sources of light and glare (see **Figures 2-8 through 2-10** in Chapter 2, "Project Description"). Transportation projects could result in marginal increases in light and glare from additional vehicle headlights, new reflective signage, new streetlights, new intersection control devices, and other lighting ancillary to transportation projects. As shown in **Figure 2-4** (see Chapter 2, "Project Description"), projects are clustered in Santa Clara County around the densely populated areas of Santa Clara, downtown San Jose, and Milpitas; in central and western Alameda County; and in San Francisco. Therefore, transportation projects that would introduce new sources of light and glare within urban areas would be similar in character to existing light sources. However, transportation projects located within rural areas could introduce light and glare to areas where no sources existed previously, which would constitute a potentially significant impact (PS).

Conclusion

As discussed above, implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects has the potential to introduce substantial new sources of light and glare. This impact would be **potentially significant (PS)**, primarily in rural areas. Mitigation Measure AES-4 addresses this impact and is described below. Per the requirements set forth in PRC Section 21099, visual impacts would not be considered significant in TPAs if projects are located in an infill site and consist of residential, mixed-use residential, or an employment center.

Mitigation Measures

Mitigation Measure AES-4: Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Design projects to minimize light and glare from lights, buildings, and roadways facilities.
- Minimize and control glare from transportation projects through the adoption of project design features that reduce glare. These features include:
  - planting trees along transportation corridors to reduce glare from the sun;
  - landscaping off-street parking areas, loading areas, and service areas; and
  - shielding transportation lighting fixtures to minimize off-site light trespass.
- Minimize and control glare from land use and transportation projects through the adoption of project design features that reduce glare. These features include:
  - limiting the use of reflective materials, such as metal;
  - using non-reflective material, such as paint, vegetative screening, matte finish coatings, and masonry;
  - screening parking areas by using vegetation or trees; and
  - using low-reflective glass.

- Impose lighting standards that ensure that minimum safety and security needs are addressed and minimize light trespass and glare associated with land use development. These standards include the following:
  - minimizing incidental spillover of light onto adjacent private properties and undeveloped open space;
  - directing luminaries away from habitat and open space areas adjacent to the project site;
  - installing luminaries that provide good color rendering and natural light qualities; and
  - minimizing the potential for sky glow into the nighttime sky and for incidental spillover of light onto adjacent private properties and undeveloped open space.

Significance after Mitigation

Mitigation Measure AES-4 would reduce significant impacts from light and glare because it would result in the modification of site design and would provide standards that would minimize the effects of light and glare. To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M).

Projects taking advantage of CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact remains **significant and unavoidable (SU)** for purposes of this program level analysis.

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3.3 AGRICULTURE AND FORESTRY RESOURCES

3.3.1 Introduction

This section evaluates the potential effects of the proposed Plan on agriculture and forestry land uses in the Bay Area. It describes trends in land use and physical development regarding agriculture and forestry lands. The impact analysis addresses the potential for physical disruption to agricultural lands or forestlands.

Comment letters received in response to the Notice of Preparation (NOP) included requests for consideration of planned rural development; the Delta Plan; and loss of pervious surfaces. Project elements, such as land use strategies to address development in rural and wildland-urban interface lands, are addressed in Chapter 2, "Project Description."

Consistency with natural community conservation plans and habitat conservation plans is addressed in Section 3.5, "Biological Resources." Consistency with open space protection plans and policies is addressed in Section 3.11, "Land Use, Population, and Housing." Potential impacts on open space parks and recreation are described in Section 3.13, "Public Services and Recreation."

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important" (CEQA Guidelines Section 15083). Neither the CEQA Guidelines nor Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.3.2 Environmental Setting

PHYSICAL SETTING

Land Use Patterns

The pattern of land uses in the Bay Area includes a mix of open space, agriculture, developed urban centers, a variety of suburban commercial and residential areas, and scattered older towns. This pattern reflects the landforms that physically define the region: the bay, rivers, and valleys. The land uses surrounding the bay margins tend to be more intensely developed, particularly from San Francisco south along the peninsula to Santa Clara County and from Contra Costa County south through Alameda County to Santa Clara County. These areas also include extensive networks of open space. The counties north of the bay (Marin, Sonoma, and Napa) are more sparsely developed with a combination of suburban development, smaller cities and towns, and agriculture. Other areas of the Bay Area, such as the East Bay (away from the bay margins) and Solano County further to the east, tend to be more suburban in character, with heavy industry related to oil refineries dotting the landscape, as well as large swaths of agriculture. These general characterizations do not capture all the land use types and patterns associated with the nine counties and 101 cities that make up the Plan area.

Extent of Urban Development

According to the most recent data (available from 2018 and 2020), approximately 18 percent of the region's approximately 4.4 million land acres were considered to be urban built-up land according to the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) (DOC 2018; Bay Area Open Space Council 2019). The remaining undeveloped area includes open space, forestry, and agricultural lands, as well as water bodies (excluding the San Francisco Bay) and parks. Approximately 29 percent of the region is identified as protected open space (Bay Area Open Space Council 2019). The amount of urban built-up land according to the FMMP, in each of the nine counties, varies from a low of 5 percent in Napa County to a high of 80 percent in San Francisco (DOC 2018, see Table 1.2-9). The Bay Area includes 101 cities, with San Jose, San Francisco, and Oakland representing the largest urbanized centers. Other major urban centers have formed throughout the region, leading to a pattern of urban land and open space. More information on urban land uses is presented in Section 3.11, "Land Use, Population, and Housing."

AGRICULTURAL LAND

Current and Historical Agricultural Uses

The Bay Area has a substantial amount of land in agricultural uses. In 2018, over half of the region's approximately 4.4 million land acres were zoned for agricultural uses or classified as agricultural land, as defined by the FMMP (DOC 2018). Of these approximately 2.3 million acres of agricultural land, over 70 percent (about 1.7 million acres) are used for grazing. Products grown in the Bay Area include field crops, fruit and nut crops, seed crops, vegetable crops, and nursery products. Field crops, which include corn, wheat, and oats, as well as pasturelands, represent approximately 62 percent of Bay Area agricultural land (DOC 2018; U.S. Department of Agriculture 2017).

Table 3.3-1 shows the acres of agricultural lands, by farmland type, for each county in the region, excluding San Francisco County. **Figure 3.3-1** shows the location of these agricultural lands within the region. The classification of agricultural lands is based primarily on soils and climate, although Prime Farmland, Farmland of Statewide Importance, and Unique Farmland must have been used for agricultural production at some time during the previous 4 years. When new data are released, map reviewers, including city and county planning departments, are notified of their availability. Maps prepared under the FMMP are reviewed at the local level for accuracy of land use classification and delineation. For more information about farmland classification, see the discussion in Section 3.3.3, "Regulatory Setting," below.

Table 3.3-1: Bay Area Agricultural Lands

	Alameda	Contra Costa	Marin	Napa	San Mateo	Santa Clara	Solano	Sonoma	Region
Prime Farmland	3,400	26,200	< 1	30,600	1,700	14,800	130,700	29,800	237,300
Farmland of Statewide Importance	1,100	7,700	140	9,600	130	3,300	6,700	17,500	46,100
Unique Farmland	2,200	3,400	280	16,800	2,100	2,200	10,200	34,000	71,100
Farmland of Local Importance	50	60,300	62,700	18,300	700	5,600	< 1	79,700	227,300
Farmland Subtotal	6,700	97,600	63,100	75,200	4,700	26,000	147,600	161,000	581,000
Grazing Land	240,900	157,700	89,000	177,800	49,100	393,000	207,300	414,600	1,729,000
Regional Total	247,600	255,100	152,100	253,000	53,800	418,900	354,800	575,600	2,311,000

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.
Prime = farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields.
Statewide Importance = similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store moisture.
Unique = farmland of lesser quality soils used for the production of the State's leading agricultural crops. This land is usually irrigated but may include nonirrigated orchards or vineyards.
Local Importance = important to the local agricultural economy as determined by the county's board of supervisors and local advisory committee.
Grazing = land on which the existing vegetation is suited to the grazing of livestock.
Farmland is defined in Appendix G of the CEQA Guidelines as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland.
Source: DOC 2018

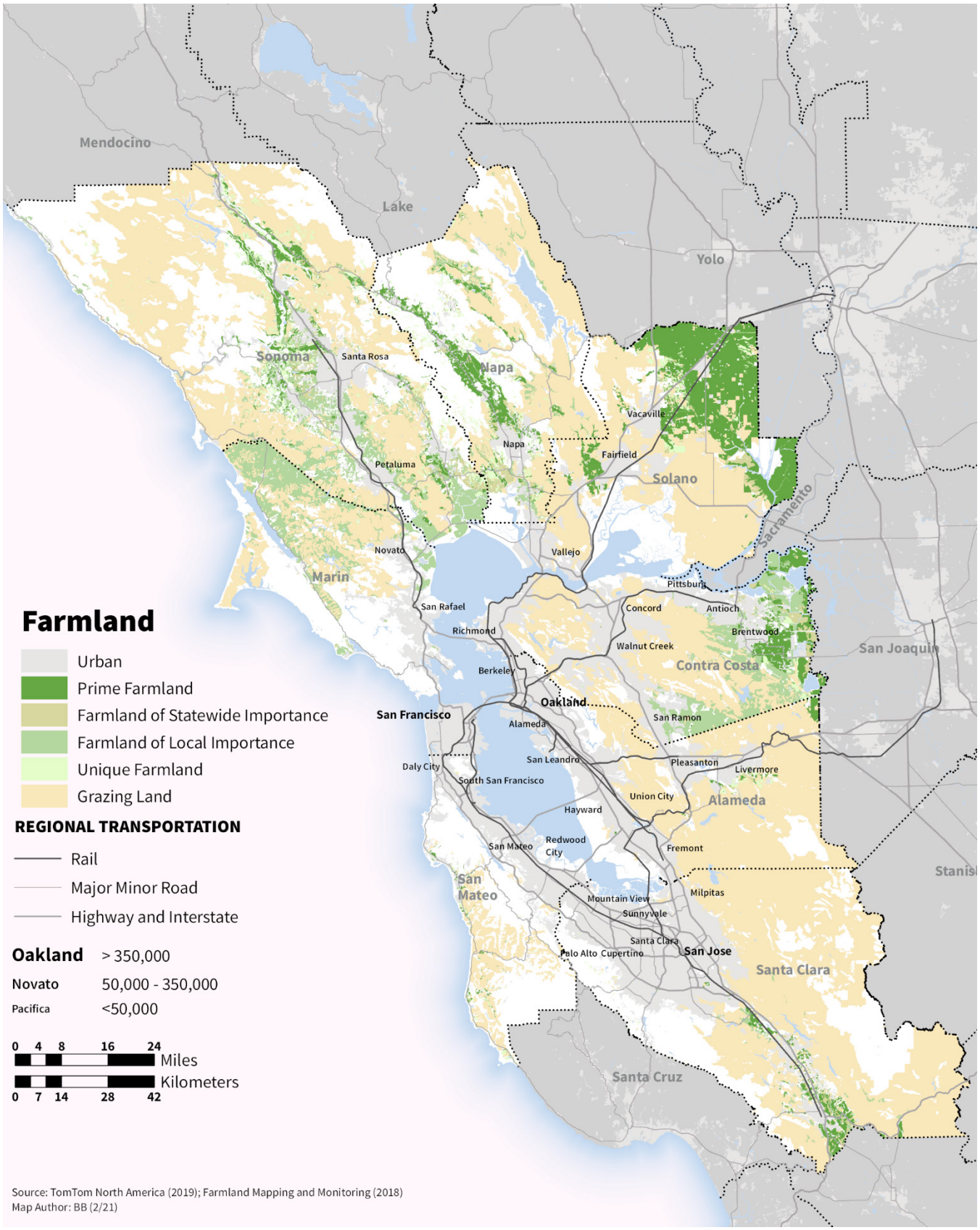

Figure 3.3-1: Agricultural Lands

Table 3.3-2 shows the acres of land zoned for agricultural uses for each county. Regionally, there is little difference between the acres of land zoned for agricultural uses and acres of land classified as agricultural as defined by the FMMP; however, these differences are more pronounced at the county level.

Table 3.3-2: Bay Area Agricultural Zoning

	Alameda	Contra Costa	Marin	Napa	San Mateo	Santa Clara	Solano	Sonoma	Regional Total
Agricultural Lands (FMMP)	247,600	255,100	152,100	253,000	53,800	418,900	354,800	575,600	2,311,000
Agricultural Zoning (Cities/Counties)	255,200	236,900	151,300	453,500	66,300	447,800	333,300	347,900	2,292,000

Note: Whole numbers have been rounded (between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.

Sources: Compiled by MTC/ABAG based on data from Bay Area Local Jurisdictions 2020 and DOC 2018

Williamson Act Lands

In 1965, the State Legislature passed the California Land Conservation Act (better known as the Williamson Act) in response to agricultural property tax burdens resulting from rapid land value appreciation. Rapidly rising property taxes, resulting from nearby urbanization, made agricultural uses increasingly less economically viable. See the discussion in Section 3.3.3, "Regulatory Setting," for a comprehensive description of the Williamson Act.

Agricultural land under Williamson Act contract includes both "prime" and "nonprime" lands. The California Land Conservation Act defines prime agricultural land as (1) U.S. Department of Agriculture (USDA) Class I or II soils; (2) land with a Storie Index soil rating of 80–100; (3) land that has returned a predetermined annual gross value for 3 of the past 5 years; (4) livestock-supporting land with a carrying capacity of at least one animal unit per acre; or (5) land planted with fruit or nut trees, vines, bushes, or crops that have a nonbearing period of less than 5 years and that will normally return a predetermined annual gross value per acre per year during the commercial bearing period (Government Code Sections 51200–51207). Nonprime lands include pasture and grazing lands and other non-irrigated agricultural land with lesser-quality soils. Prime agricultural lands under the Williamson Act are defined differently from Prime Farmland under the FMMP, as outlined above.

In 2018, approximately 1.2 million acres of land were under Williamson Act contract in the Bay Area. Of the total acres, 17 percent were designated as prime farmland, and 83 percent were nonprime (DOC 2018). This indicates that lands under Williamson Act contract in the Bay Area are primarily used for pasture and grazing and not for the cultivation of crops. **Table 3.3-3** shows the number of acres of land under Williamson Act contracts in the Bay Area as of 2020, and Williamson Act lands are shown in **Figure 3.3-2**.

Table 3.3-3: Land under Williamson Act Contracts in the Bay Area (2016-2020)

	Total Acres	Share Prime Acres	Share Nonprime Acres
Alameda	145,600	2%	98%
Contra Costa	40,700	21%	79%
Marin	80,100	0%	100%
Napa	82,500	27%	73%
San Francisco	0	0	0
San Mateo	44,000	n/a	n/a
Santa Clara	236,800	3%	97%
Solano	261,900	45%	55%
Sonoma	290,400	16%	84%
Region Total	1,182,000	17%	83%

Note: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.

Sources: Compiled by MTC and ABAG in 2021

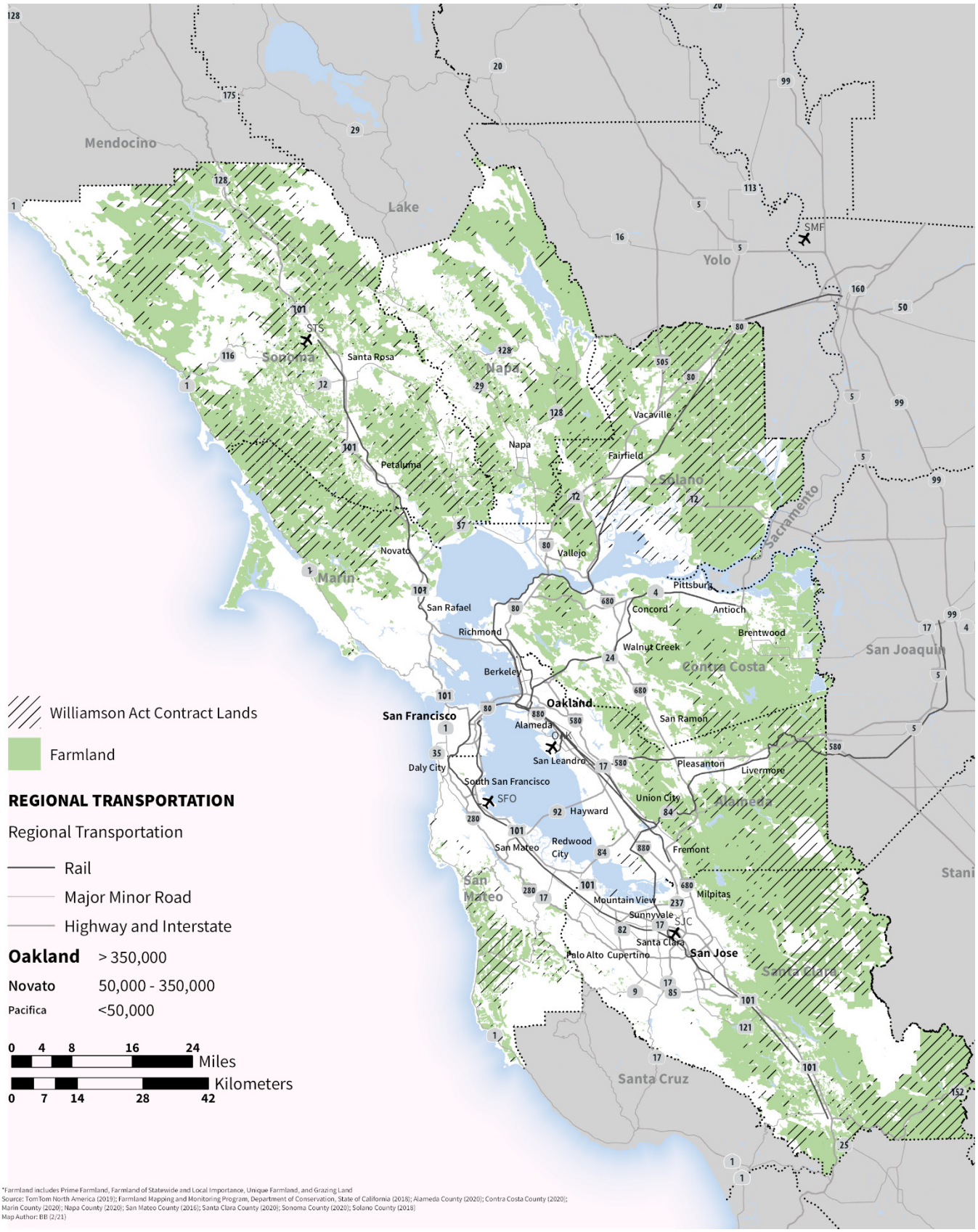

Figure 3.3-2: Williamson Act Lands

Forests

The Bay Area includes a variety of forest types spread throughout the nine-county region. Forests are generally located at higher elevations of the Coast Ranges in areas with sufficient moisture. Forestland is a valuable environmental and aesthetic resource and a defining feature in many parts of the landscape in the Bay Area. Forest habitats include a wide range of woodland and forest species. In the Bay Area, only Napa (59,100 acres), Sonoma (319,700 acres), San Mateo (45,600 acres), and Santa Clara (28,500) Counties have substantial acreages of unreserved timberland forest (U.S. Department of Agriculture 2016). For a comprehensive description of specific forest types and species, please refer to Section 3.5, "Biological Resources."

Priority Conservation Areas

The proposed Plan's core strategy is "focused growth" in existing communities along the existing transportation network. This strategy helps to achieve key regional economic, environmental, and equity goals: It builds upon existing community characteristics, efficiently leverages existing infrastructure, and mitigates impacts on areas with less development. Priority Conservation Areas (PCAs), which are identified, recommended, and approved by local governments, are key to implementing the "focused growth" strategy.

PCAs are open spaces that provide agricultural, natural resource, scenic, recreational, and/or ecological values and ecosystem functions. These areas are identified through consensus by local jurisdictions and park/open space districts as lands in need of protection because of pressure from urban development or other factors. PCAs are categorized into four designations: Natural Landscapes, Agricultural Lands, Urban Greening and Regional Recreation. There are 184 PCAs within the region.

3.3.3 Regulatory Setting

FEDERAL REGULATIONS

Farmland Protection Program

The U.S. Natural Resources Conservation Service (NRCS) maps soils and farmland uses to provide comprehensive information necessary for understanding, managing, conserving, and sustaining the nation's limited soil resources. In addition to many other natural resource conservation programs, NRCS manages the Farmland Protection Program, which provides funds to help purchase development rights to keep productive farmland in agricultural uses. Working through existing programs, USDA joins with State, tribal, or local governments to acquire conservation easements or other interests from landowners.

Agricultural Improvement Act of 2018

The Agricultural Improvement Act of 2018, or 2018 Farm Bill, which was signed on December 20, 2018 (and will remain in effect through 2023), builds upon and continues to implement many of the crucial programs that serve agricultural producers. The U.S. Department of Agriculture is charged with implementing the bill, which reauthorized previous programs in the 2014 Farm Bill to serve producers now while they seek public input for future programs. The 2018 Farm Bill continued funding for major programs but did include some changes to Natural Resources Conservation Programs such as expanding support to producers who address significant natural resources concerns through adoption of conservation practices and activities. All major conservation programs are continued, although some have been modified.

Federal Farmland Protection Policy Act

NRCS oversees the Farmland Protection Policy Act (FPPA) (7 U.S. Code [USC] Section 4201 et seq.; see also 7 CFR 658). The FPPA (a subtitle of the 1981 Farm Bill) is national legislation designed to protect farmland. The FPPA states that its purpose is to "minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses." The FPPA applies to projects and programs that are sponsored or financed in whole or in part by the federal government. It does not apply to private construction projects subject to federal permitting and licensing, projects planned and completed without assistance from a federal agency, federal projects related to national defense during a national emergency, or projects proposed on land already committed to urban development. The FPPA spells out requirements to ensure that federal programs are compatible with State, local, and private programs and policies to protect farmland, to the extent practical, and calls for the use of the Land Evaluation and Site Assessment system to aid in analysis. Because MTC or its project sponsors may ultimately seek some federal funding for transportation projects, the FPPA is applicable to the proposed Plan.

Federal Forest Legacy Program

The Federal Forest Legacy Program was a part of the 1990 Farm Bill. Its purpose is to identify and protect environmentally important forestlands that are threatened by present or future conversion to non-forest uses. The program provides conservation easements and gives priority to lands that can be effectively protected and managed, as well as lands that have significant scenic, recreational, timber, riparian, fish and wildlife, threatened and endangered species, and other cultural or environmental values. Properties that are "working forests," whereby the forestland is managed for the production of forest products, are also eligible under this program. Involvement in this program by private landowners is voluntary.

Federal Environmental Quality Incentives Program

The Environmental Quality Incentives Program is a voluntary program that provides financial and technical assistance through contracts up to 10 years in length to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. These contracts provide financial assistance to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland. In addition, another purpose of the program is to help producers meet federal, State, Tribal and local environmental regulations.

STATE REGULATIONS

Sustainable Communities and Climate Protection Act of 2008

Senate Bill 375 (SB 375) (Chapter 728, Statutes of 2008) focuses on aligning transportation, housing, and other land uses to achieve regional greenhouse gas (GHG) emission reduction targets established under the California Global Warming Solutions Act, also known as Assembly Bill 32 (AB 32). SB 375 requires California Metropolitan Planning Organizations to develop an SCS as part of the RTP, with the purpose of identifying policies and strategies to reduce per capita passenger vehicle–generated GHG emissions. The SCS must:

- identify the general location of land uses, residential densities, and building intensities within the region;
- identify areas within the region sufficient to house all the population of the region;

- identify areas within the region sufficient to house an 8-year projection of the regional housing need;
- identify a transportation network to service the regional transportation needs;
- gather and consider the best practically available scientific information regarding resource areas and farmland in the region; and
- consider the State housing goals, set forth a forecasted development pattern for the region, and allow the RTP to comply with the federal Clean Air Act of 1970 (42 USC Section 7401 et seq.).

The development pattern in the SCS, when integrated with the transportation network and other transportation measures and policies, must reduce the GHG emissions from automobiles and light-duty trucks to achieve the GHG emission reduction targets approved by the California Air Resources Board (CARB). If the SCS does not achieve the GHG emission targets set by CARB, an Alternative Planning Strategy must be developed to demonstrate how the targets could be achieved.

SB 375 also imposes a number of new requirements on the regional housing needs process. Before SB 375, the RTP and regional housing needs processes were not required to be coordinated. SB 375 now synchronizes the schedules of the Regional Housing Need Allocation (RHNA) and RTP processes. The RHNA, which is developed after the RTP, must also allocate housing units within the region consistent with the development pattern included in the SCS. Previously, the RHNA determination was based on population projections produced by the California Department of Finance (Finance). SB 375 requires the determination to be based upon population projections by Finance and regional population forecasts used in preparing the RTP. If the total regional population forecasted and used in the RTP is within a range of 3 percent of the regional population forecast completed by Finance for the same planning period, then the population forecast developed by the regional agency and used in the RTP shall be the basis for the determination. If the difference is greater than 3 percent, then the two agencies shall meet to discuss variances in methodology and seek agreement on a population projection for the region to use as the basis for the RHNA determination. If no agreement is reached, then the basis for the RHNA determination shall be the regional population projection created by Finance.

The Delta Protection Act of 1992

The Delta Protection Act of 1992 established the Delta Protection Commission, a State entity to plan for and guide the conservation and enhancement of the natural resources of the Sacramento–San Joaquin Delta (Delta) while sustaining agriculture and meeting increased recreational demand. The act defines a Primary Zone, which comprises the principal jurisdiction of the Delta Protection Commission. The Secondary Zone is the area outside the Primary Zone and within the "Legal Delta"; the Secondary Zone is not within the planning area of the Delta Protection Commission. Portions of Alameda, Contra Costa, and Solano Counties overlap with the Primary Zone. The act requires the Delta Protection Commission to prepare and adopt a land use and resource management plan for the Primary Zone of the Delta, which must meet specific goals.

Sacramento-San Joaquin Delta Reform Act of 2009

The Delta Plan, required by the 2009 Sacramento-San Joaquin Delta Reform Act, creates rules and recommendations to further the State's coequal goals for the Delta: improve Statewide water supply reliability and protect and restore a vibrant and healthy Delta ecosystem. The plan provides that the goals can be achieved all in a manner that preserves, protects, and enhances the Delta's unique agricultural, cultural, and recreational characteristics. Specific to agricultural land use, one of the five core strategies of the Delta Stewardship Council is to "maintain Delta agriculture as primary land use,

food source, a key economic sector, and a way of life." The plan includes specific policies for the protection and promotion of agriculture, such as those that call for wise location of new urban development, promotion of value-added crop processing, agritourism encouragement, wildlife-friendly farming.

California Land Conservation Act

The California Land Conservation Act (Government Code Section 51200 et seq.) of 1965, commonly known as the Williamson Act, provides a tax incentive for the voluntary enrollment of agricultural and open space lands in contracts between local government and landowners. The act allows local governments to assess agricultural land based on the income-producing value of the property rather than the "highest and best use" value, which had previously been the rule. The contract enforceably restricts the land to agricultural and open space uses and compatible uses defined in State law and local ordinances. An agricultural preserve, which is established by local government, defines the boundary of an area within which a city or county will enter into contracts with landowners. Local governments calculate the property tax assessment based on the actual use of the land instead of the potential land value assuming full development.

Terms of Williamson Act contracts are 10 years and longer. The contract is automatically renewed each year, maintaining a constant, 10-year contract, unless the landowner or local government files to initiate nonrenewal. A "notice of nonrenewal" starts the 9-year nonrenewal period. During the nonrenewal process, the annual tax assessment gradually increases. At the end of the 9-year nonrenewal period, the contract is terminated. Only a landowner can petition for a contract cancellation. Tentative contract cancellations can be approved only after a local government makes specific findings and determines that the cancellation fee has been paid by the landowner.

The State of California has the following policies regarding public acquisition of, and locating public improvements on lands in, agricultural preserves and on lands under Williamson Act contracts (Government Code Sections 51290–51295):

- State policy is to avoid locating federal, State, or local public improvements and improvements of public utilities, and the acquisition of land, in agricultural preserves.
- State policy is to locate public improvements that are in agricultural preserves on land other than land under Williamson Act contract.
- State policy is that any agency or entity proposing to locate such an improvement, in considering the relative costs of parcels of land and the development of improvements, give consideration to the value to the public of land, particularly prime agricultural land, in an agricultural preserve.

In 1998, another option in the Williamson Act Program was established with the creation of Farmland Security Zone contracts. A Farmland Security Zone is an area created within an agricultural preserve by a board of supervisors upon the request of a landowner or group of landowners. Farmland Security Zone contracts offer landowners greater property tax reduction and have a minimum initial term of 20 years. Like Williamson Act contracts, Farmland Security Zone contracts renew annually unless a notice of nonrenewal is filed.

State funding was provided in 1971 by the Open Space Subvention Act, which created a formula for allocating annual payments to local governments based on acreage enrolled in the Williamson Act Program. Subvention payments were made through fiscal year 2009 but have been eliminated by the State since that time because of revenue shortfalls. This action affected local support for the

Williamson Act because it shifted the burden of the tax revenue reductions to counties. As a result, this tool for farmland conservation, although still used, was significantly weakened.

Assembly Bill 1265 of 2011

AB 1265 (Chapter 90, Statutes of 2011) was approved in summer 2011 and reinstated parts of the Williamson Act, Revenue and Tax Code, and Open Space Subvention Act that allowed eligible counties to recapture 10 percent of the property tax benefits provided to their owners of Williamson Act lands by decreasing the duration of the Land Conservation Act and Farmland Security Zone contracts by 1 and 2 years, respectively. SB 1353 (Chapter 322, Statutes of 2014), approved by the governor on September 15, 2014, eliminated the January 1, 2016, sunset clause and made the option for participating counties to recapture portions of foregone tax revenue permanent.

California Farmland Conservancy Program

The California Farmland Conservancy Program (PRC Section 10200 et seq.) supports the voluntary granting of agricultural conservation easements from landowners to qualified nonprofit organizations, such as land trusts, as well as local governments. Conservation easements are voluntarily established restrictions that are permanently attached to property deeds, with the general purpose of retaining land in its natural, open space, agricultural, or other condition while preventing uses that are deemed inconsistent with the specific conservation purposes expressed in the easements. Agricultural conservation easements define conservation purposes that are tied to keeping land available for continued use as farmland. Such farmlands remain in private ownership, and the landowners retain all farmland use authority, but farm owners are restricted in their ability to subdivide or use the land for nonagricultural purposes, such as urban uses. Potential impacts on conservation easements would be addressed in subsequent project-level documents.

Farmland Mapping and Monitoring Program

The FMMP is the only Statewide land use inventory conducted on a regular basis. The California Department of Conservation administers the FMMP, pursuant to which it maintains an automated map and database system to record changes in the use of agricultural lands. Farmland under the FMMP is listed by category: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. The farmland categories listed under the FMMP are described below. The categories are defined pursuant to USDA land inventory and monitoring criteria, as modified for California.

Prime Farmland

Prime Farmland is land with the best combination of physical and chemical features to sustain long-term production of agricultural crops. These lands have the soil quality, growing season, and moisture supply necessary to produce sustained high yields. Soil must meet the physical and chemical criteria determined by NRCS. Prime Farmland must have been used for production of irrigated crops at some time during the 4 years before the mapping date by the FMMP.

Farmland of Statewide Importance

Farmland of Statewide Importance is similar to Prime Farmland but with minor differences, such as greater slopes or a lesser ability of the soil to store moisture. Farmland of Statewide Importance must have been used for production of irrigated crops at some time during the 4 years before the mapping date.

Unique Farmland

Unique Farmland has lesser-quality soils than Prime Farmland or Farmland of Statewide Importance. Unique Farmland is used for the production of the State's leading agricultural crops. These lands are usually irrigated but may include nonirrigated orchards or vineyards found in some climatic zones in California. Unique Farmland must have been used for crops at some time during the 4 years before the mapping date.

Farmland of Local Importance

Farmland of Local Importance is farmland that is important to the local agricultural community as determined by each county's board of supervisors and local advisory committees.

Right to Farm Act 1981

The Right to Farm Act (Civil Code Section 3482.5) is designed to protect commercial agricultural operations from nuisance complaints that may arise when an agricultural operation is conducting business in a "manner consistent with proper and accepted customs." The code specifies that established operations that have been in business for 3 or more years that were not nuisances at the time they began shall not be considered a nuisance as a result of new land use.

Sustainable Agricultural Lands Conservation Program

The Sustainable Agricultural Lands Conservation Program is a component of the Affordable Housing and Sustainable Communities Program, developed and implemented under the Greenhouse Gas Reduction Fund within the California Budget Act of 2014. The goal of the Affordable Housing and Sustainable Communities Program is to reduce GHG emissions through projects that implement land use, housing, transportation, and agricultural land preservation practices to support infill and compact development.

California Forest Legacy Program Act of 2007

The California Forest Legacy Program Act, similar to the Federal Forest Legacy Program, is a program of the California Department of Forestry and Fire Protection (CAL FIRE). The program provides conservation easements to environmentally sensitive forest areas that have environmental, aesthetic, or commodity value. Money from the program is obtained by gifts, donations, federal grants and loans, and other appropriate funding sources and from the sale of bonds pursuant to the Safe Neighborhood Parks, Clean Water, Clean Air, and Coastal Protection Bond Act of 2000. Participation in this program by landowners is entirely voluntary. This act defines "forest land" as "land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits."

Z'berg-Nejedly Forest Practice Act of 1973

The Z'berg-Nejedly Forest Practice Act of 1973 (FPA) (PRC Sections 4511-4630.2) established the State Board of Forestry and Fire Protection, whose mandate is to protect and enhance the State's unique forest and wildland resources. This mandate is carried out through enforcement of the California Forest Practice Rules (California Code of Regulations Title 14, Chapters 4, 4.5, and 10). CAL FIRE enforces the laws that regulate logging on nonfederal lands in California. Additional rules enacted by the State Board of Forestry and Fire Protection are also enforced to protect forest and wildland resources. The FPA is intended to achieve "maximum sustained production of high-quality timber products…while giving consideration to values relating to recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment" (PRC Section 4513[b]). The regulations created by the FPA define factors such as the size and location of harvest

areas, include measures to prevent unreasonable damage to residual trees, and they address the protection of riparian areas, water courses and lakes, wildlife, and habitat areas.

Z'berg-Warren-Keene-Collier Forest Taxation Reform Act of 1976

Pursuant to the Z'berg-Warren-Keene-Collier Forest Taxation Reform Act of 1976, counties were required to provide for the zoning of land used for growing and harvesting timber as Timberland Production Zones (TPZs) (see California Government Code Section 51110[b]). Designation of land as a TPZ places a 10-year restriction on use of the land. This process replaced the previous process of designating agricultural preserves (through Williamson Act contracts) in timberland. Land use under a TPZ is restricted to growing and harvesting timber and to compatible uses approved by the county. In return, taxation of timberland under a TPZ is based only on such restrictions in use.

California Timberland Productivity Act of 1982

The California Timberland Productivity Act of 1982 (California Government Code Sections 51100-51155) identifies the benefits of the State's timberlands and acknowledges the threat of timberland loss via land use conversions. The law identifies policies intended to preserve timberland, including maintaining an optimum amount of timberland, discouraging premature conversion, discouraging expansion of urban land uses into timberlands, and encouraging investments in timberland. The law establishes TPZs on all qualifying timberland that is devoted to and used for growing and harvesting timber or for growing and harvesting timber and compatible uses. The law also provides that timber operations conducted in a manner consistent with forest practice rules under the FPA shall not be or become restricted or prohibited because of any land use in or around the locality of those operations.

California Air Resources Board Compliance Offset Protocol for U.S. Forest Projects

The Forest Protocol provides requirements and methods for quantifying the net climate benefits of activities that sequester carbon on forestland. The protocol provides offset project eligibility rules; methods to calculate an offset project's net effects on GHG emissions and removal of carbon dioxide from the atmosphere; procedures for assessing the risk that carbon sequestered by a project may be reversed (i.e., released back to the atmosphere); and approaches for long-term project monitoring and reporting. The protocol is designed to ensure that the net GHG reductions and GHG removal enhancements caused by an offset project are accounted for in a complete, consistent, transparent, accurate, and conservative manner and may therefore be reported as the basis for issuing CARB or registry offset credits. The protocol provides eligibility rules, methods to quantify GHG reductions, project-monitoring instructions, and procedures for reporting Offset Project Data Reports. Additionally, all offset projects must submit to independent verification by CARB-accredited verification bodies.

California Department of Forestry and Fire Protection

CAL FIRE enforces the laws that regulate logging on nonfederal lands in California. It also provides periodic assessments of forest resources within California as part of the Fire and Resource Assessment Program. *California's Forests and Rangelands: 2017 Assessment* presents an assessment of the trends, conditions, and degree to which forest and rangeland conversion has occurred. CAL FIRE also maintains the Forest Legacy Program, which is intended to identify and protect environmentally important forestlands that are threatened by conversion of land to nonforest uses either by purchase or through deed restrictions, such as conservation easements. On October 30, 2015, Governor Brown issued an emergency proclamation and established the California Tree Mortality Task Force (now a working group under the Forest Management Task Force). On September 1, 2017, Governor Brown issued Executive Order B-42-17 to bolster the State's response to unprecedented tree die-off. One goal of the task force was to identify and map areas of tree mortality that pose the greatest potential for

harm to people and property. These areas, known as High Hazard Zones, are the areas prioritized for tree removal. Goals of the task force include increasing the rate of forest treatments and expanding state wood product markets through innovation, assistance, and investment. Advancing forest health project capacity, readiness, and completion statewide aligns with the California Forest Carbon Plan, the goal of which is to establish healthy and resilient forests that can withstand and adapt to wildfire, drought, and a changing climate.

REGIONAL AND LOCAL REGULATIONS

In accordance with Government Code Section 65584(a), ABAG, has been designated by the State and federal governments as the official comprehensive planning agency for the Bay Area. ABAG reviews projects of regional significance for consistency with regional plans. Plan Bay Area provides a policy guide for planning the region's housing, economic development, environmental quality, transportation, recreation, and health and safety.

One Bay Area Grant Program

MTC's One Bay Area Grant program (OBAG) is a funding approach that aligns MTC's investments with support for focused growth. Established in 2012, OBAG taps federal funds to maintain MTC's commitments to regional transportation priorities while also advancing the Bay Area's land use and housing goals. OBAG includes both a regional program and a county program that:

- targets project investments in Priority Development Areas and
- rewards cities and counties that approve new housing construction and accept allocations through the RHNA process.

Cities and counties can use these OBAG funds to invest in:

- local street and road maintenance,
- streetscape enhancements,
- bicycle and pedestrian improvements,
- transportation planning,
- Safe Routes to School projects, and
- PCAs.

MTC in late 2015 adopted a funding and policy framework for the second round of OBAG grants. Known as OBAG 2 for short, the second round of OBAG funding is projected to total about $800 million to fund projects from 2017-18 through 2021-22.

California Government Code, Section 56000

Each county in California has a local agency formation commission (LAFCO), which is the agency that has the responsibility to create orderly local government boundaries, with the goals of encouraging the orderly formation of local governmental agencies and the preservation of open space lands and discouraging urban sprawl. LAFCOs are governed by Section 56000 of the California Government Code. This legislation sets the commission's powers and duties, procedures for establishing and changing governmental boundaries, and other Statewide policies that LAFCOs must consider while making their determinations. While LAFCOs have no direct land use power, their actions determine which local government will be responsible for planning new areas. LAFCOs address a wide range of boundary actions, including creation of spheres of influences for cities, adjustments to boundaries of special districts, annexations, incorporations, detachments of areas from cities, and dissolutions of cities.

City and County General Plans

The most comprehensive land use planning for the San Francisco Bay Area region is provided by city and county general plans, which local governments are required by State law (California Government Code Section 65300 et seq.) to prepare as a guide for future development. The general plan contains goals and policies concerning topics that are mandated by State law or that the jurisdiction has chosen to include. Required topics are land use, circulation, housing, conservation, open space, noise, and safety. Other topics that local governments frequently choose to address are public facilities, parks and recreation, community design, and/or growth management. City and county general plans must be consistent with each other. County general plans must cover areas not included by city general plans (i.e., unincorporated areas). Issues pertaining to land use are described in the land use element, issues pertaining to agricultural and forest resources are described in the conservation element, and issues pertaining to open space are described in the open space element of general plans.

City and County Zoning

The city or county zoning code or ordinance is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code establishes separate districts or zones (e.g., residential, commercial, industrial, public, open space), presents standards for development in different districts, and identifies which uses are allowed in the various zoning districts to ensure neighboring land uses are compatible with one another. State law requires the city or county zoning code to be consistent with the jurisdiction's general plan. The zoning code usually establishes specific districts for agriculture and/or forestry resources to protect farmland and farming activities from incompatible nonfarm uses and vice versa. Agricultural zoning can specify many factors, such as the farm uses allowed, minimum farm size, the number of nonfarm dwellings allowed, or the size of a buffer separating farm and nonfarm properties.

Growth Control Measures

Local growth control endeavors to manage community growth by various methods, including tying development to infrastructure capacity or traffic level of service standards, limiting the number of new housing units, setting limits on the increase of commercial square footage, linking development to a jobs-to-housing balance, and adopting urban growth boundaries. These goals and others can be achieved through the adoption of a countywide growth management program. Growth management programs, such as adopting urban growth boundaries, have been implemented by county government and/or cities in all of the nine Bay Area counties. Section 3.11, "Land Use, Population, and Housing," lists cities and counties with urban growth boundaries and countywide land use measures.

Public Ownership, Purchase of Development Rights, and Open Space Acquisition

Local governments and special districts, either on their own or working with land trusts and conservancies, can acquire fee title to agricultural and open space lands or purchase development rights to preserve rural and agricultural areas, watersheds, or critical habitat or to create public parks and recreational areas. Such actions have been undertaken in all Bay Area counties and have had significant effects on the shape of cities and urban form in the region.

3.3.4 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the Plan Bay Area 2040 EIR (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use, or conflict with existing zoning for agricultural use, or a Williamson Act contract (Criterion AGF-1);
- conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)) (Criterion AGF-2); or
- involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use (Criterion AGF-3).

METHOD OF ANALYSIS

This program-level EIR evaluates potential impacts on agriculture and forestry resources based on the location of the proposed Plan footprint associated with the forecasted development pattern (i.e., the land use growth footprint), sea level rise adaptation infrastructure (i.e., sea level rise adaptation footprint), and transportation projects (i.e., transportation system footprint) relative to the known distribution of agriculture and forestry resources throughout the Bay Area.

Quantitative results are presented for the region (i.e., the entire footprint, often summarized by county) and for the portions of the land use growth footprint specifically within transit priority areas (TPAs). TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county.

For this impact assessment, a geographic information system was used to digitally overlay the proposed Plan's footprints associated with the forecasted land use development pattern, sea level rise adaptation infrastructure, and transportation projects onto FMMP designations from the California Department of Conservation, lands zoned for agricultural uses, Williamson Act lands, and forest resources from USDA.

The baseline for the following analysis reflects existing conditions when the EIR NOP was released in September 2020.

This evaluation of agriculture and forestry resource impacts assumes that construction and development under the proposed Plan would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts. For additional information on analysis methodology, refer to Section 3.1, "Approach to the Analysis."

IMPACTS AND MITIGATION MEASURES

Impact AGF-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use, or conflict with existing zoning for agricultural use, or a Williamson Act contract (PS)

Conversion of land related to implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would occur during project construction. Inherently, there are no direct operational impacts following conversion of land. Therefore, construction and operation impacts are not addressed separately. Indirect impacts associated with the conversion of land are addressed in Impact AGF-3.

Land Use Impacts

Land converted from Prime or Unique Farmland or Farmland of Statewide Importance to other uses can have direct effects when productive land no longer produces crops. Indirect effects would occur if the conversion of farmland results in fragmentation of agricultural land and adjacent use conflicts, hinders existing transportation access to agricultural lands, or restricts infrastructure options that are necessary to the function of the agricultural property (see Impact AGF-3 for a discussion indirect impacts to agricultural land).

The proposed Plan's land use strategies could affect land use patterns through increases to residential density and non-residential intensity within the Plan area. The proposed Plan's focused-growth strategy directs most growth to designated growth geographies including locally nominated Priority Development Areas (PDAs), Priority Production Areas (PPAs), High Resource Areas (HRAs) and Transit Rich Areas (TRAs). Approximately 67 percent of growth in the proposed Plan would occur within these growth geographies, which reduces the effects of the Plan on agricultural lands because the land use growth footprint would generally occur on developed land. A portion of the proposed Plan's land use growth footprint (approximately 4,300 acres) overlaps with Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local importance; and approximately 5,500 acres of designated Grazing Land. A total of 1,600 acres of Farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) is located within the land use growth footprint. The largest overlaps are anticipated in Contra Costa and Solano Counties (**Table 3.3-4**). In TPAs, agricultural lands included in the land use growth footprint is smaller, totaling 500 acres region-wide. While TPAs are areas in which growth is focused, they would not be developed in their entirety and would include diverse land uses in addition to jobs and housing that could include preservation of agricultural lands.

Table 3.3-4: Acreage of Land Use Growth Footprint within Agricultural Land

County		Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Unique Farmland (acres)	Farmland of Local Importance (acres)	Grazing Land (acres)
Alameda	County Total	10	2	4	0	850
	Within TPAs	10	0	0	0	80
Contra Costa	County Total	320	180	20	1,900	2,100
	Within TPAs	10	0	0	60	180
Marin	County Total	0	0	0	30	40
	Within TPAs	0	0	0	2	0
Napa	County Total	7	< 1	0	420	10
	Within TPAs	0	0	0	0	0
San Francisco	County Total	0	0	0	0	0
	Within TPAs	0	0	0	0	0

County		Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Unique Farmland (acres)	Farmland of Local Importance (acres)	Grazing Land (acres)
San Mateo	County Total	< 1	0	20	0	4
	Within TPAs	0	0	0	0	0
Santa Clara	County Total	70	8	80	60	310
	Within TPAs	< 1	0	50	6	30
Solano	County Total	570	50	250	0	2,000
	Within TPAs	0	0	0	0	70
Sonoma	County Total	10	< 1	< 1	310	130
	Within TPAs	< 1	0	0	< 1	0
Regional Total	County Total	980	230	370	2,700	5,500
	Within TPAs	20	0	50	70	360

Note: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: MTC and ABAG 2021; DOC 2018

Additionally, the land use growth footprint overlaps with approximately 2,700 acres and 210 acres of lands that are zoned for agricultural uses or under Williamson Act contract, respectively (**Table 3.3-5**).

Table 3.3-5: Acreage of Land Use Growth Footprint within Agricultural Zoning or Williamson Act Contracts

County		Agricultural Zoning (acres)	Williamson Act Contract (acres)
Alameda	County Total	140	130
	Within TPAs	7	< 1
Contra Costa	County Total	160	< 1
	Within TPAs	< 1	0
Marin	County Total	3	0
	Within TPAs	< 1	0
Napa	County Total	< 1	0
	Within TPAs	0	0
San Francisco	County Total	0	0
	Within TPAs	0	0
San Mateo	County Total	20	0
	Within TPAs	5	0
Santa Clara	County Total	320	< 1
	Within TPAs	130	0
Solano	County Total	2,000	80
	Within TPAs	60	0
Sonoma	County Total	110	1
	Within TPAs	< 1	0
Regional Total	County Total	2,700	210
	Within TPAs	200	< 1

Note: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG 2021

The proposed Plan includes strategies to help protect natural lands and farmlands and reduce overall land consumption. Strategy EN04, Maintain Urban Growth Boundaries, confines new development within areas of existing development or areas otherwise suitable for growth, as established by local jurisdictions. Strategy EN05, Protect and Manage High-Value Conservation Lands, provides strategic matching funds to help conserve and maintain high-priority natural and agricultural lands, including but not limited to PCAs and wildland-urban interface lands. Other strategies, in combination with the growth geographies, promote a more compact development pattern, which helps to preserve agricultural lands. Except for San Francisco, all counties in the Bay Area protect open space and agricultural lands by countywide land use measures, such as urban growth boundaries, urban service areas, environmental corridors, slope/density restrictions, stream conservation areas, or riparian buffers. Counties and cities with urban growth boundaries are summarized in **Table 3.3-6**. Generally, this means that if a project falls outside an urban growth boundary, there are regulatory measures in place to aid local jurisdictions in farmland protection. However, there are many cities without urban growth boundaries, and other general growth measures that are in place vary in effectiveness and enforcement.

Table 3.3-6: Bay Area Urban Growth Boundaries and Countywide Land Use Measures

County	Countywide Measure	Cities with an Urban Growth Boundary
Alameda	Yes	Dublin, Fremont, Hayward, Livermore, Pleasanton
Contra Costa	Yes	Antioch, Contra Costa, Danville, El Cerrito, Hercules, Martinez, Oakley, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, Walnut Creek
Marin	Yes	Novato
Napa	Yes	American Canyon, Napa, St. Helena, Yountville
San Francisco	No	--
San Mateo	Yes	Urban-Rural Boundary applies to all jurisdictions
Santa Clara	Yes	Cupertino, Gilroy, Los Gatos, Milpitas, Morgan Hill, Palo Alto, San José
Solano	Yes	Benicia, Fairfield, Rio Vista, Vallejo, Vacaville
Sonoma	Yes	Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, Windsor

Note: San Francisco has no affected farmland acres.
Source: Greenbelt Alliance 2020

The proposed Plan's land use growth footprint could have the potential to convert Prime or Unique Farmland or Farmland of Statewide Importance and conflict with land managed pursuant to Williamson Act contracts. The proposed Plan could affect land use patterns through increases to residential density and non-residential intensity within the Plan area. While the land use strategies in the Plan are intended to encourage growth in urbanized areas, some growth could occur in areas that could potentially convert Prime or Farmland of Statewide Importance or Unique Farmland and conflict with existing zoning for agricultural use or Williamson Act contracts. The potential conversion of Farmland, lands zoned for agriculture, and lands under Williamson Act contracts would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

The proposed Plan's sea level rise adaptation footprint has the potential to convert 270 acres of Farmland of Local Importance and 50 acres of Grazing Land. No Farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) is located within the sea level rise adaptation footprint. Of the potentially affected agricultural land, all is Farmland of Local Importance and Grazing Land and is located in Alameda, Marin, Solano, and Sonoma Counties (Table 3.3-7).

Table 3.3-7: Acreage of Sea Level Rise Adaptation Footprint within Agricultural Land

County	Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Unique Farmland (acres)	Farmland of Local Importance (acres)	Grazing Land (acres)
Alameda	0	0	0	0	7
Contra Costa	0	0	0	0	0
Marin	0	0	0	170	20
Napa	0	0	0	0	0
San Francisco	0	0	0	0	0
San Mateo	0	0	0	0	0
Santa Clara	0	0	0	0	0
Solano	0	0	0	0	<1
Sonoma	0	0	0	110	30
Regional Total	0	0	0	270	50

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: MTC and ABAG 2021; DOC 2018

Additionally, implementation of the sea level rise adaptation infrastructure has the potential to convert 590 acres of zoned agricultural land and 160 acres of farmland under Williamson Act contract, as documented in **Table 3.3-8**.

Table 3.3-8: Acreage of Sea Level Rise Adaptation Footprint within Agricultural Zoning or Williamson Act Contracts

County	Agricultural Zoning (acres)	Williamson Act Contract (acres)
Alameda	0	30
Contra Costa	40	0
Marin	20	3
Napa	0	0
San Francisco	0	0
San Mateo	0	0
Santa Clara	300	30
Solano	160	90
Sonoma	80	10
Regional Total	590	160

Note: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG 2021

The extent of farmland conversion would depend on the final scale and design of proposed adaptation infrastructure. Some conversion could be substantial in Santa Clara and Solano Counties, depending on the amount and type of farmland that is converted. The potential conversion of Farmland, lands zoned for agriculture, and lands under Williamson Act contract due to implementation of sea level rise adaptation infrastructure under the proposed Plan would be potentially significant (PS).

Transportation System Impacts

The proposed Plan's transportation projects footprint overlays 730 acres of farmland and 1,500 acres of Grazing Land, which represents less than 1 percent of all agricultural land in the Plan area. A total of 270 acres of Farmland (Prime Farmland, Unique Farmland, and Farmland of Statewide Importance) is located within the transportation projects footprint. Of the potentially affected agricultural land, the

majority (67 percent) is Grazing Land, 21 percent is Farmland of Local Importance, 9 percent is Prime Farmland, and Farmland of Statewide Importance and Unique Farmland account for less than 1 percent (**Table 3.3-9**). The proposed Plan's transportation projects footprint has the potential to convert 1,900 acres of zoned agricultural land and 240 acres of farmland under Williamson Act contract, as documented for each county in **Table 3.3-10**.

Table 3.3-9: Acreage of Transportation Projects Footprint within Agricultural Land

County	Prime Farmland (acres)	Farmland of Statewide Importance (acres)	Unique Farmland (acres)	Farmland of Local Importance (acres)	Grazing Land (acres)
Alameda	6	< 1	2	< 1	590
Contra Costa	30	1	30	270	120
Marin	0	0	0	60	10
Napa	5	7	0	50	40
San Francisco	0	0	0	0	0
San Mateo	0	0	0	0	0
Santa Clara	150	20	7	20	500
Solano	30	2	< 1	0	200
Sonoma	0	0	0	60	2
Regional Total	210	30	30	460	1,500

Note: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: MTC and ABAG 2021; DOC 2018

Table 3.3-10: Acreage of Transportation Projects Footprint within Agricultural Zoning or Williamson Act Contracts

County	Agricultural Zoning (acres)	Williamson Act Contract (acres)
Alameda	340	30
Contra Costa	350	10
Marin	20	3
Napa	60	0
San Francisco	0	0
San Mateo	< 1	0
Santa Clara	920	170
Solano	220	20
Sonoma	20	7
Regional Total	1,900	240

Note: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021

The likelihood of farmland conversion increases where transportation projects are located at the edges of existing urban areas, along waterways, or over hills separating urban areas. The extent of this area would depend on the final scale and design of transportation projects. Some conversion could be substantial, depending on the amount and type of farmland that is converted. The potential conversion of Farmland I acreage, lands zoned for agriculture, and lands under Williamson Act contract due to implementation of transportation projects under the proposed Plan would be potentially significant (PS).

Conclusion

Together, the proposed Plan's land use growth footprint, sea level rise adaptation footprint, and transportation projects footprint have the potential to convert Farmland, lands zoned for agriculture, and lands under Williamson Act contract to urban uses. The overall amount of these conversions relative to the resources would be small, as described above. However, because some conversion could be substantial within a county or local municipality, the conversion of Farmland, lands zoned for agriculture, and lands under Williamson Act contracts as a result of land use, sea level rise adaptation infrastructure, or transportation projects would be **potentially significant (PS)**. Mitigation Measure AGF-1 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure AGF-1 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Require project relocation or corridor realignment, where feasible, to avoid agricultural land, especially Prime Farmland, Farmland of Statewide Significance, and land under a Williamson Act contract.
- Provide buffers, berms, setbacks, fencing, or other project design measures to protect surrounding agriculture, and to reduce conflict with farming that could result from implementation of transportation improvements and/or projected land use pattern included as a part of the RTP/SCS.
- Maintain and expand agricultural land protections such as urban growth boundaries **[**.
- Achieve compensatory mitigation in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through Regional Advance Mitigation Planning, as deemed appropriate by the permitting agencies.
- Require acquisition of conservation easements on land in the same jurisdiction, if feasible, and at least equal in quality and size as mitigation for the loss of agricultural land.
- Institute new protection of farmland in the project area or elsewhere through the use of long-term restrictions on use, such as 20-year Farmland Security Zone contracts (Government Code Section 51296 et seq.) or 10-year Williamson Act contracts (Government Code Section 51200 et seq.).

Significance after Mitigation

Implementation of Mitigation Measure AGF-1 would reduce the potentially significant impact of conversion of Farmland, lands zoned for agriculture, and lands under Williamson Act contracts to other uses because it would require avoidance or compensation for converted lands. Projects taking advantage of CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. However, the mitigation would not ensure that the future land use development pattern, sea level rise adaptation infrastructure, and transportation projects could feasibly relocate or realign to avoid conversion of Farmland, lands zoned for agriculture, and lands under Williamson Act contract to a less-than-significant level. Accordingly, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact AGF-2: Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)) (PS)

Conversion of land related to implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would occur during project construction. Inherently, there are no direct operational impacts following conversion or rezoning of land. Therefore, construction and operation impacts are not addressed separately. Indirect impacts are addressed in Impact AGF-3.

Land Use Impacts

Land converted from timberland to other use would have direct effects related to the loss of timber crops production. Indirect effects would occur to the extent that conversion creates fragmentation of timberland and adjacent use conflicts or hinders existing transportation access to timberlands (see AGF-3 for a discussion of indirect impacts).

As shown in **Table 3.3-11**, a total of 280 acres of forest land overlap with the proposed Plan's land use growth footprint. The majority of forest land that overlaps with the growth footprint is located in Contra Costa County. Approximately 20 acres of forest land is located within TPAs. In addition, current timberland or forest land zoning exists in Contra Costa, Sonoma, and San Mateo Counties. The majority of projected development in the proposed Plan would occur on existing urban land, thereby minimizing impacts on forest land or timberland. As noted above, some Bay Area cities have urban growth boundaries, which help to protect natural lands such as forest land and timberland. While the potential conversion of 280 acres of forestland and timberland would be potentially significant (PS), it represents a small fraction of all Plan area forest land and timberland.

Table 3.3-11: Acreage of Land Use Growth Footprint within Forestland and Timberland

County		Total (acres)
Alameda	County Total	10
	Within TPAs	< 1
Contra Costa	County Total	170
	Within TPAs	1
Marin	County Total	30
	Within TPAs	20
Napa	County Total	< 1
	Within TPAs	0
San Francisco	County Total	2
	Within TPAs	2
San Mateo	County Total	30
	Within TPAs	< 1
Santa Clara	County Total	2
	Within TPAs	0
Solano	County Total	7
	Within TPAs	0

County		Total (acres)
Sonoma	County Total	30
	Within TPAs	0
Regional Total	County Total	280
	Within TPAs	20

Notes: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on data from USDA 2019

Sea Level Rise Adaptation Impacts

The proposed Plan's sea level rise adaptation footprint has the potential to convert approximately 2 acres of forest land or timberland. Of the potentially affected forest land or timberland, approximately 2 acres are in Marin County and less than 1 acre is in Alameda County, as documented for each county in **Table 3.3-12**.

Table 3.3-12: Acreage of Sea Level Rise Adaptation Footprint within Forestland and Timberland

County	Total (acres)
Alameda	<1
Contra Costa	0
Marin	2
Napa	0
San Francisco	0
San Mateo	0
Santa Clara	0
Solano	0
Sonoma	0
Regional Total	2

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded to the nearest whole number.
Sources: Data compiled by MTC and ABAG in 2021 based on data from USDA 2019

Forest land and timberland conversion is anticipated to be approximately 2 acres, though the extent of this area would depend on the final scale and design of sea level rise adaptation infrastructure. The conversion of forest land and timberland from sea level rise adaptation infrastructure would be less than significant (LTS).

Transportation System Impacts

Overall, there are transportation projects in eight counties with the potential to affect approximately 100 acres of forest land or timberland. This is less than 1 percent of overall forest land and timberland acres in the Plan area. The vast majority of this forest land is located in Santa Clara (100 acres). All other counties have 3 acres or less of forest land and timberland within the transportation projects footprint, as identified in **Table 3.3-13**. As discussed in Section 3.1, "Approach to the Analysis," the area of potential affect is likely to be a conservative (i.e., overstated) estimate of disturbance.

The likelihood of forest land and timberland conversion increases where transportation projects are located at the edges of existing urban areas, along waterways, or in areas currently separating urban areas. The extent of this impact would depend on the final scale and design of proposed projects. Nonetheless, the conversion of forest land and timberland acreage would be potentially significant (PS).

Table 3.3-13: Acreage of Transportation Projects Footprint within Forestland and Timberland

County	Total (acres)
Alameda	< 1
Contra Costa	3
Marin	< 1
Napa	0
San Francisco	< 1
San Mateo	< 1
Santa Clara	100
Solano	2
Sonoma	< 1
Regional Total	100

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on data from USDA 2019

Conclusion

Together, the proposed Plan's land use growth footprint, sea level rise adaptation footprint, and transportation projects footprint have the potential to convert forest lands and timberlands to urban uses. The overall amount of these conversions relative to the resources would be small, as described above. The conversion of forest land and timberland from sea level rise adaptation infrastructure would be less than significant, as discussed above. However, because some conversion could be substantial within a county or local municipality, the conversion of forest land or timberlands as a result of land use development pattern and transportation projects would be **potentially significant (PS)**. Mitigation Measure AGF-2 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure AGF-2 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Require project relocation or corridor realignment, where feasible, to avoid forest land or timberland.
- Maintain and expand forest land protections such as urban growth boundaries.
- Achieve compensatory mitigation in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through Regional Advance Mitigation Planning, as deemed appropriate by the permitting agencies.
- Require acquisition of conservation easements on land at least equal in quality and size as mitigation for the loss of forest land or timberland.

Significance after Mitigation

Implementation of Mitigation Measure AGF-2 would reduce the potentially significant impact of conversion of forest or timberland to other uses because it would require avoidance or compensation for converted lands. Projects taking advantage of CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. However, because the mitigation would not ensure that the future land use development pattern, sea level rise adaptation infrastructure, and transportation projects could feasibly relocate or realign to avoid forestland or timberland and because compensation may

not adequately reduce the impact to a less-than-significant level, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact AGF-3: Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use (PS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Anticipated growth under the proposed Plan would result in conversion of Farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) to non-agricultural use and conversion of forest land to non-forest use. Although the proposed Plan would include land use strategies and transportation projects that focus new anticipated development in the region's urban built-up areas, some new development is anticipated to occur in agricultural areas, on forest land, and/or near the wildland-urban interface. As described under Impact AGF-1, implementation of the proposed Plan would result in the conversion of Farmland, lands zoned for agriculture, and lands under Williamson Act contract. Lands that remain agricultural but located adjacent to urban uses, may feel pressure to develop, as nearby land values increase or as nuisances from urban development spread to agricultural lands. In addition, urban uses, especially newly urbanized areas, can lead to pressure on adjacent farms to change their farming practices (e.g., changing schedules to reduce noise or altering the extent or method of fertilizer and pesticide spraying). Further, expanded transportation infrastructure capacity and the implementation of SLR infrastructure could remove obstacles to growth in existing agricultural areas.

A range of local conservation plans, habitat conservation agencies and State/federal park designated areas provide protection for a substantial amount of forest land and farmland. The majority of projected development under the proposed Plan would occur on existing urban land, thereby minimizing impacts and potential further fragmentation of farmland, forest land or timberland. As noted above, some Bay Area cities have urban growth boundaries to limit sprawl and protect forest land and agricultural land and timberland. However, a substantial amount of land on the urban and suburban fringe is vulnerable to development, if not within the boundaries of protected lands, and face additional development pressure as adjacent lands are converted from undeveloped to developed uses. Therefore, development projects anticipated to occur under the proposed Plan could have the potential to cause other changes in the existing environment that could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use. This impact would be potentially significant (PS).

Conclusion

The proposed Plan is intended to accommodate future growth within existing municipal boundaries and urbanized areas. However, implementation of the Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects could result in conversion of Farmland or forest land to other uses that would potentially place development pressure onto adjacent undeveloped lands. This impact would be **potentially significant (PS)**. Mitigation Measure AGF-3 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure AGF-3 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Implement Mitigation Measures AGF-1 and AGF-2.

- Manage project operations to minimize the introduction of invasive species or weeds that may affect agricultural production on adjacent agricultural land. Where a project has the potential to introduce sensitive species or habitats or have other spill-over effects on nearby agricultural lands, the project proponents shall be responsible for acquiring easements on nearby agricultural land and/or financially compensating for indirect effects on nearby agricultural land. Easements (e.g., flowage easements) shall be required for temporary or intermittent interruption in farming activities (e.g., because of seasonal flooding or groundwater seepage). Acquisition or compensation would be required for permanent or significant loss of economically viable operations.

- Design project features to minimize fragmenting or isolating agricultural land. Where a project involves acquiring land or easements, ensure that the remaining agricultural land is of a size sufficient to allow economically viable farming operations. The project sponsors shall be responsible for acquiring easements, making lot line adjustments, and merging affected land parcels into units suitable for continued commercial agricultural management.

Significance after Mitigation

Implementation of Mitigation Measure AGF-3 would reduce the potentially significant impact of conversion Farmland or forestland to other uses because it would require avoidance or compensation for converted lands. Projects taking advantage of CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. However, for the reasons described above, the mitigation measures may not be feasible or may not adequately reduce the impact to a less-than-significant level. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

3.4 AIR QUALITY

This section evaluates the regional air quality impacts of implementing the proposed Plan. The analysis focuses on the following criteria pollutants: (1) ground-level ozone precursor emissions, for which the Bay Area is currently designated as a nonattainment area under the national and State standards; and (2) fine particulate matter ($PM_{2.5}$) emissions, for which the Bay Area is currently designated as nonattainment under the national and State standards. It also evaluates criteria pollutants and toxic air contaminants (TACs) from construction activity and local and regional emissions of TACs and $PM_{2.5}$. This EIR examines these pollutants at a regional level. However, for TACs and $PM_{2.5}$ a localized analysis is provided to identify potential public health impacts from locating new sensitive receptors within Transit Priority Areas.

The related issues of greenhouse gas (GHG) emissions and potential climate change effects are addressed separately in Section 3.6, "Climate Change, Greenhouse Gases, and Energy," of this EIR.

Comments received in response to the Notice of Preparation (NOP) expressed concerns about $PM_{2.5}$ and cancer risk resulting from TACs; how the Plan's proposed growth will exacerbate the toxic effects of major oil refineries in the region and subsequent health effects; and a desire to include ambitious goals for reduction in mobile source emissions.

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." (CEQA Guidelines Section 15083.) Neither the CEQA Guidelines nor the statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.4.1 Environmental Setting

PHYSICAL SETTING

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions, including wind speed, wind direction, and air temperature, in combination with local surface topography (i.e., geographic features, such as mountains and valleys), determine the effect of air pollutant emissions on local and regional air quality.

Climate, Meteorology, and Topography

The Bay Area region has a Mediterranean climate characterized by wet winters and dry summers. Rainfall totals can vary widely over a short distance, with windward coastal mountain areas receiving over 40 inches of rain, while leeward areas receive about 15 inches. During rainy periods, horizontal and vertical air movement ensures rapid pollutant dispersal. Rain also washes out particulate and other pollutants.

Normally, air temperatures decrease with increasing elevations. Sometimes this normal pattern is inverted, with warmer air aloft and cool air trapped near the earth's surface. This phenomenon occurs in all seasons. In summer, especially when wind speeds are very low, a strong inversion will trap air

emissions, and high levels of ozone smog can occur. In winter, a strong inversion can trap emissions of particulate and carbon monoxide near the surface, resulting in unhealthful air quality. Particulate matter (PM) pollution is anticipated to increase because of climate change, which can lead to worsening asthma symptoms, chronic obstructive pulmonary disease, and respiratory infections associated to premature mortality. Increasing temperatures related to climate change are also anticipated to lead to an increase in wildfires across California. Wildfires are a significant source of smoke and PM exposure. PM can also be carried over long distances by wind and then settle on ground or water. Depending on chemical composition, the effects of PM settling may include; making lakes and streams acidic, changing the nutrient balance in coastal waters and large river basins, depleting the nutrients in soil, damaging sensitive forests and farm crops and affecting the diversity of ecosystems, contributing to acid rain effects (EPA 2021).

The Bay Area topography is complex, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Pacific Ocean bounds the area to the west with warmer inland valleys to the south and east. The only major break in California's Coast Ranges occurs at San Francisco Bay. The gap on the western side is called the Golden Gate, and on the eastern side, it is called the Carquinez Strait. These gaps allow air to pass between the Central Valley and the Pacific Ocean. The general region lies in the semipermanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds. The usually mild climatological pattern is interrupted occasionally by periods of extremely hot weather, winter storms, and offshore winds.

Regional wind patterns vary from season to season. During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula. Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, Golden Gate, or the San Bruno Gap. In the winter, the region frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds. Winter stagnation episodes are characterized by nighttime drainage flows in coastal valleys. Drainage refers to the reversal of the usual daytime air flow patterns; air moves from the Central Valley toward the coast.

Wind tends to move from areas of high pressure to areas of low pressure. In warmer months, this means that air currents move onshore from the Pacific Ocean to inland areas. Pacific Ocean air receives emissions from numerous sources (anthropogenic and biogenic) as it comes onshore and will carry these pollutants to areas many miles away. Mountains and valleys often affect onshore winds. This means that a wind pattern that started as northwesterly will often swing 90 degrees or more when it encounters topographic features.

The climatological pollution potential of an area is largely dependent on winds, atmospheric stability, solar radiation, and terrain. The combination of low wind speeds and a strong inversion produces the greatest concentration of air pollutants. On days without inversions, or on days of winds averaging over 15 miles per hour, smog potential is greatly reduced. Because of wind patterns and, to a lesser degree, the geographic location of emission sources, high ozone levels usually occur in inland valleys, such as the Livermore area. High PM levels can occur in areas of intense motor vehicle use, such as freeways and ports and in most valley areas where residential wood smoke and other pollutants are trapped by inversions and stagnant air.

Existing Air Quality and Attainment Status Summary

The federal Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to set national ambient air quality standards (NAAQS) (40 CFR Part 50) for six pollutants considered harmful to public health and the environment: ground-level ozone, carbon monoxide, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM, and lead. EPA calls these pollutants "criteria" air pollutants because it regulates them

by developing human health-based and/or environmentally based criteria (science-based guidelines) for setting permissible levels.

Under amendments to the federal Clean Air Act, EPA has classified air basins or portions thereof, as either "attainment" or "nonattainment" for each criteria pollutant, based on whether the national standards have been achieved. The California Clean Air Act, patterned after the federal Clean Air Act, also designates areas as "attainment" or "nonattainment" for State standards. Thus, California has two sets of attainment/nonattainment designations: one with respect to national standards and one with respect to State standards.

Table 3.4-1 identifies the ambient air quality standards and attainment status for all criteria pollutants. The Bay Area is currently designated as a nonattainment area for State and federal ozone standards, the federal 24-hour $PM_{2.5}$ standard, and State coarse PM (PM_{10}) standards. Based on the nonattainment status of these pollutants, this analysis is focused on ground-level ozone precursor emissions and PM emissions.

Table 3.4-2 presents a 10-year Bay Area air quality summary for days over the national and California standards for ozone, carbon monoxide, and PM. Each of these criteria pollutants is discussed in more detail in the following pages.

Table 3.4-1: Bay Area Ambient Air Quality Standards and Attainment Status as of 2020

Pollutant	Averaging Time	California Standard[1,3]	Attainment Status for California Standard[1]	Federal Primary Standard[2,3]	Attainment Status for Federal Standard	Major Pollutant Sources
Ozone	8 hour	0.070 ppm	Nonattainment[4]	0.070 ppm	Nonattainment[5]	Motor vehicles, other mobile sources, combustion, industrial, and commercial processes
	1 hour	0.09 ppm	Nonattainment	---	---[6]	
Carbon Monoxide (CO)	8 hour	9.0 ppm	Attainment	9 ppm	Attainment[7]	Internal combustion engines, primarily gasoline-powered motor vehicles
	1 hour	20 ppm	Attainment	35 ppm	Attainment	
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	Attainment	0.100 ppm[8]	---[8]	Emissions from cars, trucks, and buses
	Annual Arithmetic Mean	0.030 ppm	---	0.053 ppm	Attainment	
Sulfur Dioxide (SO_2)[12]	24 Hour	0.04 ppm	Attainment	0.14 ppm	---[9]	Fossil fuel combustion at power plants and other industrial facilities, and burning of high sulfur–containing fuels by locomotives, large ships, and nonroad equipment
	1 Hour	0.25 ppm	Attainment	0.075 ppm	---[9]	
	Annual Arithmetic Mean	---	---	0.030 ppm	---[9]	
Particulate Matter (PM_{10})	24 Hour	50 µg/m^3	Nonattainment	150 µg/m^3	Unclassified	Dust- and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays)
	Annual Arithmetic Mean	20 µg/m^3	Nonattainment[10]	---	---	
Particulate Matter – Fine ($PM_{2.5}$)	24 Hour	---	---	35 µg/m^3[11]	Nonattainment	
	Annual Arithmetic Mean	12 µg/m^3	Nonattainment[10,12]	12 µg/m^3[11]	Unclassified/ Attainment	
Lead[13]	30-day Average	1.5 µg/m^3	---	---	Attainment	Fuels in on-road motor vehicles and industrial sources
	Calendar Quarter	---	---	1.5 µg/m^3	Attainment	
	Rolling 3-Month Average[14]	---	---	0.15 µg/m^3	---[14]	
Visibility- Reducing Particles (VRP)	8 hour (10:00 to 18:00 PST)	---[14]	---	No National Standards		Same as particulate matter sources

Pollutant	Averaging Time	California Standard[1,3]	Attainment Status for California Standard[1]	Federal Primary Standard[2,3]	Attainment Status for Federal Standard	Major Pollutant Sources
Sulfates	24 hour	25 µg/m^3	Attainment			Combustion of petroleum fuels that contain sulfur
Hydrogen Sulfide	1 hour	0.03 ppm	Unclassified			Natural gas and anaerobic decomposition (e.g., sewer gas, wastewater treatment plants)
Vinyl Chloride[15]	24 hour	0.010 ppm	No information available			Plastics manufacturing, landfills, wastewater treatment plants, and hazardous waste sites

Notes: ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter; NAAQS = national ambient air quality standards; VRP = visibility-reducing particles.

[1] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility-reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that the California Air Resource Board (CARB) determines would occur less than once per year on the average. The Lake Tahoe carbon monoxide standard is 6.0 ppm, a level one-half the national standard and two-thirds the State standard.

[2] National standards shown are the "primary standards" designed to protect public health. National standards other than for ozone and particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent 3-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than 1. The 8-hour ozone standard is attained when the 3-year average of the fourth-highest daily concentrations is 0.070 ppm (70 ppb) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m^3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m^3.

Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially averaged across officially designed clusters of sites falls below the standard.

[3] National air quality standards are set by the U.S. Environmental Protection Agency (EPA) at levels determined to be protective of public health with an adequate margin of safety.

[4] The 8-hour California ozone standard was approved by CARB on April 28, 2005, and became effective on May 17, 2006.

[5] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm. An area will meet the standard if the fourth-highest maximum daily 8-hour ozone concentration per year, averaged over 3 years, is equal to or less than 0.070 ppm. Nonattainment areas will have until late 2037 to meet the health standard, with attainment dates varying based on the ozone level in the area.

[6] The national 1-hour ozone standard was revoked by EPA on June 15, 2005.

[7] In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.

[8] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm.

[9] The current primary standard is set at a level of 75 ppb, as the 99th percentile of daily maximum 1-hour SO_2 concentrations, averaged over 3 years.

[10] In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.

[11] In December 2012, EPA strengthened the annual $PM_{2.5}$ NAAQS from 15.0 to 12.0 µg/m^3. In December 2014, EPA issued final area designations for the 2012 primary annual $PM_{2.5}$ NAAQS. Areas designated "unclassifiable/attainment" must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard was April 15, 2015.

[12] On January 9, 2013, EPA issued a final rule to determine that the Bay Area attains the 24-hour $PM_{2.5}$ national standard. This EPA rule suspends key State Implementation Plan requirements as long as monitoring data continue to show that the Bay Area attains the standard. Despite this EPA action, the Bay Area will continue to be designated as nonattainment for the national 24-hour $PM_{2.5}$ standard until such time as the Bay Area Air Quality Management District submits a "redesignation request" and a "maintenance plan" to EPA, and EPA approves the proposed redesignation.

[13] National lead standard, rolling 3-month average: final rule signed October 15, 2008. Final designations effective December 31, 2011.

[14] Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment because of regional haze and is equivalent to a 10-mile nominal visual range.

[15] CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure below which there are no adverse health effects determined.

Source: BAAQMD 2017a

Table 3.4-2: Ten-Year Bay Area Air Quality Summary (2010–2019)

Days Over Standard for Ozone, Carbon Monoxide, and Particulate Matter												
Year	Ozone			CO			PM_{10}		$PM_{2.5}$	NO_2		SO_2
	1-Hr	8-Hr		1-Hr	8-Hr		24-Hr		24-Hr[2]	1-Hr		24-Hr
	Cal	Nat[1]	Cal	Nat	Cal	Nat/Cal	Nat	Cal	Nat	Nat	Cal	Nat/Cal
2010	8	11	11	0	0	0	0	2	6	0	0	0
2011	5	9	10	0	0	0	0	3	8	0	0	0
2012	3	8	8	0	0	0	0	2	3	1	0	0
2013	3	3	3	0	0	0	0	6	13	0	0	0
2014	3	9	10	0	0	0	0	2	3	0	0	0
2015	7	12	12	0	0	0	0	1	9	0	0	0
2016	6	15	15	0	0	0	0	0	0	0	0	0
2017	6	6	6	0	0	0	0	6	18	1	0	0
2018	2	3	3	0	0	0	1	6	18	0	0	0
2019	6	9	9	0	0	0	0	5	1	0	0	0

Notes: Nat = national; Cal = California.

[1] In October 2015, the U.S. Environmental Protection Agency implemented a new 8-hour ozone standard of 70 parts per billion. Exceedances are based on this standard. (Note that national and State numbers can differ because of data-handling conventions.)

[2] U.S. EPA tightened the national 24-hour PM 2.5 standard from 65 to 35 µg/m3 in 2006. On January 9, 2013, U.S. EPA issued a final rule to determine that the San Francisco Bay Area region attains the 24-hour PM 2.5 national standard. This U.S. EPA rule suspends key SIP requirements as long as monitoring data continues to show that the Air District attains the standard. Despite this U.S. EPA action, the Air District will continue to be designated as non-attainment for the national 24-hour PM2.5 standard until the Air District submits a redesignation request and a maintenance plan to U.S. EPA, and U.S. EPA approves the proposed redesignation.

Source: BAAQMD 2020

Ozone

Ozone is a reactive pollutant that is not emitted directly into the atmosphere but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and oxides of nitrogen (NOX). ROG and NOX are known as precursor compounds of ozone. Mobile sources (e.g., motor vehicle exhaust) and area sources (e.g., industrial emissions, gasoline vapors, architectural coatings, various consumer products, and chemical solvents) are some of the main sources of ROG and NOX that contribute to the formation of ozone. Ozone is a regional air pollutant because it is formed downwind of sources of ROG and NOX under the influence of wind and sunlight. During summertime (particularly on hot, sunny days with little or no wind), ozone levels are at their highest.

Short-term exposure to elevated concentrations of ozone is linked to such health effects as eye irritation and breathing difficulties. Repeated exposure to ozone can make people more susceptible to respiratory infections and aggravate preexisting respiratory diseases. Long-term exposures to ozone can cause more serious respiratory illnesses. Ozone also damages trees and other natural vegetation; reduces agricultural productivity; and causes deterioration of building materials, surface coatings, rubber, plastic products, and textiles.

Tables 3.4-3 and 3.4-4 show exceedances of the State 1-hour ozone standard and national 8-hour ozone standard, respectively. The number of days the region experiences unhealthy ozone levels has fallen overall from 2002 to 2019. This improvement is because of the California Air Resources Board (CARB) regulations affecting motor vehicle emissions and Bay Area Air Quality Management District (BAAQMD) regulations to reduce emissions from industrial and commercial sources.

Table 3.4-3: Days Exceeding the California 1-Hour Ozone Standard (2002–2019)

Stations by Sub-Region	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Northern																		
Napa/Napa Valley College	1	2	0	0	1	0	1	1	1	0	0	0	0	0	0	1	0	1
San Rafael	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Santa Rosa/Sebastopol	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vallejo	1	2	1	0	0	0	1	2	0	0	0	0	0	0	1	1	0	0
Central																		
Hayward	0	3	0	0	2	0	1	4	--	0	0	0	1	2	0	2	0	2
Oakland	0	0	0	0	--	--	0	0	1	0	0	0	0	0	0	2	0	1
Oakland-West	--	--	--	--	--	--	--	--	--	0	0	0	0	0	0	0	0	1
Redwood City	0	1	1	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0
San Francisco	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Leandro	1	2	1	1	0	0	0	--	--	--	--	--	--	--	--	--	--	--
Richmond/San Pablo	0	0	1	0	0	0	0	0	1	0	0	0	0	0	--	3	0	1
Eastern																		
Bethel Island	5	0	1	0	9	0	4	2	3	0	1	0	0	0	0	0	0	0
Concord	5	5	1	1	8	1	3	2	2	2	0	0	1	0	1	0	0	0
Fairfield	4	0	1	0	3	0	2	2	1	0	0	0	0	0	0	0	0	0
Livermore	10	10	5	6	13	2	5	8	3	3	2	3	0	1	2	5	2	4
Pittsburg	4	0	0	0	3	1	1	--	--	--	--	--	--	--	--	--	--	--
San Ramon	--	--	--	--	--	--	--	--	--	--	1	0	0	1	1	0	0	1
Southern																		
Fremont	3	4	0	1	4	0	1	4	1	--	--	--	--	--	--	--	--	--
Cupertino	--	--	--	--	--	--	--	--	--	0	0	0	--	--	--	--	--	--
Los Gatos	4	7	0	3	7	0	2	3	2	0	0	0	0	1	0	0	0	0
Mountain View/Sunnyvale	0	4	1	1	3	0	0	--	--	--	--	--	--	--	--	--	--	--
San Jose Central	--	4	0	1	5	0	1	0	5	--	--	--	--	--	--	--	--	--
San Jose East	0	2	0	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Jose	--	--	--	--	--	--	--	--	--	1	1	0	0	0	0	3	0	1
Gilroy	6	6	0	0	4	0	1	1	0	0	0	0	0	1	0	1	1	0
San Martin	8	9	0	2	7	1	2	4	2	0	0	0	1	1	1	1	0	0

Note: -- = no data available.

Source: BAAQMD 2020

Table 3.4-4: Days Exceeding the National 8-Hour Ozone Standard (2002-2019)

Stations by Sub-Region	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Northern																		
Napa/Napa Valley College	0	0	0	0	0	0	2	1	2	0	0	1	0	0	0	2	0	2
San Rafael	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Santa Rosa/Sebastopol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Vallejo	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2	0	1
Central																		
Hayward	0	1	0	--	0	0	1	3	--	0	0	0	0	0	0	3	0	2
Oakland	0	0	0	0	--	--	0	0	0	0	0	0	0	0	0	2	0	2
Oakland-West	--	--	--	--	--	--	--	--	--	0	0	0	0	0	0	0	0	1
Redwood City	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	2
San Francisco	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
San Leandro	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
Richmond/San Pablo	0	0	0	0	0	0	0	--	1	0	0	0	0	0	0	2	0	2
Eastern																		
Bethel Island	3	0	0	0	1	0	4	3	4	2	2	0	0	2	2	1	1	1
Concord	3	1	0	0	4	0	6	2	1	2	2	0	2	2	2	0	0	2
Fairfield	0	0	0	0	1	0	1	2	2	1	1	0	0	1	0	0	0	0
Livermore	6	3	0	1	5	1	6	6	3	2	3	1	4	2	4	6	3	7
Patterson Pass	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15	--	--	--
Pittsburg	2	0	0	0	1	0	1	--	--	--	--	--	--	--	--	--	--	--
San Ramon	--	--	--	--	--	--	--	--	--	--	3	0	3	--	1	2	2	1
Southern																		
Fremont	0	1	0	0	0	0	1	0	1	--	--	--	--	--	--	--	--	--
Cupertino	--	--	--	--	--	--	--	--	--	0	0	1	--	--	--	--	--	--
Los Gatos	2	2	0	1	4	0	2	4	2	0	0	0	1	4	0	3	0	2
Mountain View/Sunnyvale	0	2	0	0	0	0	1	--	--	--	--	--	--	--	--	--	--	--
San Jose Central	--	0	0	0	1	0	2	0	3	--	--	--	--	--	--	--	--	--
San Jose East	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Jose	--	--	--	--	--	--	--	--	--	0	0	1	0	2	0	4	0	2
Gilroy	2	2	0	0	2	0	1	2	5	0	0	0	0	3	0	1	0	0
San Martin	5	4	0	0	5	0	2	5	5	0	1	1	3	4	1	3	1	2

Notes: These values reflect exceedances based on ozone standards at the time.

-- = no data available.

Source: BAAQMD 2020

Carbon Monoxide

Carbon monoxide is an odorless and invisible gas. It is a nonreactive pollutant that is a product of incomplete combustion of gasoline in automobile engines. Carbon monoxide is a localized pollutant, and the highest concentrations are found near the source. Ambient carbon monoxide concentrations generally follow the spatial and temporal distributions of vehicular traffic and are influenced by wind speed and atmospheric mixing. Carbon monoxide concentrations are highest in flat areas on still winter nights when temperature inversions trap the carbon monoxide near the ground. When inhaled at high concentrations, carbon monoxide reduces the oxygen-carrying capacity of the blood, which,

in turn, results in reduced oxygen reaching parts of the body. Most of the Bay Area's carbon monoxide comes from on-road motor vehicles, although a large amount also comes from burning wood in fireplaces.

The approved maintenance plan for the San Francisco-Oakland-San Jose carbon monoxide nonattainment area did not extend the maintenance plan period beyond 20 years from redesignation. Consequently, transportation conformity requirements for carbon monoxide ceased to apply after June 1, 2018 (i.e., 20 years after the effective date of EPA's approval of the first 10-year maintenance plan and redesignation of the area to attainment for the carbon monoxide NAAQS). As a result, as of June 1, 2018, transportation conformity requirements no longer apply for the carbon monoxide NAAQS in the San Francisco-Oakland-San Jose carbon monoxide nonattainment area for Federal Highway Administration/Federal Transit Association projects as defined in 40 CFR 93.101 (see: https://www.govinfo.gov/content/pkg/FR-2005-11-30/pdf/05-23502.pdf#page=1).

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local sources of NO_X emissions.

Most of the Bay Area's NO_2 comes from on-road motor vehicles. Since the year 2010, the Bay Area has had three exceedances of the national NO_2 standard – one exceedance each in 2012, 2015 and 2017.

Sulfur Dioxide

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills, as well as by the combustion of fuel containing sulfur. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at 5 parts per million or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis. (EPA 2018)

Most of the Bay Area's SO_2 comes from petroleum refineries. Bay Area refineries are the largest source of sulfur oxide (SO_X) emissions, emitting approximately 5,000 tons per year and ranking 350 on the list of top SO_2 emitters in the nation (CARB 2011, 2015). Despite these major sources, the overall concentration of SO_2 in the region is low. Over the past 10 years, the Bay Area has not experienced any exceedances of either the national or the State SO_2 standard.

Particulate Matter

PM includes dirt, dust, soot, smoke, and liquid droplets found in the air. Coarse PM, or PM_{10}, refers to particles less than or equal to 10 microns in diameter (about one-seventh the diameter of a human hair). PM_{10} is primarily composed of large particles from sources such as road dust, residential wood burning, construction/demolition activities, and emissions from on- and off-road engines. Some sources of PM, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in diameter, and it contains particles formed in the air from primary gaseous emissions. Examples include sulfates formed from SO_2 emissions from power plants and industrial facilities; nitrates formed from NO_X emissions from power plants, automobiles, and other combustion sources; and carbon formed from organic gas emissions from automobiles and industrial facilities.

The Bay Area experiences its highest PM concentrations in the winter, especially during evening and night hours, because of the cool temperatures, low wind speeds, low inversion layers, and high humidity. Specifically, $PM_{2.5}$ is viewed as a major component of the region's total PM problem because $PM_{2.5}$ accounts for roughly half of PM_{10} annually. On winter days when the PM standards are exceeded, $PM_{2.5}$ from wood burning at residential land uses are the most likely contributors daily PM emissions (BAAQMD 2012:89, 135).

Coarse and fine PM is small enough to get into the lungs and can cause numerous health problems, including respiratory conditions, such as asthma and bronchitis, and heart and lung disease. People with heart or lung disease, the elderly, and children are at highest risk from exposure to PM.

Lead

Lead is a metal found naturally in the environment, as well as in manufactured products, and it is a potent neurotoxin that can cause increased chances of cancer and noncancer health effects for adults and children. Lead is known to negatively affect child brain development and function. The major sources of lead emissions have historically been mobile and industrial sources, but it can occur in dust created by demolition or deterioration of lead-based paint. Lead-based paint is present on buildings built before EPA's ban on the use of such paint in 1978. EPA also phased out leaded fuels as of December 1995, resulting in an 89-percent decline in lead emissions from mobile sources between 1980 and 2010 (EPA 2016; CARB 2001).

In the Bay Area, aircraft exhaust and manufacturing are the major sources of lead emissions (STI 2008; BAAQMD 2014a). Contact with lead-based paint in older communities and demolition activities are also active health concerns in region (EPA 2017a). CARB established risk management guidelines in 2001 to identify new, modified, and existing sources of lead in the State to better understand the health risks, control emissions, and reduce exposure to lead (CARB 2001).

Toxic Air Contaminants

The California Health and Safety Code defines TACs as air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a present or potential hazard to human health. TACs are less pervasive in the urban atmosphere than criteria air pollutants, but they are linked to short-term (acute) or long-term (chronic and/or carcinogenic) adverse human health effects. For evaluation purposes, TACs are separated into carcinogens and noncarcinogens based on the nature of the physiological effects associated with exposure to TACs. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. Cancer risk from carcinogens is expressed as excess cancer cases per 1 million exposed individuals, typically over a lifetime of exposure. Noncarcinogens differ in that there is a safe level at which it is generally assumed that no negative health impacts would occur. These levels are determined on a pollutant-by-pollutant basis.

There are many different types of TACs with varying degrees of toxicity. TACs may also exist as PM or as vapors or gases. Sources of TACs include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust—particularly diesel-powered vehicles. Compared to other air toxics that CARB has identified and controlled, diesel particulate matter (diesel PM) emissions are estimated to be responsible for about 70 percent of the total ambient air toxics risk Statewide (CARB 2005).

The three most potent carcinogens—diesel PM overall, and 1,3-butadiene and benzene as specific components of diesel PM—come primarily from motor vehicles. Cleaner motor vehicles and fuels are reducing the risks from these three priority toxic air pollutants. The remaining toxic air pollutants, such as hexavalent chromium and perchloroethylene, while not appearing to contribute as much to the overall risks, can present high risks to people living close to a source because of the highly localized

concentration of TACs. CARB has control measures for motor vehicles, consumer products, and industrial source programs either already in place, in development, or under evaluation for most TACs.

Health risks from diesel PM are highest in areas of concentrated emissions, such as near ports, rail yards, freeways, or warehouse distribution centers. According to CARB, diesel engine emissions are responsible for the majority of California's known cancer risk from outdoor air pollutants. Those most vulnerable are children, whose lungs are still developing, and the elderly, who may have other serious health problems. Based on numerous studies, CARB has also stated that diesel PM is a contributing factor for premature death from heart and/or lung diseases. In addition, diesel PM reduces visibility and is a strong absorber of solar radiation that contributes to global warming (BAAQMD 2012).

According to CARB, levels of toxic air pollutants have decreased significantly with the adoption of airborne toxic control measures, stringent vehicle standards, requirements for low-emission vehicles, and cleaner fuels. As a result of these measures, more than 30,000 facilities in California have reduced their toxic emissions. This has led to the reduction of ambient cancer risk in California by about 80 percent since 1990. Several communities also have established community emission reduction plans that outline actions that stationary facilities and mobile sources can take to further reduce harmful air pollutants. (CARB 2021)

BAAQMD's Community Air Risk Evaluation (CARE) Program, initiated in 2004, works extensively with local governments, communities, and businesses to reduce air pollution and adverse health outcomes in disproportionately affected areas within the Bay Area. Periodically, the CARE Program identifies affected areas by overlaying maps that combine emissions, estimated cancer risks, predicted $PM_{2.5}$ concentrations, and health outcome data.

The CARE program has brought together government, communities, and business in an effort to understand and address localized areas of elevated air pollution and adverse health impacts. While improvements in air quality continues to occur throughout the Bay Area, levels of air pollution and their impacts vary from location to location. Air pollution levels of many pollutants are highest in close proximity to pollution sources—such as near freeways, busy roadways, busy distribution centers, and large industrial sources. Communities where these types of sources are concentrated often have areas within them where air pollution is relatively high and corresponding health impacts are greater (BAAQMD 2014).

In addition to tracking regional criteria pollution levels as measured at central monitoring sites, and in addition to tracking TAC pollution levels from individual permitted facilities, BAAQMD tracks the cumulative impacts of exposures to multiple pollutants and multiple sources in the neighborhoods where people live. With the shift toward more consideration of cumulative air pollution exposures, BAAQMD's staff continues to evaluate the health status of Bay Area residents and how health status affects vulnerability to air pollution. This has been a gradual but important shift. It is a shift that will continue to require closer collaboration between BAAQMD and the region's health departments and health professionals and researchers. By exploring the links between air pollution exposures and community health status, the CARE Program will continue to help focus BAAQMD's resources to achieve the greatest health benefits (BAAQMD 2014b).

3.4.2 Regulatory Setting

Air quality is regulated at the federal, State, and regional levels. This section summarizes the applicable air quality regulations and regulatory agencies.

FEDERAL REGULATIONS

Federal Clean Air Act

The federal Clean Air Act (CAA) of 1970, amended in 1977 and 1990 (42 U.S. Code 7506[c]), was enacted for the purposes of protecting and enhancing the nation's air resources to benefit public health. In 1971, the CAA required EPA to set NAAQS to achieve the purposes of Section 109 of the act. The NAAQS require that certain pollutants should not exceed specified levels; areas that exceed the standard for specified pollutants are designated as "nonattainment" areas. In promulgating the NAAQs, EPA allowed some states the option to develop stricter State standards. Pursuant to this, California adopted its own set of stricter standards under the California Clean Air Act (CCAA) of 1988 (described below under "State Regulations").

The federal CAA requires states to develop State Implementation Plans (SIPs) that outline how each state will control air pollution under the CAA. A SIP includes the regulations, programs, and policies that a state will use to clean up polluted areas. States must hold public hearings and provide opportunities for the public and industries to be involved and comment on the development of each state plan.

1990 Amendments to Clean Air Act

The 1990 amendments to the CAA included a provision to address air toxics. Under Title III of the CAA, EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants, which are nationally uniform standards oriented toward controlling particular hazardous air pollutants. Section 112(b) of the CAA identifies 189 "Air Toxics" (hazardous air pollutants), directs EPA to identify sources of the 189 pollutants, and establishes a 10-year time period for EPA to issue technology-based emissions standards for each source category. Title III of the CAA provides for a second phase under which EPA is to assess residual risk after the implementation of the first phase of standards and impose new standards, when appropriate, to protect public health.

Federal Transportation Conformity Requirements

Transportation conformity is required under the CAA Section 176(c) to ensure that federally supported highway and transportation project activities are consistent with ("conform to") the purpose and requirements of the SIP. Conformity currently applies to areas that are designated nonattainment and those redesignated to attainment after 1990 ("maintenance areas") for the following transportation-related criteria pollutants: ozone, $PM_{2.5}$ and PM_{10}, carbon monoxide, and NO_x. Conformity, for the purpose of the SIP, means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. Conformity is demonstrated by showing that the total air pollutant emissions projected for an RTP/SCS are within the emissions limits ("budgets") established by the SIP.

Conformity requires demonstration that transportation control measures (TCMs) in ozone nonattainment areas are implemented in a timely fashion. TCMs are expected to be given funding priority and to be implemented on schedule, and in the case of any delays, any obstacles to implementation are expected to be or are being overcome. A total of 33 TCMs have been fully implemented since the 1982 Bay Area Air Quality Plan; 12 TCMs were originally listed in the 1982 Bay Area Air Quality Plan, 16 additional TCMs were adopted by MTC in February 1990 in response to a 1990 lawsuit in the federal district court to bring the region back on the "Reasonable Further Progress" track, and five TCMs were adopted as part of the 2001 1-Hour Ozone Attainment Plan. These TCMs include strategies such as improved transit service and transit coordination, ridesharing services and new carpool lanes, signal timing, freeway incident management, and increased gas taxes and bridge tolls to encourage use of alternatives modes.

MTC must make a determination that the proposed Plan conforms to the SIP and is consistent with the applicable air quality attainment plans. The transportation conformity analysis and findings prepared by MTC for the proposed Plan are addressed in a process separate from the proposed Plan environmental review process. Upon completion of the conformity analysis for the proposed Plan and associated Transportation Improvement Program, these materials will be posted for review at www.planbayarea.org.

Safer Affordable Fuel-Efficient Vehicles Rule Part One: One National Program

In September 2019, EPA and the National Highway Traffic Safety Administration issued the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program, which revoked California's authority to set its own GHG emissions standards and zero-emission vehicle mandates in California (84 Federal Register 51310) In April 2020, the federal agencies issued the SAFE Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks, which relaxed federal GHG emissions and fuel economy standards (85 Federal Register 24174). At the time of preparation of this environmental document, the implications of the SAFE Rule on California's future emissions are uncertain. On February 8, 2021, the incoming administration issued a stay in regard to the legal challenges by California and other states to the revocation of California's waiver (JDSupra 2021a). As of April 22, 2021, there is currently a proposal to withdraw Part One of the SAFE Rule (JDSupra 2021b).

STATE REGULATIONS

Mulford-Carrel Act

In 1967, the California Legislature passed the Mulford-Carrel Act, which established CARB from two Department of Health bureaus operating at that time: the Bureau of Air Sanitation and the Motor Vehicle Pollution Control Board. CARB was formed to work with the public and private sectors to promote and protect public health, welfare, and ecological resources to reduce air pollutants while recognizing and considering the State's economy. Assembly Bill (AB) 32, also known as the Global Warming Solutions Act of 2006 (Nunez), expanded CARB's role to development and oversight of California's main GHG reduction programs. These include cap and trade, the Low Carbon Fuel Standard, and the zero-emission vehicle programs.

With the passage of additional laws (such as Senate Bill [SB] 32 in 2016 and AB 398 in 2017), CARB continues to map out how these programs and others can help California reach its next target: reducing GHG emissions an additional 40 percent below 1990 levels by 2030. The ultimate goal for California is to reduce GHG emissions by 80 percent below 1990 levels by 2050.

California Clean Air Act

The CCAA of 1988 requires nonattainment areas to achieve and maintain the California ambient air quality standards (CAAQS) by the earliest practicable date and local air districts to develop plans for attaining the State ozone, carbon monoxide, SO_2, and NO_2 standards. CARB sets the CAAQS.

Under the CCAA, areas not in compliance with the standard must prepare plans to reduce ozone. Noncompliance with the State ozone standard does not affect the ability to proceed with any transportation plan, program, or project. The first Bay Area Clean Air Plan was adopted in 1991, and updates to the Clean Air Plan have occurred since then, with the most recent adopted version being the *2017 Clean Air Plan: Spare the Air, Cool the Climate*. The *2017 Clean Air Plan* provides "all feasible measures" to reduce ozone precursors—ROG and NO_x—and reduce transport of ozone and its precursors to neighboring air basins. In addition, the 2017 Clean Air Plan builds upon and enhances BAAQMD's efforts to reduce emissions of $PM_{2.5}$ and TACs (BAAQMD 2017b).

Senate Bill 656 (Chapter 738, Statues of 2003)

In 2003, the California Legislature enacted SB 656 (Chapter 738, Statutes of 2003), codified as Health and Safety Code Section 39614, to reduce public exposure to PM_{10} and $PM_{2.5}$. SB 656 required CARB, in consultation with local air pollution control and air quality management districts (air districts), to develop and adopt, by January 1, 2005, a list of the most readily available, feasible, and cost-effective control measures that could be employed by CARB and the air districts to reduce PM_{10} and $PM_{2.5}$ (collectively referred to as PM). The legislation established a process for achieving near-term reductions in PM throughout California ahead of federally required deadlines for $PM_{2.5}$ and provided new direction on PM reductions in those areas not subject to federal requirements for PM. Measures adopted as part of SB 656 complement and support those required for federal $PM_{2.5}$ attainment plans, as well as for State ozone plans. This ensures continuing focus on PM reduction and progress toward attaining California's more health protective standards. This list of air district control measures was adopted by CARB on November 18, 2004.

The BAAQMD also complied with this legislation; staff developed a Particulate Matter Implementation Schedule that was adopted by BAAQMD in November 2005, and BAAQMD adopted the measures identified in the Implementation Schedule (BAAQMD 2012).

Toxic Air Contaminant Identification and Control Act of 1983

The Toxic Air Contaminant Identification and Control Act (AB 1807, Tanner 1983) created California's program to reduce exposure to air toxics. The program involves a two-step process: risk identification and risk management.

In the risk identification step, and upon CARB's request, the Office of Environmental Health Hazard Assessment evaluates the health effects of substances other than pesticides and their pesticidal uses. Substances with the potential to be emitted or that are currently being emitted into the ambient air may be identified as a TAC.

In the risk management step, once a substance is identified as a TAC, and with the participation of local air districts, industry, and interested public, CARB prepares a report that outlines the need and degree to regulate the TAC through a control measure (CARB 2020).

Assembly Bill 2588: Air Toxics "Hot Spots" Information and Assessment Act of 1987

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly) was enacted in September 1987. Under this act, stationary sources are required to report the types and quantities of certain substances their facilities routinely release into the air. Emissions of interest are those that result from the routine operation of a facility or that are predictable, including but not limited to continuous and intermittent releases and process upsets or leaks.

The goals of the Air Toxics "Hot Spots" Act are to collect emission data, identify facilities having localized impacts, ascertain health risks, and notify nearby residents of significant risks. In September 1992, the "Hot Spots" Act was amended by SB 1731 (Calderon) to address the reduction of significant risks. The bill requires that owners of significant-risk facilities reduce their risks below the level of significance (CARB 2020).

Diesel Risk Reduction Plan

In August 1998, CARB identified particulate emissions from diesel-fueled engines (diesel PM) as TACs, based on data linking diesel PM emissions to increased risks of lung cancer and respiratory disease. Following the identification process, CARB was required to determine if there was a need for further control, which led to creation of the Diesel Advisory Committee to assist in the development of a risk

management guidance document and risk reduction plan. In September 2000, CARB adopted the Diesel Risk Reduction Plan, which recommends control measures to reduce the risks associated with diesel PM and achieve a goal of 75-percent diesel PM reduction by 2010 and 85 percent by 2020.

Specific Statewide regulations designed to further reduce diesel PM emissions from diesel-fueled engines and vehicles are continuing to be evaluated and developed. The goal of these regulations is to make diesel engines as clean as possible by establishing state-of-the-art technology requirements or emission standards to reduce diesel PM emissions.

California Health and Safety Code

Under the California Health and Safety Code, Division 26 (Air Resources), CARB is authorized to adopt regulations to protect public health and the environment through the reduction of TACs and other air pollutants with adverse health effects. CARB has promulgated several mobile and stationary source airborne toxic control measures (ATCMs) pursuant to this authority. For instance, effective as of July 2003, CARB approved an ATCM that limits school bus idling and idling at or near schools to only when necessary for safety or operational concerns (13 CCR Chapter 10, Section 2480). This ATCM is intended to reduce diesel PM and other TACs and air pollutants from heavy-duty motor vehicle exhaust. It applies to school buses, transit buses, school activity buses, youth buses, general public paratransit vehicles, and other commercial motor vehicles. This ATCM focuses on reducing public exposure to diesel PM and other TACs, particularly for children riding in and playing near school buses and other commercial motor vehicles, who are disproportionately exposed to pollutants from these sources (CARB 2010). In addition, effective February 2005, CARB approved an ATCM to limit the idling of diesel-fueled commercial motor vehicles with gross vehicular weight ratings of greater than 10,000 pounds, regardless of the state or country in which the vehicle is registered (13 CCR Chapter 10, Section 2485).

California Building Standards Code - Title 24

Title 24 is a collection of energy standards for California buildings. Its goal is to promote energy efficiency in new homes and commercial constructions. Since 1978, California residents have had to comply with Title 24, Part 6 of the CCR in their homes and businesses. This section specifies energy-efficiency standards designed to make the State's energy usage more responsible and sustainable.

Title 24 receives updates every 3 years to incorporate the latest research, design, and trends in interior systems, such as lighting and HVAC systems. The latest adopted revisions to Title 24 regulations came out in 2019, superseding the version issued in 2016. Title 24 energy compliance requirements apply to new constructions and any new installations or retrofits in existing buildings. Older buildings do not have to upgrade their systems, but if they choose to renovate, their new systems must meet Title 24 standards. Updated Title 24 standards for 2022 were drafted in May 2021 but are not final as of the publication of this Draft EIR.

Heavy-Duty Vehicle Inspection Program

The Heavy-Duty Vehicle Inspection Program (HDVIP) and the Periodic Smoke Inspection Program (PSIP) are CARB's heavy-duty vehicle inspection programs for in-use trucks and buses. HDVIP requires heavy-duty trucks and buses to be inspected for excessive smoke, tampering, and engine certification label compliance. Any heavy-duty vehicle traveling in California may be inspected, including vehicles registered in other states and foreign countries. CARB inspection teams perform tests at border crossings, California Highway Patrol weigh stations, fleet facilities, and randomly selected roadside locations. Owners of trucks and buses found in violation are subject to minimum penalties starting at $300 per violation. Penalty payment and proof of correction must be supplied to clear violations.

PSIP requires annual opacity self-testing for California fleets with two or more heavy-duty vehicles.

Drayage Truck Regulation

CARB established the Drayage Truck Regulation as part of its ongoing efforts to reduce PM and NOx emissions from diesel-fueled engines and improve air quality associated with goods movement. The purpose of this regulation is to reduce emissions and public exposure to diesel PM, NOx, and other air contaminants by setting emission standards for in-use, heavy-duty diesel-fueled vehicles that transport cargo to and from California's ports and intermodal rail facilities.

Starting January 1, 2023, drayage trucks are subject to the provisions of Title 13, CCR, Section 2025, the Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants from In-Use Heavy Duty Diesel-Fueled Vehicles, which requires that all not otherwise exempt in-use on-road diesel vehicles, including drayage trucks, have a 2010 model year emissions equivalent engine by January 1, 2023 (Article 4.5, Chapter 1, Division 3, Title 13, Section 2027, CCR).

Senate Bill 1: The Road Repair and Accountability Act of 2017

SB 1 was passed in April 2017 by a two-thirds majority in the California Legislature. As the largest transportation investment in California history, SB 1 is expected to raise $52.4 billion in funding to rebuild neighborhood streets, freeways, and bridges across California. Transportation improvements funded by SB 1 include: maintenance of State highways and bridges, repairs to local streets and roads, transit, congested corridors and trade corridors, and bike and pedestrian projects. Funding for SB 1 comes from State gas tax and vehicle fees. It is split evenly between State and local governments for highway and local road repair and maintenance. SB 1 doubles the amount of revenue that cities, such as the City of Oakland, receive from the State for local street maintenance and repair.

Proposition 1B: Goods Movement Emission Reduction Program

The $1 billion Proposition 1B Goods Movement Emission Reduction Program is a partnership between CARB and local agencies, air districts, and seaports to quickly reduce air pollution emissions and health risk from freight movement along California's trade corridors. Local agencies apply to CARB for funding. Then those agencies offer financial incentives to owners of equipment used in freight movement to upgrade to cleaner technologies. Projects funded under this program must achieve early or extra emission reductions not otherwise required by law or regulation.

California Air Pollution Control Officers Association

The California Air Pollution Control Officers Association (CAPCOA), is a non-profit association of the air pollution control officers from all 35 local air quality agencies throughout California. CAPCOA was formed in 1976 to promote clean air and to provide a forum for sharing of knowledge, experience, and information among the air quality regulatory agencies around the State. The Association promotes unity and efficiency, and strives to encourage consistency in methods and practices of air pollution control.

In August of 2010 CAPCOA released "Quantifying Greenhouse Gas Mitigation Measures, A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures." This work is considered "state of the practice" for this subject matter and provides a common platform of information and tools for identifying feasible mitigation measures to reduce air quality impacts from proposed development projects. As noted, the source document for the table of mitigation measures provided below is the CAPCOA document.

Table 3.4-5: On-Model Measures: CalEEMod's Mitigation Measures Are Based on the CAPCOA Measures

CalEEMod Traffic Tab: Land Use & Site Enhancement Measures (Designated by associated CAPCOA measure)		
Measure Number	Land Use/Location	Description
LUT-1	Increase Density	Designing the Project with increased densities
LUT-2	Increase Location Efficiency	Documentation of empirical data to justify the "cap" for all land use/location strategies
LUT-3	Increase Mixed Use Development	Increase Diversity of Urban and Suburban Developments
LUT-4	Improve Destination Accessibility	Project close to regional employment or destination center
LUT-5	Increase Transit Accessibility	Project near high-quality transit
LUT-6	Integrate Below Market Rate Housing	Incorporates affordable housing
LUT-8	Encourage Alternative Mode Use	Locate Project near Bike Path/Bike Lane
Measure Number	Neighborhood/Site Enhancements	Description
SDT-1	Improve Pedestrian Network	On-site pedestrian access network links all of project internally and externally
SDT-2	Provide Traffic Calming Measures	Projects streets and intersections feature traffic calming features
SDT-3	Implement NEV Network	Project provides a viable Neighborhood Electric Vehicle (NEV) network
CalEEMod Traffic Tab: Neighborhood Enhancement Measures (Designated by associated CAPCOA measure)		
SDT-4	Encourage Non-Motorized Travel	Create Urban Non-Motorized Zones
SDT-5	Increase Bike Commuting	Incorporate Bike Lane Street Design
SDT-6	Increase Bike Parking	Provide Bike Parking for Non-Residential projects
SDT-7	Increase Bike Parking	Provide Bike Parking for Multi-Unit Residential projects
SDT-8	Increase Electric Vehicle Parking	Provide Electric Vehicle Parking
SDT-9	Designate Bike Commuting Routes	Improve Connectivity to Off-site Bike Networks
CalEEMod Traffic Tab: Parking Policy/Pricing Measures (Designated by associated CAPCOA measure)		
Measure Number	Parking Policy/Pricing	Description
PDT-1	Limit Parking Supply	Change parking requirements and types of supply
PDT-2	Unbundle Parking Costs	Parking cost separated from property costs
CalEEMod Traffic Tab: Transit Improvement Measures (Designated by associated CAPCOA measure)		
Measure Number	Transit System Improvements	Description
TST-1	Provide BRT System	Establish a Bus Rapid Transit line with permanent operational funding stream
TST-3	Expand Transit Network	Establishes or enhances bus line with permanent operational funding stream
TST-4	Increase Transit Frequency	Reduces headways of existing transit
TST-5	Increase Parking Near Transit	Provide short-term and long-term bicycle parking near transit stations and stops
CalEEMod Traffic Tab: Commute Trip Measures (Designated by associated CAPCOA measure)		
Measure Number	Commute Trip Reduction	Description
TRT-1	Implement Trip Reduction Program	Implement voluntary Commute Trip Reduction (CTR) program with employers
TRT-2	Implement Trip Reduction Program	Implement Commute Trip Reduction (CTR) ordinance
TRT-3	Increase Ride-sharing	Provide Ride-Sharing Programs
CalEEMod Energy Tab: Building Energy Measures (Designated by associated CAPCOA measure)		
Measure Number	Building Energy	Description
BE-1	Exceed Title 24	Use less energy than allowed by Title 24
CalEEMod Energy Tab: Alternative Energy Measures (Designated by associated CAPCOA measure)		
Measure Number	Alternative Energy	Description
AE-1	On-site Renewable Energy	Establish Onsite Renewable or Carbon-Neutral Energy Systems-Generic

Sources: CAPCOA 2010, CAPCOA 2016

REGIONAL AND LOCAL REGULATIONS

Regional Air Districts

The nine-county MTC region encompasses three air basins: the San Francisco Bay Area Air Basin in its entirety, portions of the North Coast Air Basin, and portions of the Sacramento Valley Air Basin. Northern Sonoma County is located within the North Coast Air Basin, and eastern Solano County is located within the Sacramento Valley Air Basin. (The remaining areas not located within those air basins are located within the San Francisco Bay Area Air Basin.) BAAQMD governs the San Francisco Bay Area Air Basin, the Northern Sonoma County Air Pollution Control District (NSCAPCD) governs the North Coast Air Basin, and the Yolo-Solano Air Quality Management District (YSAQMD) governs the Sacramento Valley Air Basin. The geographic boundaries of these three air basins and air districts are shown in **Figure 3.4-1**. Each air pollution control district is responsible for attaining and maintaining air quality standards and undertakes a variety of activities, including adopting and enforcing rules and regulations, issuing permits for stationary sources of air pollution, inspecting stationary sources of air pollution, responding to citizen inquiries and complaints, monitoring ambient air quality and meteorological conditions, administering incentives-based programs to reduce motor vehicle emissions, and conducting public education campaigns. In California, air pollution control districts generally follow county boundaries; in the more urban areas, county agencies were merged by State legislation into unified air quality management districts.

Maritime Air Quality Improvement Plan

In collaboration with a task force of diverse stakeholders, the Port of Oakland (Port) developed the Maritime Air Quality Improvement Plan (MAQIP) to guide its efforts to reduce criteria pollutants, notably diesel PM, associated with maritime (seaport) activities at the Port. The MAQIP is the Port's master plan to reduce air pollution from both mobile and stationary on/near-shore and off-shore sources at the seaport. It not only supports current and future State and local emission reduction requirements but enhances these requirements through early implementation goals and by targeting emission reductions that exceed legally mandated requirements.

The MAQIP builds upon the Port Maritime Air Quality Policy Statement (Port Air Quality Statement), adopted by the Board of Port Commissioners in March 2008. The Port Air Quality Statement sets a goal of reducing the excess community cancer health risk related to exposure to diesel PM emissions associated with the Port's maritime operations by 85 percent from 2005 to 2020, through all practicable and feasible means. It also commits the Port to implement early action emissions reduction measures to reduce the duration of the public's exposure to emissions that may cause health risks, through all practicable and feasible means.

Comprehensive Truck Management Plan

The Port of Oakland initiated development of the Comprehensive Truck Management Plan (CTMP) in early 2007 through the establishment of a technical advisory committee. The purpose of the CTMP is to address air quality, safety and security, business and operations, and community issues associated with drayage trucks serving the Port. As part of implementing the CTMP, the Port has developed a truck registry for trucks serving the seaport, supported compliance with truck-related regulations to reduce emissions of air pollutants, increased safety and security domain awareness, improved operational efficiencies, reduced traffic and congestion, and involved and educated stakeholders.

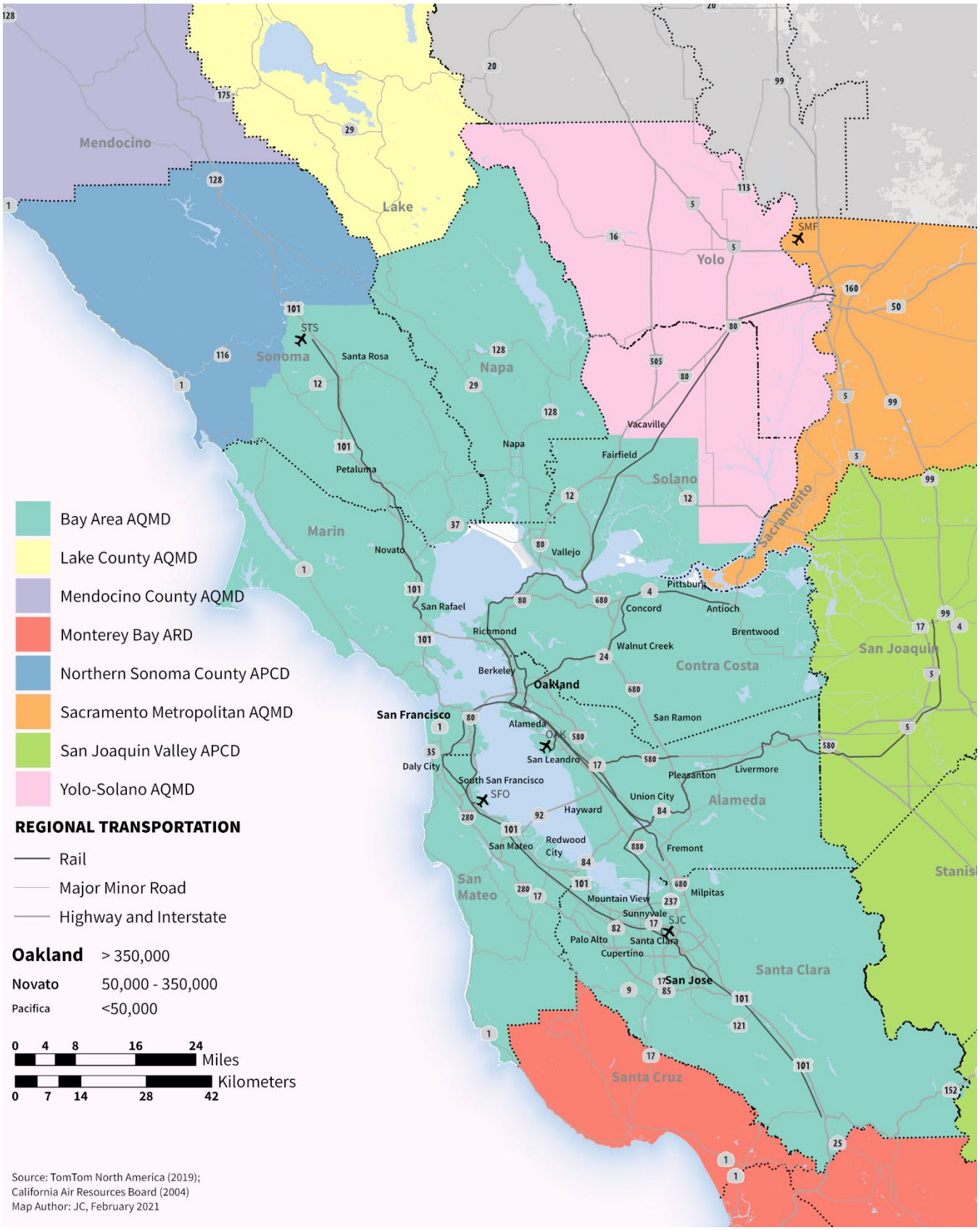

Figure 3.4-1: Area Air Basins

Bay Area Air Quality Management District

BAAQMD attains and maintains air quality conditions in the San Francisco Bay Area Air Basin through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of BAAQMD includes the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. BAAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA and CCAA.

As mentioned above, BAAQMD adopts rules and regulations. All projects are subject to BAAQMD's rules and regulations in effect at the time of construction. Specific rules applicable to project construction and operation may include, but are not limited to, the following rules:

- **Regulation 2, Rule 1, General Permit Requirements.** This rule includes criteria for issuance or denial of permits, exemptions, appeals against decisions of the air pollution control officer, and BAAQMD actions on applications.
- **Regulation 2, Rule 2, New Source Review.** This rule applies to new or modified sources and contains requirements for best available control technology (BACT) and emission offsets. Rule 2 implements federal New Source Review and Prevention of Significant Deterioration requirements.
- **Regulation 6, Rule 1, General Requirements.** Regulation 6 limits the quantity of PM in the atmosphere by controlling emission rates, concentration, visible emissions, and opacity.
- **Regulation 7, Odorous Substances.** Regulation 7 places general limitations on odorous substances and specific emission limitations on certain odorous compounds. A person (or facility) must meet all limitations of this regulation but meeting such limitations shall not exempt such person from any other requirements of BAAQMD, State, or national law. The limitations of this regulation shall not be applicable until BAAQMD receives odor complaints from 10 or more complainants within a 90-day period, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel, or residence. When the limits of this regulation become effective, as a result of the citizen complaints described above, the limits shall remain effective until such time as no citizen complaints have been received by BAAQMD for 1 year. The limits of this regulation shall become applicable again if BAAQMD receives odor complaints from five or more complainants within a 90-day period. BAAQMD staff investigate and track all odor complaints it receives and make attempts to visit the site and identify the source of the objectionable odor and assist the owner or facility in finding a way to reduce the odor.
- **Regulation 8, Rule 3, Architectural Coatings.** This rule limits the quantity of volatile organic compounds in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within BAAQMD's jurisdiction.

The Air District developed screening criteria to provide lead agencies and project applicants with a conservative indication of whether a proposed project could result in potentially significant air quality impacts. If all of the screening criteria are met by a proposed project, then the lead agency or applicant would not need to perform a detailed air quality assessment of their project's air pollutant emissions. These screening levels are generally representative of new development on greenfield sites without any form of mitigation measures taken into consideration, and the screening criteria do not account for project design features, attributes, or local development requirements that could also result in lower emissions. For projects that are mixed-use, infill, and/or proximate to transit service and local services, emissions would be less than the greenfield type project that these screening criteria are based on. If a project includes emissions from stationary source engines (e.g., back-up generators) and

industrial sources subject to Air District Rules and Regulations, the screening criteria should not be used. The project's stationary source emissions should be analyzed separately from the land use-related indirect mobile- and area-source emissions. Stationary-source emissions are not included in the screening estimates given below and, for criteria pollutants, must be added to the indirect mobile- and area-source emissions generated by the land use development and compared to the appropriate Thresholds of Significance. Greenhouse gas emissions from permitted stationary sources should not be combined with operational emissions, but compared to a separate stationary source greenhouse gas threshold.

The screening criteria developed for greenhouse gases were derived using the default emission assumptions in URBEMIS and using off-model GHG estimates for indirect emissions from electrical generation, solid waste and water conveyance. If the project has other significant sources of GHG emissions not accounted for in the methodology described above, then the screening criteria should not be used. Projects below the applicable screening criteria shown in Table 3.4-6 would not exceed the 1,100 MT of CO2e/yr GHG threshold of significance for projects other than permitted stationary sources.

If a project, including stationary sources, is located in a community with an adopted qualified GHG Reduction Strategy, the project may be considered less than significant if it is consistent with the GHG Reduction Strategy. A project must demonstrate its consistency by identifying and implementing all applicable feasible measures and policies from the GHG Reduction Strategy into the project.

Table 3.4-6: Criteria Air Pollutants and Precursors and GHG Screening Level Sizes

Land Use Type	Operational Criteria Pollutant Screening Size	Operational GHG Screening Size	Construction Criteria Pollutant Screening Size
Single-family	325 du (NO_X)	56 du	114 du (ROG)
Apartment, low-rise	451 du (ROG)	78 du	240 du (ROG)
Apartment, mid-rise	494 du (ROG)	87 du	240 du (ROG)
Apartment, high-rise	510 du (ROG)	91 du	249 du (ROG)
Condo/townhouse, general	451 du (ROG)	78 du	240 du (ROG)
Condo/townhouse, high-rise	511 du (ROG)	92 du	252 du (ROG)
Mobile home park	450 du (ROG)	82 du	114 du (ROG)
Retirement community	487 du (ROG)	94 du	114 du (ROG)
Congregate care facility	657 du (ROG)	143 du	240 du (ROG)
Day-care center	53 ksf (NO_X)	11 ksf	277 ksf (ROG)
Elementary school	271 ksf (NO_X)	44 ksf	277 ksf (ROG)
Elementary school	2,747 students (ROG)	-	3,904 students (ROG)
Junior high school	285 ksf (NO_X)	-	277 ksf (ROG)
Junior high school	2,460 students (NO_X)	46 ksf	3,261 students (ROG)
High school	311 ksf (NO_X)	49 ksf	277 ksf (ROG)
High school	2,390 students (NO_X)	-	3,012 students (ROG)
Junior college (2 years)	152 ksf (NO_X)	28 ksf	277 ksf (ROG)
Junior college (2 years)	2,865 students (ROG)	-	3,012 students (ROG)
University/college (4 years)	1,760 students (NO_X)	320 students	3,012 students (ROG)
Library	78 ksf (NO_X)	15 ksf	277 ksf (ROG)
Place of worship	439 ksf (NO_X)	61 ksf	277 ksf (ROG)
City park	2,613 acres (ROG)	600 acres	67 acres (PM_{10})
Racquet club	291 ksf (NO_X)	46 ksf	277 ksf (ROG)

Land Use Type	Operational Criteria Pollutant Screening Size	Operational GHG Screening Size	Construction Criteria Pollutant Screening Size
Racquetball/health	128 ksf (NO_X)	24 ksf	277 ksf (ROG)
Quality restaurant	47 ksf (NO_X)	9 ksf	277 ksf (ROG)
High turnover restaurant	33 ksf (NO_X)	7 ksf	277 ksf (ROG)
Fast food rest. w/ drive thru	6 ksf (NO_X)	1 ksf	277 ksf (ROG)
Fast food rest. w/o drive thru	8 ksf (NO_X)	1 ksf	277 ksf (ROG)
Hotel	489 rooms (NO_X)	83 rooms	554 rooms (ROG)
Motel	688 rooms (NO_X)	106 rooms	554 rooms (ROG)
Free-standing discount store	76 ksf (NO_X)	15 ksf	277 ksf (ROG)
Free-standing discount superstore	87 ksf (NO_X)	17 ksf	277 ksf (ROG)
Discount club	102 ksf (NO_X)	20 ksf	277 ksf (ROG)
Regional shopping center	99 ksf (NO_X)	19 ksf	277 ksf (ROG)
Electronic Superstore	95 ksf (NO_X)	18 ksf	277 ksf (ROG)
Home improvement superstore	142 ksf (NO_X)	26 ksf	277 ksf (ROG)
Strip mall	99 ksf (NO_X)	19 ksf	277 ksf (ROG)
Hardware/paint store	83 ksf (NO_X)	16 ksf	277 ksf (ROG)
Supermarket	42 ksf (NO_X)	8 ksf	277 ksf (ROG)
Convenience market (24 hour)	5 ksf (NO_X)	1 ksf	277 ksf (ROG)
Convenience market with gas pumps	4 ksf (NO_X)	1 ksf	277 ksf (ROG)
Bank (with drive-through)	17 ksf (NO_X)	3 ksf	277 ksf (ROG)
General office building	346 ksf (NO_X)	53 ksf	277 ksf (ROG)
Office park	323 ksf (NO_X)	50 ksf	277 ksf (ROG)
Government office building	61 ksf (NO_X)	12 ksf	277 ksf (ROG)
Government (civic center)	149 ksf (NO_X)	27 ksf	277 ksf (ROG)
Pharmacy/drugstore w/ drive through	49 ksf (NO_X)	10 ksf	277 ksf (ROG)
Pharmacy/drugstore w/o drive through	48 ksf (NO_X)	10 ksf	277 ksf (ROG)
Medical office building	117 ksf (NO_X)	22 ksf	277 ksf (ROG)
Hospital	226 ksf (NO_X)	39 ksf	277 ksf (ROG)
Hospital	334 beds (NO_X)	84 ksf	337 beds (ROG)
Warehouse	864 ksf (NO_X)	64 ksf	259 ksf (NO_X)
General light industry	541 ksf (NO_X)	121 ksf	259 ksf (NO_X)
General light industry	72 acres (NO_X)	-	11 acres (NO_X)
General light industry	1,249 employees (NO_X)	-	540 employees (NO_X)
General heavy industry	1899 ksf (ROG)	-	259 ksf (NO_X)
General heavy industry	281 acres (ROG)	-	11 acres (NO_X)
Industrial park	553 ksf (NO_X)	65 ksf	259 ksf (NO_X)
Industrial park	61 acres (NO_X)	-	11 acres (NO_X)
Industrial park	1,154 employees (NO_X)	-	577 employees (NO_X)
Manufacturing	992 ksf (NO_X)	89 ksf	259 ksf (NO_X)

Notes: THE SCREENING VALUES IN THIS TABLE CANNOT BE USED AS SCREENING FOR RISK AND HAZARD IMPACTS.
du = dwelling units; ksf = thousand square feet; NOX = oxides of nitrogen; ROG = reactive organic gases.
Screening levels include indirect and area source emissions. Emissions from engines (e.g., back-up generators) and industrial sources subject to air district rules and regulations embedded in the land uses are not included in the screening estimates and must be added to the above land uses.
Source: BAAQMD 2017c

Northern Sonoma County Air Pollution Control District

NSCAPCD attains and maintains air quality conditions in northern Sonoma County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of NSCAPCD includes the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. NSCAPCD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA and CCAA.

As mentioned above, NSCAPCD adopts rules and regulations. All projects are subject to NSCAPCD's rules and regulations in effect at the time of construction. Specific rules applicable to project construction and operation may include, but are not limited to, the following rules:

- **Rule 200, Permit Requirements.** This rule establishes permitting processes (i.e., Authority to Construct, Modify, Replace, Operate, or Use) to review new and modified sources of air pollution.
- **Rule 220, New Source Review Standards.** This rule would require any new or modified stationary source that generates emissions that exceed established emissions limits for each pollutant (i.e., ROG, NO_X, SO_X, PM_{10}, carbon monoxide, and lead) to comply with BACT.
- **Rule 400, General Limitations.** This rule prohibits any source from generating air contaminants or other materials that would cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; endanger the comfort, repose, health, or safety of any such persons or the public; or cause or have a natural tendency to cause injury or damage to business or property.

Yolo-Solano Air Quality Management District

YSAQMD attains and maintains air quality conditions in Yolo and Solano Counties through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of YSAQMD includes the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. YSAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA and CCAA.

As mentioned above, YSAQMD adopts rules and regulations. All projects are subject to YSAQMD's rules and regulations in effect at the time of construction. Specific rules applicable to project construction and operation may include, but are not limited to, the following rules:

- **Rule 2.11, Particulate Matter Concentration.** This rule prohibits any source that would emit dust, fumes, or total suspended PM from generated emissions that would exceed the rule's established emission concentration limit.
- **Rule 2.14, Architectural Coatings.** This rule establishes volatile organic compound content limits for all architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured within YSAQMD's jurisdiction.
- **Rule 2.40, Wood Burning Appliances.** This rule prohibits installation of open-hearth wood-burning fireplaces in any new development (residential or commercial, single or multifamily units). New developments may use only a pellet-fueled heater, an EPA Phase II certified wood-burning heater, or a gas fireplace.
- **Rule 2.37, Natural Gas–Fired Water Heaters and Small Boilers.** This rule establishes NO_X emission limits for natural gas–fired water heaters with a rated heat input capacity less than 1,000,000

British thermal units per hour manufactured, offered for sale, sold, or installed within YSAQMD's jurisdiction.

- **Rule 3.1, General Permit Requirements.** This rule establishes permitting processes (i.e., Authority to Construct and Permit to Operate) to review new and modified sources of air pollution.
- **Rule 3.4, New Source Review.** This rule would require any new or modified stationary source that generates emissions that exceed established emissions limits for each pollutant (i.e., ROG, NO_X, SO_X, PM_{10}, carbon monoxide, and lead) to comply with BACT and emissions offset requirements.
- **Rule 3.13, Toxics New Source Review.** This rule requires the installation of BACT for toxics at any constructed or reconstructed major source of TACs.

Air Quality Management Plans

Clean Air Plan (Bay Area Air Quality Management District)

The CCAA requires that all local air districts in the State endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources and provides districts with the authority to regulate indirect sources.

For State air quality planning purposes, the Bay Area is classified as a serious nonattainment area for the 1-hour ozone standard. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the Bay Area update the Clean Air Plan every 3 years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data.

The 2017 Clean Air Plan (adopted April 19, 2017) provides a regional strategy to protect public health and protect the climate. To protect public health, the plan describes how BAAQMD will continue making progress toward attaining all State and federal air quality standards and eliminating health risk disparities from exposure to air pollution among Bay Area communities. To protect the climate, the plan defines a vision for transitioning the region to a postcarbon economy needed to achieve ambitious GHG reduction targets for 2030 and 2050 and provides a regional climate protection strategy that will put the Bay Area on a pathway to achieve those GHG reduction targets.

The 2017 plan includes a wide range of control measures designed to decrease emissions of the air pollutants that are most harmful to Bay Area residents, such as PM, ozone, and TACs; reduce emissions of methane and other "super-GHGs" that are potent climate pollutants in the near term; and decrease emissions of carbon dioxide by reducing fossil fuel combustion.

Highlights of the 2017 plan include the following goals and measures:

- Limit Fossil Fuel Combustion: Develop a regionwide strategy to increase fossil fuel combustion efficiency at industrial facilities, beginning with the three largest sources of industrial emissions: oil refineries, power plants, and cement plants.
- Stop Methane Leaks: Reduce methane emissions from landfills and from oil and natural gas production, storage, and distribution.
- Reduce Exposure to Toxics: Reduce emissions of TACs by adopting more stringent limits and methods for evaluating toxic risks at existing and new facilities.
- Put a Price on Driving: Implement pricing measures to reduce travel demand.
- Advance Electric Vehicles: Accelerate the widespread adoption of electric vehicles.

- Promote Clean Fuels: Promote the use of clean fuels and low- or zero-carbon technologies in trucks and heavy-duty vehicles.
- Accelerate the Production of Low-Carbon Buildings: Expand the production of low-carbon, renewable energy by promoting on-site technologies, such as rooftop solar and ground-source heat pumps.
- Support More Energy Choices: Support community choice energy programs throughout the Bay Area.
- Make Buildings More Efficient: Promote energy efficiency in both new and existing buildings.
- Make Space and Water Heating Cleaner: Promote the switch from natural gas to electricity for space and water heating in Bay Area buildings. (BAAQMD 2020)

Northern Sonoma County Air Pollution Control District

NSCAPCD is in attainment for all criteria air pollutants. It does not currently have and is not required to have an air quality management plan.

Yolo-Solano Air Quality Management District

Criteria Air Pollutants

The CCAA requires districts to submit air quality plans for areas that do not meet State standards for ozone, carbon monoxide, SO_2, NO_2, and PM. YSAQMD has attained all standards with the exception of ozone and PM. Ozone levels in Yolo and Solano Counties are in the healthy range on most days. However, emissions created within Yolo and Solano Counties do affect neighboring communities, especially in the greater Sacramento region. For this reason, YSAQMD is included in the Sacramento federal nonattainment area by EPA. As a nonattainment area for the federal ozone standard, the Sacramento region is required to prepare various planning documents on an ongoing basis.

Specific to YSAQMD, the CCAA requirement is to produce a plan for attaining and maintaining State ambient air quality standards for ozone with subsequent updates every 3 years. YSAQMD's current Triennial Assessment and Plan update (examining the years 2015–2017) discusses the progress YSAQMD has made toward improving the air quality in its jurisdiction since its last Triennial Plan. On May 10, 2017, EPA found that the area attained the 2006 $PM_{2.5}$ standard by the attainment date of December 31, 2015 (EPA 2017b). This finding was based on complete, quality-assured, and certified $PM_{2.5}$ monitoring data for 2013–2015. The $PM_{2.5}$ Maintenance Plan and Redesignation Request will be updated and submitted in the future based on the clean data finding made by EPA (YSAMQMD 2019).

Toxic Air Contaminants

The Air Toxics "Hot Spots" Program was enacted by State law (AB 2588) in 1987. The purpose of the law is to provide the public with information about the routine emissions and potential health impacts of toxic pollutants released to the air by facilities. Certain facilities are subject to the program and are required to submit a toxic emissions inventory. With those data, YSAQMD calculates a prioritization score for each facility. Depending on the prioritization score, some facilities are required to perform a health risk assessment.

YSAQMD's Air Toxics Hot Spots Program requires certain facilities with the potential to emit certain amounts of toxic air pollutants to submit emissions inventories to YSAQMD and, in some cases, pursue risk reduction strategies. The program is intended to provide the public with information about potential health impacts from toxic air pollutants routinely emitted by facilities.

City and County General Plans

The most comprehensive land use planning for the San Francisco Bay Area region is provided by city and county general plans, which local governments are required by State law (California Government Code Section 65300 et seq.) to prepare as a guide for future development. The general plan contains goals and policies concerning topics that are mandated by State law or that the jurisdiction has chosen to include. Required topics are land use, circulation, housing, conservation, open space, noise, and safety. Other topics that local governments frequently choose to address include public facilities, parks and recreation, community design, natural resources, healthy communities, energy and sustainability, air quality, and growth management. Except for the San Joaquin Valley area, air quality is an optional general plan topic. Jurisdictions may choose to consider air quality as a stand-alone topic, as part of another mandatory or optional element, or not at all. Local planning policies related to air quality often address exposure to air pollutants, public health, density, compact development, alternative transportation modes, energy conservation, cleaner-fuel vehicles, emissions reduction, and public education, among other topics.

3.4.3 Impact Analysis

SIGNIFICANCE CRITERIA

Significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the Plan Bay Area 2040 EIR (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- conflict with or obstruct implementation of the applicable air quality plan (Criterion AQ-1);
- result in a net increase in construction-related emissions (Criterion AQ-2);
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (Criterion AQ-3);
- expose sensitive receptors to substantial pollutant concentrations (Criterion AQ-4); or
- result in other emissions (such as those leading to odors) adversely affecting a substantial number of people (Criterion AQ-5).

Note that the Northern Sonoma County Air Pollution Control District and YSAQMD do not currently have officially recommended significance thresholds for regional plans. BAAQMD's updated CEQA Guidelines (updated May 2017) are intended to help lead agencies navigate through the CEQA process. The Guidelines for implementation of the Thresholds are for information purposes only to assist local agencies. Recommendations in the Guidelines are advisory and should be followed by local governments at their own discretion. These Guidelines may inform environmental review for development projects in the Bay Area, but do not commit local governments or the Air District to any specific course of regulatory action. The Guidelines offer step-by-step procedures for a thorough environmental impact analysis of adverse air emissions due to land development in the Bay Area.

If a project meets the screening criteria and is consistent with the methodology used to develop the screening criteria, its air quality impacts may be considered less than significant. Otherwise, lead agencies should evaluate potential air quality impacts of projects (and plans), as explained in Chapters 4–9 of the Guidelines. These chapters describe how to analyze air quality impacts from criteria air pollutants, GHGs, local community risk and hazards, and odors associated with construction activity and operations of a project or plan. If after proper analysis, the project or plan's air quality impacts are

found to be below the significance thresholds, then the air quality impacts may be considered less than significant. If not, the lead agency should implement appropriate mitigation measures to reduce associated air quality impacts. Lead agencies are responsible for evaluating and implementing all feasible mitigation measures in their CEQA document.

METHOD OF ANALYSIS

This program-level EIR evaluates potential impacts on air quality based on the location of the proposed Plan's footprint associated with the forecasted development pattern (i.e., the land use growth footprint), sea level rise adaptation infrastructure (i.e., sea level rise adaptation footprint), and transportation projects (i.e., transportation system footprint). The baseline for this analysis reflects existing conditions when the EIR NOP was released in September 2020. However, impacts relying on analysis from Travel Model 1.5 (e.g., VMT), reflect a baseline year of 2015 because it is the most recent year for which comprehensive land use, demographic, transit ridership and traffic volumes are available for the Bay Area region. Existing concentrations in the year 2015 were used as a baseline because of the potential for new land uses under the proposed Plan to be constructed at any point between the Plan's adoption and 2050.

This evaluation of air quality impacts assumes that construction and development under the proposed Plan would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist, it is reasonable to assume that they would be implemented, thereby reducing impacts.

Construction-Related Emissions

Construction emissions can vary depending on the level of activity, the specific operations taking place, the equipment being operated, local soil conditions, weather conditions, and other factors. A qualitative analysis of potential local and regional air quality impacts from construction activity associated with proposed Plan investments was conducted. At the program level of analysis, it is not possible to quantify the amount of emissions expected from construction of the transportation projects or land use development that would be consistent with the proposed Plan. However, the overall impact on local and regional air quality from construction emissions associated with any one project or all projects combined would be primarily dependent on the quantity, age, and fuel type of the construction equipment and the duration of their operation at the construction site or in the region. Also, individual land use and transportation projects associated with implementation of the proposed Plan, depending on their size, may exceed the thresholds for short-term construction criteria air pollutant emissions, especially if best management practices (BMPs) are not implemented.

Operational Emissions

This analysis addresses the effect of land use growth and transportation projects under the proposed Plan on air quality. Under the proposed Plan, MTC forecasts that Transit Priority Areas (TPAs) would absorb a majority of the approximately 1.4 million new households and 1.4 million new jobs expected in the Plan area by 2050. Much of the housing growth and job growth is expected to occur around the Plan area's transit network (e.g., BART, Caltrain) in Santa Clara, San Francisco, Alameda, and San Mateo Counties. With more limited transit access, the North Bay counties of Marin, Napa, Sonoma, and Solano are expected to take on a much smaller share of regional growth.

The changes in land use travel activity under 2015 and 2050 conditions projected under the proposed Plan are summarized in **Table 3.4-7**, below.

Table 3.4-7: Bay Area Travel Activity Data

	2015 Baseline	2050 Proposed Plan	Change (2015 to 2050)	
			Numerical	Percent
Total Population	7,581,000	10,368,000	+2,786,000	+42%
Employed Residents	2,841,000	4,027,000	+1,186,000	+37%
Vehicles in Use	4,617,000	5,295,000	+679,000	+15%
Engine Starts	23,164,000	27,066,000	+3,902,000	+17%
Daily VMT	155,006,000	181,917,000	+26,911,000	+17%

Notes: Whole numbers have been rounded (between 11 and 999 to the nearest 10, above 1,000,000 to the nearest 1,000). Number of vehicles in use, engine starts, and Daily VMT forecasts do not account for expected reductions from the implementation of Strategy EN09 due to modeling limitations.
Source: Data compiled by MTC and ABAG in 2021

Area-Source Emissions

Area-source emissions were calculated using region-specific inputs derived from MTC's regional land use forecasting model, UrbanSim 2.0, and default model assumptions in the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 (CAPCOA 2017). The proposed Plan includes two environmental strategies that, when implemented, would result in lower emissions. Strategy EN02, "Provide Means-Based Financial Support to Retrofit Existing Residential Buildings," would result in building ordinances and building retrofits to meet higher energy standards, among other things. Similarly, Strategy EN03, "Fund Energy Upgrades to Enable Carbon Neutrality in All Existing Commercial and Public Buildings," would support the electrification and resilient power system upgrades leading to lower building emissions. The emissions reductions of these two strategies were not quantified for the impact discussions below because of modeling limitations.

Area-source emissions consist of ROG, NO_X, PM_{10}, and $PM_{2.5}$ generated by a variety of sources, including natural gas combustion for space and water heating; consumer products, such as cleaning solutions and hair products; and landscaping equipment. With respect to wood-burning activities, as of November 2016, BAAQMD prohibits any wood-burning devices, such as wood-burning fireplaces or stoves, from being installed in new construction under BAAQMD Regulation 6, Rule 3, Section 6-3-306. Thus, it was assumed that any new construction would not operate wood-burning stoves and any new fireplaces would combust natural gas instead of wood.

The percent of new residential units that have fireplaces was based on default CalEEMod assumptions for single and multi-family units for each county. Natural gas emissions from fireplaces are included in the analysis of area-source emissions. Other emissions sources were also calculated using default assumptions within CalEEMod, including natural gas for heating and cooking; consumer products used in nonindustrial applications that emit ROGs during their product use, such as cleaning supplies, kitchen aerosols, cosmetics, toiletries; landscaping equipment; and the application of architectural coating as a part of ongoing maintenance of buildings. Emissions from roadway maintenance, such as re-striping and resealing, were not included as they would only occur intermittently every 10 to 15 years. For this analysis, the changes in land uses between existing conditions (2015, the latest year for which a full dataset is available) and Plan buildout in 2050 were modeled to estimate area-source emissions. This analysis modeled the energy intensity rates (e.g., therms per 1,000 square feet of interior space) for new land uses built between 2015 and 2050 and were assumed to meet 2019 Title 24 of the California Code of Regulations, known as the California Building Standards Code or Title 24. Title 24 contains energy efficiency standards applicable to all residential and non-residential buildings throughout California. With CalEEMod, building electricity and natural gas use is divided into two categories: (1) end uses subject to Title 24 standards and (2) end uses not subject to Title 24 standards.

For electricity, Title 24 uses include the major building envelope systems covered by Part 6 (California Energy Code) of Title 24 such as space heating, space cooling, water heating, and ventilation. Non-Title 24 uses include all other end uses, such as appliances, electronics, and other miscellaneous plug-in uses.

For natural gas, uses are likewise categorized as Title 24 or Non-Title 24, with Title 24 uses including building heating and hot water end uses. Non-Title 24 natural gas uses include cooking and appliances (including pool/spa heaters). In addition, there is increasingly interest in banning the use of natural gas in new construction. in California since Berkeley passed the first prohibition in 2019. This is true in the Bay Area, where the cities San Francisco, Oakland, and San Jose have proposed to reduce natural gas use by passing electric-only building mandates. Therefore, the analyses conducted here are conservative because they do not account for that reduction in natural gas use.

Motor Vehicle Emissions

Motor vehicle, or mobile source, emissions were calculated using MTC's travel demand forecasting model, Travel Model 1.5, and mobile source emission factors developed by CARB. Travel Model 1.5 produces forecasts of travel behavior and vehicle activity for the proposed Plan's base year, 2015, and 2050. Travel Model 1.5 has been extensively reviewed by federal and State agencies and refined in connection with the application to air quality analyses of various kinds. Key model outputs for use in air quality analyses include total daily vehicle trips, vehicle miles traveled (VMT), and distribution of VMT by speed. This information was then used to determine total emissions from transportation activity in the Bay Area using motor vehicle emission factors from CARB's Emission Factor (EMFAC) model.

Vehicle activity projections are correlated to changes in demographic, housing, and socioeconomic factors. For calculations relying on outputs from Travel Model 1.5 and population totals (i.e., per capita VMT or per capita energy use), model-simulated population levels were used to ensure consistency. Simulated population may be slightly different than overall population forecasts for the proposed Plan and alternatives due to slight variability in modeling tools (please refer to Chapter 1 for an explanation of the different modeling tools). As shown in **Table 3.4-5**, between 2015 and 2050, the Bay Area is projected to add about 2.8 million people (a 42-percent increase) and 1.2 million employed residents (a 37-percent increase). Based on expected future growth, the total daily VMT in the region would increase by 17 percent, meaning VMT is projected to grow at a rate less than half that of population and job growth in the region. The results presented in **Table 3.4-5** do not account for implementation of Strategy EN09, "Expand Transportation Demand Management Initiatives," due to limitations that do not allow for the distribution of the VMT reductions by speed and county, key model outputs for emissions analyses. As such, the mobile source emissions in the following analyses are overstated.

CARB's EMFAC2021 emissions inventory model was used to calculate emissions for motor vehicles operating in the Bay Area for this Draft EIR analysis. CARB released EMFAC2021 (v1.0.0) in January 2021 and subsequently released version v1.0.1 on April 30, 2021 replacing version v1.0.0. EMFAC2021 includes the latest data on California's car and truck population, activity, and emission testing. New forecasting frameworks have been incorporated into EMFAC2021 to project zero-emission vehicle (ZEV) population, and to estimate heavy-duty vehicle miles traveled. New model features are added to reflect the more fuel and technologies, including modules to show emissions from Plug-in Hybrid Electric Vehicles and natural gas trucks, as well as energy consumption from ZEVs. Heavy-duty truck categories have been expanded to show more vocational types. EMFAC2021 also incorporates the most recently adopted on-road mobile source regulations and reflects CARB's latest understanding of statewide and regional vehicle activities, emissions, and recently adopted regulations such as the Advanced Clean Trucks (ACT) Regulation and Heavy Duty Omnibus Regulation. While EMFAC2021 is the latest emission inventory model that CARB uses to assess emissions from on-road motor vehicles in California and to support CARB's planning and policy development, EPA approval has yet to occur.

EMFAC2021 also includes updated carbon dioxide emission rates for 2016 through 2020 model year light-duty vehicles. The updates use the latest national fuel efficiency data from www.fueleconomy.gov, the official U.S. government source for fuel efficiency information. Further, unlike 2-cycle fuel economies used in EMFAC2017, EMFAC2021 benefits from the more realistic 5-cycle fuel economies. Additionally, CARB staff implemented the Final Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule phase-in schedule on GHG emissions in EMFAC2021. The final SAFE rule applies to passenger cars and light-duty trucks in California. While the previously established federal GHG emission standards and related "augural" fuel economy standards for model years 2021-2025 would have achieved yearly improvements through model year2025, the SAFE rule results in far less stringent standards and consequently higher carbon dioxide emissions.

EMFAC2021 generates emission factors for all types of on-road vehicles in different seasons and driving conditions. CARB developed these factors based on thousands of emissions tests on both new and used vehicles recruited randomly from the California fleet. In the EMFAC2021 model, the emission rates were combined with vehicle activity data provided by regional transportation agencies (such as MTC) to calculate the regional emissions inventories.

Emission estimates for ROG, NOX, CO, and PM (associated with engine exhaust and tire wear) are direct outputs from EMFAC2021. To obtain estimates of the amount of PM generated by autos from roads (called "entrained dust"), regional VMT was multiplied by the following (annual) factors: (1) 0.134 grams per mile entrained dust for PM_{10} and (2) 0.020 grams per mile entrained dust for $PM_{2.5}$ (CARB 2021).

Toxic Air Contaminants

TACs were evaluated on both a regional and local level. The regional analysis studies the impacts of the cumulative TAC emissions in the entire Plan area; the local analysis studies the impacts of TAC emissions on corridors within TPAs and disproportionally impacted communities to provide a better understanding of localized health impacts. The methodologies for regional and localized TACs analyses are described separately below along with a description of the specific methods used for each emissions source.

Regional TAC Levels

To calculate TACs from all on-road motor vehicles, MTC uses the CT-EMFAC2017 model which forecasts on-road vehicle emissions for criteria pollutants, TACs, GHG emissions, and fuel consumption. CT-EMFAC2017 is the most up to date on-road motor vehicle emission factor model for TACs available for use in California. In addition, the underlying data for the CT-EMFAC2017 model is based on the CARB's EMFAC2017 on-road emissions model and CARB-supplied/EPA-supplied TAC speciation factors.

Local TAC Concentrations and Associated Levels of Health Risk Exposure

The purpose of the local pollutant impact analysis is to assess potential localized health impacts to sensitive receptors within TPAs based on the transportation projects and the forecasted land use changes in the proposed Plan. BAAQMD's 2017 CEQA Air Quality Guidelines define sensitive receptors as, "facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals and residential areas." SB 375 and the proposed Plan promotes residential and commercial/retail development along existing transit corridors (i.e., TPAs) to reduce vehicle trips, vehicle miles traveled, and mobile source air pollution. While this strategy is beneficial to air quality in general by reducing the mass of air pollution emitted regionally, sensitive receptors located in close proximity to sources of TACs and $PM_{2.5}$ can be exposed to serious adverse health effects. Urbanized areas typically contain a wide range of TAC and $PM_{2.5}$ sources that can create localized health risks to residents and other sensitive receptors from prolonged exposure to elevated concentrations. Such sources include stationary and area sources (e.g., gas stations, manufacturing facilities) and mobile sources (e.g., cars, trucks, trains).

This program-level EIR evaluates potential impacts on air quality based on the location of the proposed Plan's footprint associated with the forecasted development pattern (i.e., the land use growth footprint) relative to the known distribution of sensitive receptors in the Bay Area.

Quantitative results are presented for the region (i.e., the entire footprint, often summarized by county) and for the portions of the land use growth footprint specifically within TPAs. TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county.

For this impact assessment, a geographic information system (GIS) was used to digitally overlay the proposed Plan's land use growth footprint associated with forecasted land use development onto the location of communities and places throughout the region which BAAQMD estimated to have elevated levels of fine particulates and/or TACs.

The land use growth footprint is derived from the UrbanSim 2.0 land use model and represents the development or redevelopment of parcels of land simulated to accommodate the region's forecasted growth of households and jobs from 2015 through 2050 through new building(s). Precise building site(s) on the parcels are not known, therefore the land use growth footprint incorporates the entire parcel. Because of this assumption, the area of potential effects tends to be overstated when considering the land use growth footprint.

Analysis of TAC and $PM_{2.5}$ in Disproportionally Impacted Communities

Some locations in the Plan area are exposed to higher concentrations of TACs and $PM_{2.5}$ than other areas. Areas of higher exposure tend to be located along major transportation and goods movement corridors and areas with lower household incomes. Communities in these areas are, therefore, more vulnerable to the harmful effects of air pollution. As a result, these areas experience higher rates of adverse health outcomes. The effects of the proposed transportation projects and projected land use growth are evaluated to determine whether communities that are already disproportionally impacted would be exposed to an increase or decrease in TAC and $PM_{2.5}$ emissions.

CARE Communities

BAAQMD's CARE Communities are defined as areas that (1) are close to or within areas of high cancer risk levels from TAC emissions, (2) are exposed to elevated $PM_{2.5}$ concentrations, and (3) experience increased mortality and illnesses from $PM_{2.5}$ and ozone levels above background levels. This Draft EIR identifies potential impacts in CARE Communities because these areas have been identified as those with the highest existing concentrations of TACs and $PM_{2.5}$ and are currently disproportionately impacted in comparison to other communities in the Plan area. MTC's evaluation of the proposed Plan's transportation investments and strategies on Equity Priority Communities is addressed in the Equity Analysis Report found at planbayarea.org/reports, prepared as a supplemental report to the proposed Plan.

In addition, BAAQMD developed the *Planning Healthy Places* process to conduct local modeling of potential impact areas of air pollution in finer spatial detail (with grid sizes down to 20 meters by 20 meters), as opposed to the region-level assessment. Modeling work presented in *Planning Healthy Places* identified areas in close proximity to roadways with high traffic volume and major pollutant sources, such as refineries. For these identified areas, BAAQMD recommends either further study or a list of BMPs depending on the level of exposure and type of emission source (BAAQMD 2016).

Motor Vehicle Emissions

Travel activity data for the roadway network were derived from MTC's travel demand forecasting model, Travel Model 1.5. The model forecasts VMT, along with daily vehicle trips and distribution of VMT by speed. This data is then imported into EMFAC2021 to obtain emissions data.

In its analysis, MTC modeled regional impacts from VMT on all links in the network and used a separate methodology to assess impacts to CARE Community. This approach is consistent with the PBA 2040 EIR and the approach that was developed by MTC's Equity Analysis workgroup. MTC used a GIS to digitally overlay the CARE communities onto Travel Model 1.5's roadway links to identify the roadway links that run through CARE communities and non-CARE communities that meet these criteria. TAC and $PM_{2.5}$ emissions were then estimated for CARE community and non-CARE community roadway links in each county. For example, the emission estimates for CARE communities in Contra Costa County reflect vehicle activity on the roadway links in the Concord and Richmond/San Pablo CARE communities.

TAC Emission Sources

The following describes the types of TAC emission source impacts analyzed in this EIR.

High Traffic Roadways

This source includes all roadways that carry more than 30,000 vehicles per day and pass through a TPA. Cancer risk levels and $PM_{2.5}$ concentrations were modeled using travel activity data (from MTC's travel demand forecasting model, Travel Model 1.5) along each roadway link and area-specific meteorological data.

Railroads

Railroad sources include all passenger and freight rail lines and wait times at rail stations in TPAs. BAAQMD modeled emissions using activity data for Amtrak, Caltrain, SMART rail, eBART, and ACE passenger lines. Fuel-based emissions along freight lines were provided by Union Pacific and BNSF rail lines.

Ferry Terminals

Buffer distances for ferry terminals were developed by extrapolating modeling results from excursions vessels departing San Francisco.

Large and/or Complex Sources

Large and complex sources—for example, oil refineries or seaports—can emit relatively high levels of TACs and fine PM. There are typically numerous emission sources within each of these facilities, making it difficult to characterize the specific local variations of concentrations of TACS and fine PM within the surrounding community (BAAQMD 2016).

Stationary Sources

Stationary sources include sources permitted by BAAQMD, such as refineries, gas stations, back-up generators, and auto body shops. Screening analyses for cancer risk and $PM_{2.5}$ exposures from stationary sources were conducted in accordance with the BAAQMD CEQA Guidelines (BAAQMD 2016).

IMPACTS AND MITIGATION MEASURES

Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan (LTS)

The nine-county MTC region encompasses three air basins: the San Francisco Bay Area Air Basin in its entirety, portions of the North Coast Air Basin, and portions of the Sacramento Valley Air Basin. Northern Sonoma County is located within the North Coast Air Basin, and eastern Solano County is located within the Sacramento Valley Air Basin. BAAQMD governs the San Francisco Bay Area Air Basin.

BAAQMD's 2017 Clean Air Plan, Spare the Air Cool the Climate (2017 Plan), is a multi-pollutant plan focused on two closely related goals: 1) protecting public health and 2) protecting the climate. The 2017 Plan's goals related to climate are discussed in Section 3.6, "Climate Change, Greenhouse Gases, and Energy." With respect to public health and air quality impacts, the 2017 Plan updates the previous Bay Area ozone plan, the 2010 Clean Air Plan, pursuant to air quality planning requirements defined in the California Health and Safety Code. To fulfill State ozone planning requirements, the control strategy includes all feasible measures to reduce emissions of ozone precursors—ROG and NO_X—and reduce transport of ozone and its precursors to neighboring air basins. In addition, the Plan builds upon and enhances the Air District's efforts to reduce emissions of $PM_{2.5}$ and TACs.

The control strategy, which serves as the backbone of the 2017 Plan, builds upon existing regional, State, and national programs that have successfully reduced air pollution and improved public health over the past several decades. The control strategy includes an integrated set of control measures designed to:

- reduce ozone precursors, in order to fulfill California Health and Safety Code ozone planning requirements;
- protect public health by reducing emissions of ozone precursors, PM TACs; and
- serve as a regional climate protection strategy by reducing GHG emissions across the full range of economic sectors.

The 2017 Plan's comprehensive control strategy includes 85 control measures with some measures focusing on reducing a single type of air pollutant. Many of the measures, however, reduce multiple pollutants and serve both to protect public health and to protect the climate. The control strategies in the 2017 Plan recognize the need to reduce motor vehicle travel and emissions by integrating transportation, land use, and air quality planning. Cleaner fuels and improved emission controls have substantially reduced emissions from mobile sources in recent decades. However, growth in motor vehicle use (as measured in VMT on both a per-capita and an absolute basis) has offset some of the benefit of the improved emission controls. This increase in VMT has been caused or facilitated, in part, by dispersed development patterns that result in increased dependency on motor vehicles and by population and job growth. The 2017 Plan encourages future population and job growth in areas that are well served by transit and where mixed-use communities provide jobs, housing, and retail in close proximity.

Key themes embedded in the 2017 Plan include:

- the need to reduce motor vehicle emissions by driving cleaner, driving smarter, and driving less;
- reducing per-capita VMT and promoting policies that enable families to reduce their motor vehicle ownership;
- designing communities where people can walk, bike, or use transit on a convenient basis; and
- ensuring that focused growth in priority areas is planned and designed to protect people from both existing sources and new sources of emissions.

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Operation

The proposed Plan's core "focused growth" strategy discussed in Chapter 2, "Project Description," aligns with the four key themes embedded in the 2017 Plan, identified above. This core strategy of the proposed Plan is intended to "focus growth" into existing communities along the existing

transportation network to achieve key regional economic, environmental and equity goals by building upon existing community characteristics, leveraging existing infrastructure, while reducing effects on areas with less low-density development.

In addition, many of the proposed Plan's 35 integrated housing, economic, transportation, and environmental strategies align and would help implement many of the 85 control measures in the 2017 Plan control strategy. Applicable land use control measures of the 2017 Plan are listed below:

- EN2: Decrease Energy Use: This measure focuses on decreasing energy use in the Bay Area by (1) increasing consumer awareness about energy efficiency through education and outreach and (2) tracking electricity use.
- BL1: Green Buildings: This control measure would increase energy efficiency and the use of on-site renewable energy—as well as decarbonize existing end uses—for all types of existing and future buildings. The measure includes policy assistance, incentives, diffusion of public information, and targeted engagement and facilitation of partnerships in order to increase energy efficiency and on-site renewable energy in the buildings sector.
- BL2: Decarbonize Buildings: This control measure would reduce GHG emissions, criteria pollutants, and TACs by limiting the installation of space- and water-heating systems and appliances powered by fossil fuels. This measure will be implemented by developing model policies for local governments that support low- and zero-carbon technologies, as well as potentially developing a rule limiting the sale of natural gas furnaces and water heaters.
- BL4: Urban Heat Island Mitigation: This control measure in intended to reduce the "urban heat island" phenomenon by increasing the application of "cool roofing" and "cool paving" technologies, as well as increasing the prevalence of urban forests and vegetation, through voluntary approaches and educational outreach.

Applicable transportation control measures of the 2017 Plan are listed below:

- TR1: Clean Air Teleworking: The primary objective of the Clean Air Teleworking measure is to increase the number of employees who telework in the Bay Area, especially on Spare the Air days, by providing outreach and assistance to employees and employers.
- TR2: Trip Reduction Programs: The Trip Reduction Programs measure includes a mandatory and voluntary trip reduction program. The regional Commuter Benefits Program, resulting from SB 1339, and similar local programs in jurisdictions with ordinances that require employers to offer pretax transit benefits to their employees are mandatory programs. Voluntary programs include outreach to employers to encourage them to implement strategies that encourage their employees to use alternatives to driving alone.
- TR3: Local and Regional Bus Service: The Local and Regional Bus Service improvements control measure will improve existing transit service on the region's core transit systems and include new bus rapid transit lines in San Francisco, Oakland, and Santa Clara County.
- TR4: Local and Regional Rail Service Improvements: This measure will improve rail service by sustaining and expanding existing services and by providing funds to maintain rail cars, stations, and other rail capital assets. Specific projects for implementation include BART extensions, Caltrain electrification, Transbay Transit Center building and rail foundation, Capital Corridor intercity rail service, and Sonoma Marin Area Rail Transit (SMART) District commuter rail project.

- TR5: Transit Efficiency and Use: This measure will improve transit efficiency and make transit more convenient for riders through continued operation of 511 Transit, full implementation of Clipper® fare payment system, and the Transit Hub Signage Program.

- TR6: Freeway and Arterial Operations: This measure improves the performance and efficiency of freeway and arterial systems through operational improvements, such as implementing the Freeway Performance Initiative, the Bay Area Freeway Service Patrol, and the Arterial Management Program.

- TR7: Safe Routes to Schools and Transit: This measure will facilitate safe routes to schools and transit by providing funds and working with transportation agencies, local governments, schools, and communities to implement safe access for pedestrians and cyclists. Likely projects will include implementation of youth outreach and educational programs to encourage walking and cycling, the construction of bicycle facilities, and improvements to pedestrian facilities.

- TR8: Ridesharing and Last-Mile Connections: The Ridesharing and Last-Mile Connections measure will promote ridesharing services and incentives through the implementation of the 511 Regional Rideshare Program, as well as local rideshare programs implemented by congestion management agencies. These activities will include marketing rideshare services, operating a rideshare information call center and website, and providing vanpool support services. In addition, this measure includes provisions for encouraging car sharing programs.

- TR9: Bicycle and Pedestrian Access and Facilities: The bicycle component of this measure will expand bicycle facilities serving employment sites, educational and cultural facilities, residential areas, shopping districts, and other activity centers. Typical improvements include bike lanes, routes, paths, and bicycle parking facilities. The bicycle component also includes a bike-share pilot project that was developed to assess the feasibility of bicycle sharing as a first- and last-mile transit option.

- TR10: Land Use Strategies: Local land use decisions can directly and indirectly affect air quality and GHG emissions, as well as people's exposure to TACs. This measure supports land use patterns that reduce VMT and associated emissions and exposure to TACs, especially within infill locations and affected communities.

- TR11: Value Pricing Strategies: This measure will pursue implementation of value pricing strategies, such as tolling on transbay bridges and cordon pricing on roads, as well as auto pricing options, such as a VMT fee and pay at-the-pump auto insurance.

- TR13: Parking Policies: Parking policies and practices have a profound impact on vehicle travel and mode choice, as well as land use patterns and the quality of the built environment. Parking policies are also an important tool in implementing focused growth strategies. This control measure outlines how MTC and the Air District, in cooperation with regional agency partners, will (1) take actions at the regional level to implement parking policies that will benefit air quality, and (2) encourage and support local agency parking policies to reduce motor vehicle travel and promote focused growth.

- TR14: Cars & Light Trucks: This control measures summarizes actions by the Air District, MTC, local businesses, city and county governments, and State and federal agencies to expand the use of zero-emission vehicles and plug-in electric vehicles (PEV), comprising both battery electric and plug-in hybrid passenger vehicles and light-duty trucks, within the Bay Area.

- TR15: Public Outreach: The Public Outreach control measure includes activities to encourage Bay Area residents to make choices that benefit air quality. This measure includes various public outreach campaigns to educate the public about the health effects of air pollution and the air

quality benefits of reducing motor-vehicle trips and choosing transportation modes that reduce motor vehicle emissions. The measure includes outreach and education regarding electric vehicles, smart driving, carpooling, vanpooling, use of public transit, biking, walking, and telecommuting.

- TR16: Indirect Source Review: An indirect source review rule would reduce construction and operating emissions associated with new or modified land uses in the Bay Area. The Indirect Source Review measure is intended to address potential increases in air pollutant emissions related to economic and population growth in the region. Indirect sources are development projects that generate or attract motor vehicle trips and thus "indirectly" cause air pollution from vehicles and area sources. Area source emissions include fireplaces, home heating furnaces, hot water heaters, and landscape maintenance equipment.

- TR18: Goods Movement: The measure includes regional programs to reduce emissions associated with goods movement including funding for goods movement–related infrastructure, planning work to update the Regional Goods Movement Plan, and participation in the regional Goods Movement Collaborative. Goods movement is a critical component of the Bay Area's economic and transportation system, and a significant source of air pollutant emissions. Exposure to diesel PM from goods movement disproportionately affects the health of residents near ports, railyards, distribution centers, and roads with high truck volumes. Investing in the Bay Area's trade corridors will address existing air quality and public health issues, as well as help the region to prepare for continued growth in this economic sector.

Table 3.4-8 below cross references the proposed Plan's housing, economic, and environmental strategies to relevant control measures in the 2017 Plan.

Table 3.4-8: Proposed Plan Land Use Strategies and 2017 Plan Control Measures

Proposed Plan Strategy	Relevant Control Measures in 2017 Clean Air Plan
Strategy H3: **Allow a Greater Mix of Housing Densities and Types in Growth Geographies** | Allow a variety of housing types at a range of densities to be built in PDAs, select TRAs, and select HRAs.	TR10
Strategy H4: **Build Adequate Affordable Housing to Ensure Homes for All** | Construct enough deed-restricted affordable homes necessary to fill the existing gap in housing for the unhoused community and to meet the needs of low-income households.	BL1, BL2, BL4, TR10, EN2
Strategy H5: **Transform Aging Malls and Office Parks into Neighborhoods** | Permit and promote the reuse of shopping malls and office parks with limited commercial viability as neighborhoods with housing at all income levels.	BL1, BL2, BL4, TR10, EN2
Strategy H6: **Provide Targeted Mortgage, Rental and Small Business Assistance to Communities of Concern** | Provide assistance to low-income communities and communities of color to address the legacy of exclusion and predatory lending, while helping to grow locally owned businesses.	BL1, BL2, BL4, TR10, EN2
Strategy H8: **Accelerate Reuse of Public and Community-Owned Land for Mixed-Income Housing and Essential Services** | Help public agencies, community land trusts and other non-profit landowners to accelerate development of mixed-income affordable housing.	BL1, BL2, BL4, TR10, EN2
Strategy EC3: **Invest in High-Speed Internet in Underserved Low-Income Communities** | Provide direct subsidies and construct public infrastructure to ensure all communities have affordable access to high-speed internet.	TR1
Strategy EC4: **Allow Greater Commercial Densities in Growth Geographies** | Allow greater densities for new commercial development in select PDAs and select TRAs to encourage more jobs to locate near public transit.	TR10
Strategy EC5: **Provide Incentives to Employers to Shift Jobs to Housing-Rich Areas Well Served by Transit** | Provide subsidies to encourage employers to relocate offices to housing-rich areas near regional rail stations.	TR5, TR10
Strategy EC6: **Retain and Invest in Key Industrial Lands** | Implement local land use policies to protect key industrial lands identified as PPAs, while funding key infrastructure improvements in these areas.	TR10

Proposed Plan Strategy	Relevant Control Measures in 2017 Clean Air Plan
Strategy EN2: **Provide Means-Based Financial Support to Retrofit Existing Residential Buildings** | Adopt building ordinances and incentivize retrofits to existing buildings to meet higher seismic, wildfire, water, and energy standards, providing means-based subsidies to offset associated costs.	BL1, BL2, EN2
Strategy EN3: **Fund Energy Upgrades to Enable Carbon-Neutrality in All Existing Commercial and Public Buildings** | Support electrification and resilient power system upgrades in all public and commercial buildings.	BL1, BL2, EN2
Strategy EN4: **Maintain Urban Growth Boundaries** | Using urban growth boundaries and other existing environmental protections, confine new development within areas of existing development or areas otherwise suitable for growth, as established by local jurisdictions.	TR10
Strategy EN5: **Protect and Manage High-Value Conservation Lands** | Provide strategic matching funds to help conserve and maintain high-priority natural and agricultural lands, including but not limited to PCAs and wildland-urban interface lands.	TR10
Strategy EN6: **Modernize and Expand Parks, Trails and Recreation Facilities** | Invest in quality parks, trails and open spaces that provide inclusive recreation opportunities for people from all backgrounds, abilities, and ages to enjoy.	TR10
Strategy EN7: **Expand Commute Trip Reduction Programs at Major Employers** | Set a sustainable commute target for major employers as part of an expanded Bay Area Commuter Benefits Program, with employers responsible for funding incentives and disincentives to shift auto commuters to any combination of telecommuting, transit, walking, and/or bicycling.	TR1, TR2, TR8, TR9, TR15
Strategy EN8: **Expand Clean Vehicle Initiatives** | Expand investments in clean vehicles, including more fuel-efficient vehicles and electric vehicle subsidies and chargers.	TR14
Strategy EN9: **Expand Transportation Demand Management Initiatives** | Expand investments in programs like vanpools, bikeshare, carshare and parking fees to discourage solo driving.	TR2, TR8, TR11, TR13, TR14

Source: Data compiled by MTC and ABAG in 2021 in consultation with BAAQMD

The proposed Plan supports the 2017 Plan in a variety of areas by providing a long-term transportation funding strategy, allocating housing construction funds, and defining a strategy to meet the GHG reduction goals for cars and light trucks established by CARB pursuant to SB 375 (discussed above). The proposed Plan pursues the region's goals through a strategy to direct the region's future housing needs to Priority Development Areas (PDAs), while protecting open space, scenic areas, and agricultural lands that face near-term development pressure through Priority Conservation Areas (PCAs). In addition to reducing development pressure on the region's open space, this "focused growth" approach would place development near existing transit facilities and encourage more balanced jobs and housing ratios to reduce commute distances. In addition to changes in land use and transportation investments, the proposed Plan includes a number of complementary policies and programs designed to provide additional reductions in vehicle travel and GHG emissions from on-road vehicles.

Consistent with the 2017 Plan, a primary objective of the proposed Plan is to reduce mobile-source GHG emissions through reductions in per-capita VMT. Reducing VMT would lead to direct reduction in transportation related air quality pollutants emitted by motor vehicles. Additionally, reducing GHG emissions may further improve local air quality. Atmospheric warming associated with GHG emissions and climate change have the potential to increase ground-level ozone in many regions, which may present challenges for compliance with the ozone standards in the future. The impact of GHG emissions and climate change on other air pollutants, such as PM, is less certain, but research is underway to address these uncertainties.

The policies and the capital investments defined by transportation strategies in the proposed Plan are consistent with the relevant control measures in the 2017 Plan. **Table 3.4-9**, like **Table 3.4-8**, above, cross references the proposed Plan's transportation and environmental strategies that align and would

help implement control measures in the 2017 Plan. See also Impact TRA-2 in Section 3.15, "Transportation," for a discussion of the proposed Plan strategies. As noted under TRA-2, the combination of proposed Plan transportation and environmental strategies, plus the housing and economy strategies in the proposed Plan, would shift trips throughout the Bay Area away from driving and towards transit, walk, and bike modes. The proposed Plan would support implementation of the 2017 Plan. Therefore, the proposed Plan would not conflict with nor obstruct implementation of the primary goals, applicable control measures, or implementation of any control measures of BAAQMD's 2017 Clean Air Plan, and this impact would be less than significant (LTS).

Table 3.4-9: Proposed Plan Transportation Strategies and 2017 Plan Control Measures

Proposed Plan Strategy	Relevant Control Measures in 2017 Clean Air Plan
Strategy T2: **Support Community-Led Transportation Enhancements in Communities of Concern** | Provide direct funding to historically marginalized communities to fund locally identified transportation needs.	TR3, TR4, TR5, TR7, TR8, TR9, TR14, TR15
Strategy T3: **Enable a Seamless Mobility Experience** | Eliminate barriers to multi-operator transit trips by streamlining fare payment and trip planning, while requiring schedule coordination at timed transfer hubs.	TR5, TR8, TR9
Strategy T4: **Reform Regional Transit Fare Policy** | Streamline fare payment and replace existing operator- specific discounted fare programs with an integrated fare structure across all transit operators.	TR5
Strategy T5: **Implement Per-Mile Tolling on Congested Freeways with Transit Alternatives** | Apply a per-mile charge on auto travel on select congested freeway corridors where transit alternatives exist, with discounts for carpoolers, low-income residents, and off-peak travel, with excess revenues reinvested into transit alternatives in the corridor.	TR11
Strategy T6: **Improve Interchanges and Address Highway Bottlenecks** | Rebuild interchanges and widen key highway bottlenecks to achieve short-to-medium term congestion relief.	TR6, TR14, TR18
Strategy T7: **Advance Other Regional Programs and Local Priorities** | Fund regional programs like Clipper and 511, while supporting local transportation investments on arterials and local streets.	TR5
Strategy T8: **Build a Complete Streets Network** | Enhance streets to promote walking, biking, and other micromobility through sidewalk improvements, car-free slow streets, and 10,000 miles of bike lanes or multi-use paths.	TR2, TR7, TR8, TR9
Strategy T9: **Advance Regional Vision Zero Policy through Street Design and Reduced Speeds** | Reduce speed limits to 20 to 35 miles per hour on local streets and 55 miles per hour on freeways, relying on design elements on local streets and automated speed enforcement on freeways.	TR7, TR9
Strategy T10: **Enhance Local Transit Frequency, Capacity and Reliability** | Improve the quality and availability of local bus and light rail service, with new bus rapid transit lines, South Bay light rail extensions, and frequency increases focused in lower-income communities.	TR3, TR4
Strategy T11: **Expand and Modernize the Regional Rail Network** | Better connect communities while increasing frequencies by advancing a New Transbay Rail Crossing, BART to Silicon Valley Phase 2, Valley Link and Caltrain/High-Speed Rail Grade Separations, among other projects.	TR3, TR4

Source: Data compiled by MTC and ABAG in 2021 in consultation with BAAQMD

The Northern Sonoma County Air Pollution Control District (NSCAPCD) governs the North Coast Air Basin. NSCAPCD is in attainment for all state and federal criteria air pollutants and NSCAPCD does not currently have and is not required to have an air quality management plan. NSCAPCD makes air quality improvements though the permitting and rule-making processes.

The Yolo-Solano Air Quality Management District (YSAQMD) governs the Sacramento Valley Air Basin, which covers eastern Solano County. YSAQMD is within the Sacramento Air Quality Management District's federal nonattainment boundaries and is directly responsible for portions of the federal 2015 ozone SIP. YSAQMD was required to submit a reasonably available control technology (RACT) SIP analysis, and it was approved by their board of directors on September 9, 2020. The YSAQMD's RACT analysis recommends VOC limits for solvents that are generally equivalent to those found in the BAAQMD rule regulating solvent use. In addition, for state of California air quality standards, YSAQMD is not required to prepare an attainment plan for PM_{10} or $PM_{2.5}$, but YSAQMD consulted with MTC,

ABAG, and BAAQMD during the development of their triennial assessment and plan update, and the proposed Plan would not be inconsistent with the YSAQMD Triennial Plan.

Conclusion

The proposed Plan's core objectives and strategies align with and would support the implementation of the 2017 Clean Air Plan and YSAQMD Triennial Plan. Because the proposed Plan would not conflict with or obstruct implementation of the primary goals, applicable control measures, or implementation of any control measures of BAAQMD's 2017 Clean Air Plan and YSAQMD Triennial Plan, the impact would be **less than significant (LTS)**.

Mitigation Measures

None required.

Impact AQ-2: Result in a substantial net increase in construction-related emissions (PS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Construction

Construction-related emissions from implementation of the proposed Plan's forecasted development pattern, sea level rise adaptation infrastructure, and transportation projects would contribute to construction-related emissions but would not likely result in a substantial net increase in emissions under the proposed Plan. Construction activity tends to be temporary in nature and would be expected to occur throughout the proposed Plan's implementation period through 2050. Construction equipment and processes are generally similar between land use, sea level rise adaptation, and transportation projects.

As individual projects under the projected land use pattern, sea level rise infrastructure, and planned transportation improvements are constructed, construction activity would result in emissions of criteria air pollutants (e.g., $PM_{2.5}$ and PM_{10}) and precursors (e.g., Reactive Organic Gases [ROG] and NO_x) from site preparation (e.g., excavation, grading, and clearing); exhaust from off-road equipment, material delivery vehicles, and worker commute vehicles; vehicle travel on paved and unpaved roads; and other miscellaneous activities (e.g., building construction, asphalt paving, application of architectural coatings, and trenching for utility installation). The above pollutants are specifically relevant because the region is in nonattainment for State and federal ozone standards, the federal 24-hour $PM_{2.5}$ standard, and State PM_{10} standards. These emission types and associated levels fluctuate greatly depending on the particular type, number, and duration of usage for the varying equipment used during construction. The site preparation phase typically generates the most substantial emission levels because of the on-site equipment and ground-disturbing activities associated with grading, compacting, and excavation. Site preparation equipment and activities typically include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers).

With respect to construction equipment, EPA and CARB have adopted rules and regulations establishing criteria pollutant and hazardous emissions limits for diesel powered on-road vehicles and off-road equipment. The current EPA and CARB rules and emission standards are in the process of being implemented and are therefore reasonably foreseeable. EPA and CARB regulations of on-road and off-road engines target the primary sources of emissions at construction sites. These include on-road heavy-duty trucks and off-road aerial lifts, backhoes, cranes, crawler tractors, excavators, forklifts, graders, loaders, mowers, rollers, scrapers, skid steer loaders, tractors, trenchers, two-engine vehicles, and workover rigs. In addition, CARB's clean fuel standards would reduce emissions from all internal combustion engines and their stationary and portable equipment regulations would reduce emissions from the smaller equipment used at construction sites, such as portable generators and tub grinders.

Although EPA and CARB have adopted stringent air diesel PM emission regulations for construction equipment, these regulations alone cannot assure that all projects consistent with the proposed Plan would use only the lowest emissions-generating construction equipment due primarily to the fleet averaging component of the compliance requirements. Additionally, dust emissions from construction activity would occur from the disturbance of sites and material handling. Construction could also occur at any point under the Plan build-out period and could potentially occur over a short period of time, resulting in substantial construction-related emissions on a daily basis. This impact would be potentially significant (PS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects could result in a substantial net increase in construction-related emissions, this impact would be **potentially significant (PS)**. Mitigation Measure AQ-2 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure AQ-2 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

When applicable screening levels set by the relevant air district are exceeded, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

Construction Best Practices for Exhaust

- The applicant/general contractor for the project shall submit a list of all off-road equipment greater than 25 horsepower (hp) that would be operated for more than 20 hours over the entire duration of project construction, including equipment from subcontractors, to the relevant air district (e.g., BAAQMD, NSCAPCD, or YSAQMD) for review and certification. The list shall include all information necessary to ensure the equipment meets the following requirement:
  - Equipment shall be zero emissions or have engines that meet or exceed either EPA or CARB Tier 4 off-road emission standards, and it shall have engines that are retrofitted with a CARB Level 3 Verified Diesel Emissions Control Strategy (VDECS), if one is available for the equipment being used. Equipment with engines that meet Tier 4 Interim or Tier 4 Final emission standards automatically meet this requirement; therefore, a VDECS would not be required.
  - Idling time of diesel-powered construction equipment and trucks shall be limited to no more than two minutes. Clear signage of this idling restriction shall be provided for construction workers at all access points.
  - All construction equipment shall be maintained and properly tuned in accordance with the manufacturers' specifications.
  - Portable diesel generators shall be prohibited. Grid power electricity should be used to provide power at construction sites; or propane and natural gas generators may be used when grid power electricity is not feasible.

Construction Best Practices for Entrained Dust

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. For projects over five acres in size, soil moisture should be maintained at a minimum of 12 percent. Moisture content can be verified by lab samples or a moisture probe.

- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- On-site dirt piles or other stockpiled PM shall be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind-blown dust emissions. The use of approved nontoxic soil stabilizers shall be incorporated according to manufacturers' specifications to all inactive construction areas.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. Dry power sweeping should only be performed in conjunction with thorough watering of the subject roads.
- All vehicle speeds on unpaved roads and surfaces shall be limited to 15 mph.
- All roadway, driveway, and sidewalk paving shall be completed as soon as possible. Building pads shall be paved as soon as possible after grading.
- All construction sites shall provide a posted sign visible to the public with the telephone number and person to contact at the lead agency regarding dust complaints. The recommended response time for corrective action shall be within 48 hours. BAAQMD's Complaint Line (1-800-334-6367) shall also be included on posted signs to ensure compliance with applicable regulations.
- All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
- Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.
- Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- All transfer processes involving a free fall of soil or other PM shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.
- All trucks and equipment, including their tires, shall be washed off before leaving the site.
- Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.
- Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.
- Open burning shall be prohibited at the project site. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (e.g., trash, demolition debris) may be conducted at the project site. Vegetative wastes shall be chipped or delivered to waste-to-energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. It is unlawful to haul waste materials off-site for disposal by open burning.
- The primary contractor shall be responsible for ensuring that all construction equipment is properly tuned and maintained before and for the duration of on-site operation.

- Where accessible, existing power sources (e.g., power poles) or clean-fuel generators shall be used rather than temporary power generators.
- A traffic plan shall be developed to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Operations that affect traffic shall be scheduled for off-peak hours. Obstruction of through-traffic lanes shall be minimized. A flag person shall be provided to guide traffic properly and ensure safety at construction sites.

Applicable mitigation measures shall be required at the time grading permits are issued.

Significance after Mitigation

The measures described above would minimize emissions of criteria air pollutants (e.g., PM_{10} and $PM_{2.5}$) and precursors (e.g., ROG and NOx) by requiring best practices for dust and exhaust emissions through the use of readily available, lower-emitting diesel equipment, and/or equipment powered by alternative cleaner fuels (e.g., propane) or electricity, as well as on-road trucks using particulate exhaust filters.

To the extent that an implementing agency requires an individual project to implement all feasible mitigation measures described above, the project's impact would be less than significant with mitigation (LTS-M).

Projects taking advantage of CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above to address site-specific conditions. However, MTC and ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (PS)

Land Use Impacts

Operation

This discussion addresses operation of the proposed Plan. See Impact AQ-2 for a discussion of the construction-related impact of Plan implementation. As shown in **Table 3.4-10**, the area-source emissions of criteria pollutants and precursors would increase over the planning horizon of the Plan because of the net increase in population, households, and employment in the region. When compared to existing conditions (2015), implementation of the proposed Plan would increase area-source ROG emissions by 22.8 tons per day, NO_X emissions by 5.3 tons per day, PM_{10} emissions by 1.5 tons per day, and $PM_{2.5}$ emissions by 1.5 tons per day. In addition, because the proposed Plan area is in nonattainment for State and federal ozone standards, the federal 24-hour $PM_{2.5}$ standard, and State PM_{10} standard, emissions of ozone precursors (ROG and summertime NO_x), $PM_{2.5}$ and PM_{10} are evaluated to determine whether emissions of these pollutants would result in a cumulatively considerable net increase. **Table 3.4-11** shows the percent breakdown of the net change in regional emissions by area-source type. As discussed under "Method of Analysis," these area-source emissions estimates are based on the net change in land use development anticipated in the region under the Plan. The land use and transportation network in the proposed Plan provides only the foundation for future development and transportation patterns. Whether or not individual projects would result in substantial area source emissions would depend on various parameters (e.g., project size, design, energy efficiency) that are not known at this time and, therefore, cannot be quantified on an individual

basis. However, area-source emissions associated with implementation of the proposed Plan have been generally calculated for informational purposes.

As shown in **Table 3.4-10**, the majority of new ROG emissions would come from consumer products, CO emissions from landscaping equipment, and NO_X, PM_{10}, and $PM_{2.5}$ emissions from natural gas use. CARB and the three air districts in the region have policies in place that regulate emissions from architectural coatings and hearths. CARB also has five existing consumer product regulations (CARB 2019). However, more emission reduction measures may be needed to ensure that all projects consistent with the proposed Plan would not exceed existing levels. This impact would be potentially significant (PS).

Table 3.4-10: Unmitigated Daily Area-Source Emissions from Changes in Land Uses by County in 2050 (tons per day)

County	ROG	NO_X	PM_{10}	$PM_{2.5}$
Alameda	5.4	1.6	0.2	0.2
Contra Costa	3.7	1.2	0.1	0.1
Marin	1.2	0.3	0.1	0.1
Napa	0.2	0.1	0.0	0.0
San Francisco	7.8	0.8	1.0	1.0
San Mateo	2.4	0.7	0.1	0.1
Santa Clara	0.2	0.1	0.0	0.0
Solano	1.3	0.4	0.0	0.0
Sonoma	0.7	0.2	0.0	0.0
Regional Total	22.8	5.3	1.5	1.5

Notes: Forecasts of area-source emissions do not account for expected reductions from the implementation of strategy EN02 or EN03 because of modeling limitations. "Changes in land uses" are the net change in land uses between 2015 and 2050 anticipated under the proposed Plan.

Source: Data provided by Ascent Environmental in 2021 based on modeling using CalEEMod 2016.3.2 and land use estimates provided by MTC and ABAG in 2021

Table 3.4-11: Distribution of Area-Source Emissions from Changes in Land Uses by Source in 2050

Source	ROG	NO_X	PM_{10}	$PM_{2.5}$
Architectural Coatings	14%	0%	0%	0%
Consumer Products[1]	82%	0%	0%	0%
Landscaping Equipment	2%	4%	15%	15%
Natural Gas – Hearths[2]	N/A	2%	19%	19%
Natural Gas – Energy[3]	1%	94%	66%	66%
Total	100%	100%	100%	100%

Notes: Forecasts of area-source emissions do not account for expected reductions from the implementation of strategy EN02 or EN03 because of modeling limitations. "Changes in land uses" are the net change in land uses between 2015 and 2050 anticipated under the proposed Plan.

[1] Includes emissions from consumer products, such as aerosols and household chemicals.

[2] Includes emissions from natural gas combustion in hearths.

[3] Includes emissions from natural gas combustion in water heating, space heating, and cooking applications.

Sources: Estimates calculated by Ascent Environmental in 2021 based on modeling using CalEEMod 2016.3.2 and land use estimates provided by MTC and ABAG in 2021

Sea Level Rise Adaptation Impacts

Operation

The operation of sea level rise adaptation infrastructure would not result in a considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard because the sea level rise adaptation infrastructure would not

include stationary equipment that would generate or emit emissions. This impact would be less than significant (LTS).

Transportation System Impacts

Operation

The proposed transportation projects would result in a net increase in VMT (**Table 3.4-7**); however, as shown in **Table 3.4-12**, mobile source emissions of criteria pollutants ROG, NO_X (summertime and wintertime), and $PM_{2.5}$ in the region would decrease between 2015 and 2050, the planning horizon for the proposed Plan. When compared to existing conditions (2015), emissions associated with development under the proposed Plan would be reduced: ROG emissions by 70 percent (41.1 tons per day), summertime NO_X emissions by 81 percent (89.9 tons per day), and wintertime NO_X emissions by 81 percent (102.2 tons per day). The primary reason for these reductions is the increasingly stringent emission controls adopted by CARB for new vehicle engines and fuels. This includes the Truck and Bus Regulation, which requires diesel truck and bus engines to be upgraded to reduce emissions. Additional contributors include the Enhanced Smog Check Program and fleet turnover wherein older polluting cars are retired and replaced with newer and substantially less polluting cars. The land use pattern in the proposed Plan concentrates future growth at higher densities around existing and proposed transit investments, which would reduce driving and motor vehicle emissions per capita.

Table 3.4-12: Emission Estimates for Criteria Pollutants using EMFAC2021 Emission Rates (tons per day)

	Baseline, 2015	Proposed Project, 2050	Change, 2015 to 2050	
			Numerical	Percentage
ROG	58.5	17.4	-41.1	-70%
NO_X (Summertime)	111.6	21.7	-89.9	-81%
NO_X (Wintertime)	126.7	24.5	-102.2	-81%
$PM_{2.5}$	6.3	5.5	-0.7	-12%
PM_{10}	27.1	30.0	+3.0	+11%

Note: Forecasts of mobile-source emissions do not account for expected reductions from the implementation of strategy EN08 or EN09 because of modeling limitations.
Source: Emissions modeling using EMFAC 2021; data compiled by MTC and ABAG in 2021

The results in **Table 3.4-12** indicate that mobile-source $PM_{2.5}$ emissions would decrease by 12 percent (0.7 tons per day), and PM_{10} emissions would increase 11 percent (3.0 tons per day) during the proposed Plan's timeframe compared to existing conditions. The higher levels of PM_{10} emissions in 2050 conditions are primarily a function of the 17 percent growth in VMT (**Table 3.4-7**) (which directly affects the occurrence of entrained roadway dust), with some contributions from tire and brake wear and exhaust. Exhaust emissions of PM_{10} would not increase at the same rate as VMT (17 percent) because of the stringent emission controls that would take effect with fleet turnover. Note that daily VMT is projected to increase when comparing the proposed Plan to existing conditions, but to a large degree, these increases would be offset by improvements to the vehicle fleet.

SB 1, the Road Repair and Accountability Act of 2017, requires the California Department of Motor Vehicles, starting January 1, 2020, to verify that a medium-duty or heavy-duty vehicle is compliant with or exempt from CARB's Truck and Bus Regulation before allowing registration.

In addition, the Goods Movement Emission Reduction Program (GMP, Program) under Proposition 1Bis a partnership between CARB and local agencies designed to quickly reduce diesel emissions and health risk from freight movement along California trade corridors. Projects funded under this Program must achieve early or extra emission reductions not otherwise required by law or regulation. The BAAQMD will solicit projects during 2020-2021 for the Year 5 Program. BAAQMD staff will evaluate

all applications received during the solicitation period and submit a single approved-projects list to CARB for competitive ranking based on estimated emission reductions and cost-effectiveness. Eligible project types include upgrading diesel-powered RTG with zero-emissions RTG system (electric, fuel cell), converting existing yard truck with an electric drive train and control system, replacing yard trucks with electric-or fuel cell-powered yard trucks, replacing forklifts with class 1 electric or fuel cell-powered forklifts, and replacing large-capacity lift equipment with electric-or fuel cell-powered lifts. With the replacement or conversion of at least one yard truck, applicants may also apply for a battery charger or hydrogen fueling unit (BAAQMD 2017b).

Even with implementation of these programs, there would be significant reductions in ROG, NO_X, and some reduction in $PM_{2.5}$ mobile-source emissions. Nonetheless, because there would be a net increase in PM_{10} emissions from mobile sources, this impact would be potentially significant (PS).

Conclusion

Table 3.4-13 shows the net new daily emissions that would occur in the region as a result of the implementation of the proposed Plan's land use development pattern and transportation projects; implementation of sea level rise adaptation infrastructure projects are not anticipated to result in net increases in emissions.

Table 3.4-13: Net Mobile- and Area-Source Emissions Anticipated under the Plan (Tons per Year)

Source	ROG	NO_X	$PM_{2.5}$	PM_{10}
Mobile	-41.1	-89.9	-0.7	3.0
Area	22.8	5.3	1.5	1.5
Total	-18.3	-84.6	0.8	4.5
Increase from Existing?	No	No	Yes	Yes
Within BAAQMD CEQA Plan Thresholds of Significance	Yes	Yes	No	No

Note: Forecasts of mobile- and area-source emissions do not account for expected reductions from the implementation of strategy EN02, EN03, EN08, or EN09 because of modeling limitations.

Sources: Emissions modeling using EMFAC2021; data compiled by MTC and ABAG in 2021

As shown in Table 3.4-13, the proposed Plan would result in a net decrease in ROG and NO_X emissions. However, there would be a net increase in PM emissions. Therefore, the proposed Plan could cause a net increase of emissions of criteria pollutants from mobile and area sources compared to existing conditions.

A key source of PM is the combustion of fossil fuels. After these fuels break down during combustion, they cool, become radicalized, and agglomerate. These particles can form highly toxic compounds, and, when inhaled, the particles can enter the respiratory tract, causing chemical imbalances throughout the body, potentially resulting in inflammation, cell death and organ failure. The health effects from toxic PM emission compounds can contribute to cardiovascular events, such as stroke and heart attack (BAAQMD 2020).

For PM emissions, the Bay Area faces challenges in overcoming information gaps including concerns of newly dominant sources of $PM_{2.5}$. As PM emissions from top sources are reduced, additional sources emerge as priorities, yet less information is available about these other sources. This leaves a lag between re-prioritization and updated scientific literature and this uncertainty cannot yet be quantified. As emissions from vehicle exhaust are reduced, the proportion of $PM_{2.5}$ attributed to re-entrained road dust increases. However, calculations for re-entrained road dust were last updated in the late 1980s. These methods are being currently evaluated and updated by CARB and the California Department of Transportation (BAAQMD 2020).

BAAQMD continues to update its rules and regulations to further limit PM exposures. As its focus shifts from an exclusively regional perspective to reducing risks for disproportionately impacted local communities, the Air District is exploring the possibility of treating PM as a TAC. Although the State of California does not presently recognize undifferentiated PM as an air toxic, it may be possible for the Air District to do so independently (BAAQMD 2020).

The increase of PM emissions could result in an increase in ambient concentrations of PM in the San Francisco Bay Area Air Basin and, moreover, increase the likelihood that ambient concentrations exceed the CAAQS and NAAQS. The increase in Plan-generated emissions of PM could impede air quality planning efforts to bring the air basin into attainment of the CAAQS for both PM_{10} and $PM_{2.5}$. However, the levels of criteria air pollutant and precursor emissions associated with implementation of the Plan cannot be directly correlated to specific health outcomes for specific sensitive receptors.

While the description of effects noted above could manifest in the recipient receptors, actual effects on individuals depend on individual factors, such as life stage (e.g., older adults are more sensitive), preexisting cardiovascular or respiratory diseases, and genetic conditions. Even with this type of specific medical information (which is confidential to the individual), there are wide ranges of potential outcomes from exposure to particulates, from no effect to the effects described above. In addition, local and regional concentration levels of PM are highly dependent on meteorological conditions, such as precipitation and wind patterns, and MTC does not have land use authority over the anticipated new development under the Plan and cannot know with certainty that future development would occur as outlined in the proposed Plan or if new growth would occur within the Plan area and period. Therefore, other than determining the types of health effects that could occur, it would be speculative to more specifically correlate exposure to criteria air pollutants from this Plan to specific health outcomes for sensitive receptors.

Plan-generated emissions could contribute to the existing nonattainment condition in the county with respect to the CAAQS and NAAQS for PM and could therefore increase the potential for adverse health impacts from exposure to PM. While the Plan would not conflict with the 2017 Clean Air Plan and other applicable plans and policies, it is possible that individual projects developed under the Plan could exceed BAAQMD's project-level thresholds. For this reason, should this occur, this impact would be **potentially significant (PS)**. Mitigation Measures AQ-3(a) through AQ-3(d) address this impact and are presented below.

Mitigation Measures

Mitigation Measure AQ-3(a) MTC and ABAG, in partnership with BAAQMD, and implementing agencies, shall work together to support the use of existing air quality and transportation funds and seek additional funds to continue to implement BAAQMD and CARB programs (e.g., Carl Moyer) intended to retrofit and replace trucks and locomotives.

Mitigation Measure AQ-3(b) MTC and ABAG, in partnership with BAAQMD and the Port of Oakland, and other agency partners, shall work together to secure incentive funding to reduce mobile PM emissions from mobile exhaust and entrained PM sources such as tire wear, brake wear, and roadway dust.

Mitigation Measure AQ-3(c) MTC and ABAG, in partnership with local air districts, and implementing agencies shall:

- support the advancement of corridor-level plans and implementation of projects located on severely congested (LOS F) facilities and

- incorporate transportation demand management (TDM) strategies into individual land use land transportation projects and plans, as part of the planning process; TDM strategies could include ridesharing, carsharing, telecommuting, adopting flexible working hours, implementing parking management and traffic- calming measures, and marketing TDM options (especially alternative commuting services).

Mitigation Measure AQ-3(d) When applicable screening levels set by the applicable air district are exceeded, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below or are updated by BAAQMD/the applicable air district or within CalEEMod:

- Provide for, or contribute to, dedication of land for off-site Class I and Class II bicycle trails linking the project to designated bicycle commuting routes in accordance with the regional bikeway master plan.
- Provide preferential parking spaces for carpool and vanpool vehicles, implement parking fees for single-occupancy vehicle commuters, and implement parking cash-out program for employees.
- Support local requirements regarding electric vehicle charging spaces.
- Support the inclusion of bus shelters at transit access points where deemed appropriate by local public transit operator in large residential, commercial, and industrial projects.
- Support local communities and agencies equipping of residential structures with electric outlets in the front and rear of the structure to facilitate use of electrical lawn and garden equipment.
- Support the contribution to the provision of synchronized traffic signals on roadways affected by the project and as deemed necessary by the local public works department.
- Support local transit-enhancing infrastructure that includes bus turnouts or bulbs, passenger benches, street lighting, route signs and displays, and shelters as demand and service routes warrant, subject to review and approval by local transportation planning agencies.
- Support pedestrian-enhancing infrastructure that includes sidewalks and pedestrian paths, direct pedestrian connections, street trees to shade sidewalks, pedestrian safety designs and infrastructure, street furniture and artwork, street lighting, pedestrian signalization and signage, and/or access between bus service and major transportation points in the Plan area.
- Support local community requirements to require all employment centers to include an adequate number of on-site shower/locker facilities for bicycling and pedestrian commuters (typically one shower and three lockers for every 25 employees per shift).
- Support local communities and agencies to provide park-and-ride lots as deemed feasible and appropriate by transportation planning agencies.
- At employment centers that exceed a designated size, as measured by the number of employees, support the provision of on-site child care and after-school facilities or contribute to off-site construction of such facilities within walking distance of employment land uses (for employment centers on or adjacent to industrial land uses, on-site child daycare centers shall be provided only if supported by the findings of a comprehensive health risk assessment performed in consultation with the local air district).
- Commit to support programs that include guaranteed ride home, subsidized transit passes, and rideshare matching.
- Support local communities and agencies to provide transportation (e.g., shuttles) to major transit stations and multimodal centers.

Mitigation Measure AQ-3(e): Implementing agencies and/or project sponsors shall implement the following measures, where feasible and necessary based on project- and site-specific considerations, to reduce criteria air pollutant emitted by natural gas combustion in buildings:

- Prohibit natural gas infrastructure in new development.
- Utilize, or design to support, microgrid electric systems to facilitate the resiliency of new developments prohibiting natural gas.
- Equip residential structures containing front and rear yard area with electric outlets in the front and rear of the structure to facilitate use of electrical lawn and garden equipment.
- Install ground-source heat pumps, solar, or other alternatively-fueled water heaters instead of natural gas or grid-based electric water heaters.
- Install ground-source heat pump, or other alternative, heating and cooling systems.
- Increase wall and attic insulation to 20 percent above Title 24 requirements (residential and commercial).
- Orient buildings to take advantage of solar heating and natural cooling, and use passive solar designs (residential, commercial, and industrial).
- Provide energy-efficient windows (double pane and/or Low-E) and awnings or other shading mechanisms for windows, porches, patios, and walkways.
- Utilize passive solar cooling and heating designs, ceiling and whole house fans, and programmable thermostats in the design of heating and cooling systems.

Significance after Mitigation

Mitigation Measures AQ-3(a) through AQ-3(d) would reduce significant impacts from forecasted increases in $PM_{2.5}$ and PM_{10} because they would lead to reductions in vehicle trips and VMT. Further, Mitigation Measure AQ-3(e) would reduce area-source emissions from natural gas combustion and landscaping equipment in new developments. Projects taking advantage of CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above to address site-specific conditions. However, because reductions cannot be estimated, it cannot be concluded with certainty that all significant impacts would be avoided. This impact would remain **significant and unavoidable (SU)** for purposes of this program level review.

Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations (PS)

Some communities and neighborhoods in the region experience relatively higher air pollution levels and corresponding negative health impacts than others. Levels of local air pollutants such as fine PM and TACs are highest near air pollution sources, such as freeways, heavily trafficked seaports, and large industrial facilities. In addition, there are many smaller, more discrete sources of air pollution, including gas stations and back-up diesel generators, that exacerbate conditions in communities with already elevated levels of air pollution that can be harmful to people's health (BAAQMD 2016). Given the lack of specific information regarding construction locations and construction activities, impacts cannot be quantified with precision.

The proposed Plan could potentially adversely expose sensitive receptors to substantial pollutant; therefore, this impact would be significant if implementation of the proposed Plan would:

- Locate sensitive receptors in TPAs where:
  - (a) cancer risk would exceed 100 in a million, and/or exceed fine PM concentrations of 0.8 micrograms per cubic meter (µg/m^3) and/or are within 500 feet of a freeway, 175 feet of a major roadway (>30k AADT), or 500 feet of a ferry terminal or
  - (b) TACs (cancer risk) or PM2.5 concentrations would result in noncompliance with an adopted Community Risk Reduction Plan;
- cause a cumulative net increase in emissions of TACs, including diesel PM, 1,3-butadiene, and benzene, from on-road mobile sources compared to existing conditions;
- result in changes in TAC and or $PM_{2.5}$ exposure levels that disproportionally affect minority and low-income populations; or
- result in disproportionate impacts from TAC and $PM_{2.5}$ emissions on CARE communities.

Land Use Impacts

The Plan would result in land use growth, including land uses that would locate sensitive receptors, throughout the Plan area. Figure 3.4-2 displays the locations of areas where cancer risk levels and/or $PM_{2.5}$ concentrations are exceeded, referred to as TAC Risk Areas, in relation to TPAs. In general, the figures show that TAC Risk Areas tend to occur along high-volume freeways and roadways, high-use rail lines, locations near numerous stationary-sources, and locations where a single stationary-source has very high estimated cancer risk levels or $PM_{2.5}$ concentration. Table 3.4-14 quantifies the acres of overlap between the proposed Plan's land use growth footprint and the TAC Risk Areas.

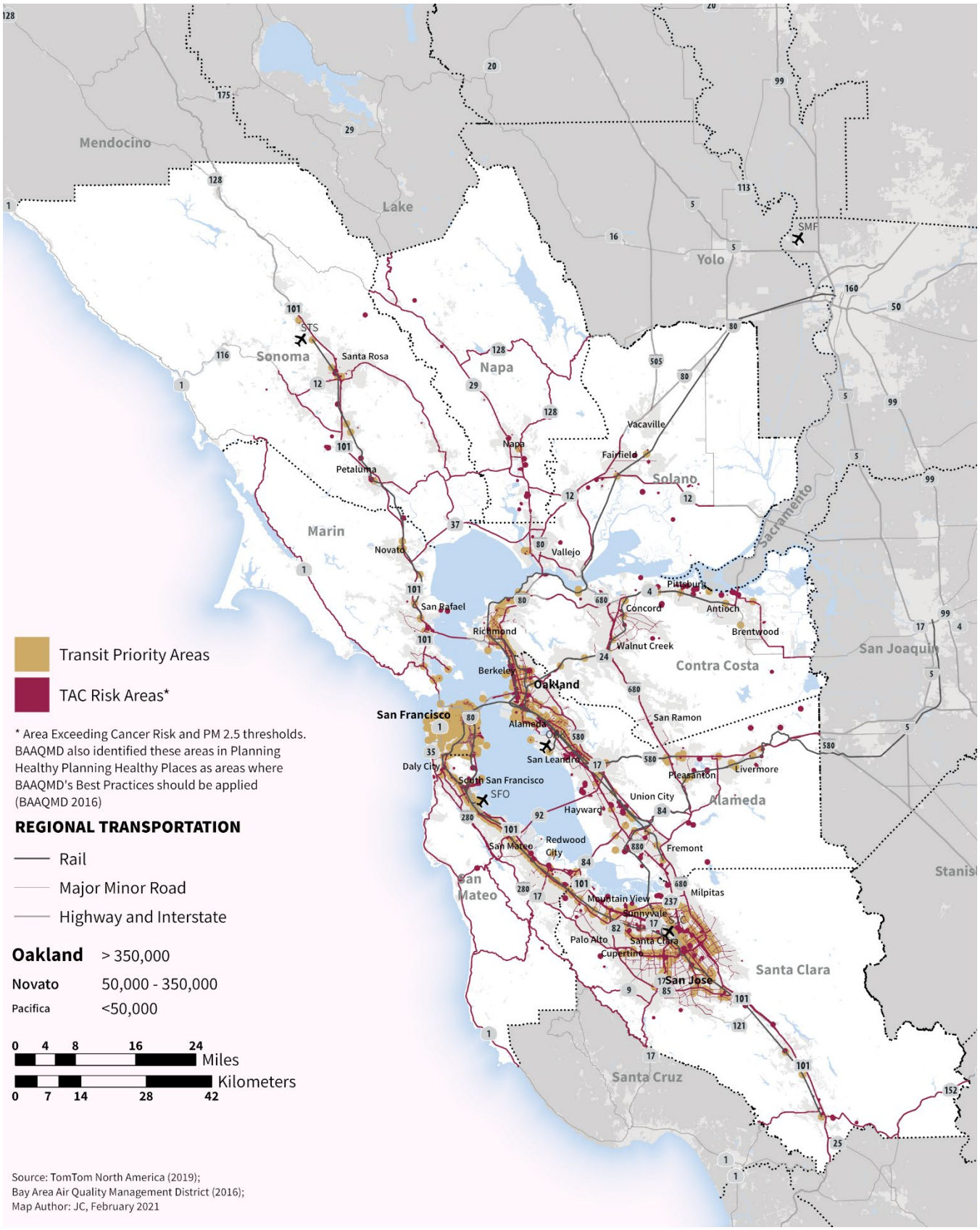

Figure 3.4-2: Toxic Air Contaminant Risk Areas

Table 3.4-14: Acreage of Land Use Growth Footprint within Toxic Air Contaminant Risk Areas

County		Total (acres)
Alameda	County Total	2,100
	Within TPAs	1,300
Contra Costa	County Total	1,300
	Within TPAs	420
Marin	County Total	400
	Within TPAs	130
Napa	County Total	220
	Within TPAs	20
San Francisco	County Total	730
	Within TPAs	700
San Mateo	County Total	1,000
	Within TPAs	730
Santa Clara	County Total	2,500
	Within TPAs	1,700
Solano	County Total	330
	Within TPAs	40
Sonoma	County Total	260
	Within TPAs	50
Regional Total	County Total	8,900
	Within TPAs	5,100

Notes: TPA acreages are a subset of county acreages. Whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding. $PM_{2.5}$ emissions in TAC risk areas would exceed cancer risk and $PM_{2.5}$ thresholds.

Sources: Data compiled by MTC and ABAG in 2021; BAAQMD 2016

As shown in the table above, many TPAs (and any potential sensitive receptors within those areas) would be located in areas where increased cancer risk levels and/or $PM_{2.5}$ concentration exceed 0.8 µg/m^3. Although the analysis under "Transportation System Impacts," below, finds that TAC and diesel PM emissions would decrease through 2050 in the Plan area, it is possible that sensitive receptors may locate within the risk areas in the future.

Although some of the proposed Plan's land use growth footprint could result in additional stationary sources and building energy and water usage, these would be subject to applicable air district rules as established by adopted plans and regulations at the time of air quality permitting as well as project-level CEQA analyses, as applicable.

Additionally, in jurisdictions with an adopted Community Risk Reduction Plan (CRRP), any proposed project that includes sensitive land uses and or receptors should be evaluated against the standards and mitigation measures in those adopted plans. The goal of a CRRP is to bring TAC and $PM_{2.5}$ concentrations for the entire community covered by the Plan down to acceptable levels as identified by the local jurisdiction and approved by the Air District. This approach provides local agencies a proactive alternative to addressing communities with high levels of risk on a project-by-project approach.

The proposed Plan could locate sensitive receptors in areas where TACs or $PM_{2.5}$ concentrations result in cancer risk levels greater than 100 in a million or a concentration of $PM_{2.5}$ greater than 0.8 micro grams (µg) per cubic meter (m^3), as summarized in **Table 3.4-14**, above, or where TACs or $PM_{2.5}$ concentrations are in noncompliance with an adopted CRRP. Thus, land use impacts would be potentially significant (PS). Mitigation Measure AQ-4(a) is presented below to help reduce TACs or $PM_{2.5}$ emissions from mobile and area sources.

Sea Level Rise Adaptation Impacts

The operation of sea level rise adaptation infrastructure would not result in a considerable net increase in emission of fine PM or TACs because it would not include stationary equipment that would generate or emit emissions. Therefore, implementation of sea level rise adaptation infrastructure would not result in the exposure of sensitive receptors to substantial pollutant concentrations. This impact would be less than significant (LTS).

Transportation System Impacts

For transportation system impacts, the proposed Plan would have a significant impact if it would:

- cause a cumulative net increase in emissions of TACs, including diesel PM, 1,3-butadiene, and benzene, from on-road mobile sources compared to existing conditions, or
- result in changes in TAC and or $PM_{2.5}$ exposure levels that disproportionally impact minority and low-income populations.

Toxic Air Contaminants Emissions

Mobile sources and projected changes in VMT are based on transportation and land use forecasts developed using the MTC travel demand forecasting model, known as Travel Model 1.5, with the land use forecasting model, known as Bay Area UrbanSim 2.0. The integrated model produced the key outputs used in assessing the significance of transportation and air quality impacts, such as VMT. Based on this modeling, it is estimated that implementation of the proposed Plan would result in a net increase in VMT (Table 3.4-7); however, as shown in Table 3.4-15, there would be a 91-percent decrease in diesel PM, a 71-percent decrease in 1,3-butadiene, and a 75-percent decrease in benzene compared to existing conditions. These reductions can be attributed to CARB regulations that control TACs, namely AB 1807 of 1983 that created the Toxic Air Contaminant Identification and Control Act, AB 2588 of 1987 that established the Air Toxics "Hot Spots" Information and Assessment Act, and SB 656 of 2003 that requires CARB and local air districts to identify control measures for PM. Other State regulations that reduce smog or other pollutants also reduce TACs, such as the standards for low emission vehicles, clean fuels, reformulated gasoline and diesel fuel specifications, and CARB's HDVIP, discussed above. In addition, there are a number of programs in place to address PM in general and TACs in particular, including CARB and BAAQMD's Goods Movement Program, which provides financial incentives to owners of equipment used in freight movement to upgrade to cleaner technologies, and Port of Oakland Clean Air Programs such as the Maritime Air Quality Improvement Plan, Comprehensive Truck Management Plan, and Seaport Air Quality 2020 and Beyond Plan.

In addition, the State's Drayage Truck Regulation requires all trucks to meet the equivalent of the on-road 2004 emission standard via newer trucks or verified diesel emission control strategies (VDECS) by December 31, 2009. All pre-1994 engines were phased-out as of January 1, 2010 and after December 31, 2013, drayage trucks were required to meet the 2007 engine emissions standards.

Table 3.4-15: Emission Estimates for Toxic Air Contaminants Pollutants (kilograms per day)

	Baseline, 2015	Proposed Plan, 2050	Change, 2015 to 2050	
			Numerical	Percent
Diesel Particulate Matter	1,366.2	126.9	-1,239.3	-91%
1,3 Butadiene	77.5	22.5	-55.0	-71%
Benzene	363.1	90.7	-272.4	-75%

Source: Data compiled by MTC and ABAG in 2021

Because the proposed Plan would result in a reduction in TAC emissions, as shown in Table 3.4-15, there would be a less-than-significant impact (LTS).

Effects on CARE Communities

This analysis discloses effects from TAC and $PM_{2.5}$ emissions on CARE communities. Figure 3.4-3 displays the locations of designated CARE communities in relation to MTC and ABAG's designated Equity Priority Communities (previously known as "Communities of Concern").

Table 3.4-16 summarizes MTC's analysis results, expressed as a percentage change in TAC pollutants (diesel PM, benzene, and 1, 3 butadiene), $PM_{2.5}$ exhaust, and total $PM_{2.5}$ emissions when compared to the base year emissions for each county with a CARE community and the entire region.

Table 3.4-16: Percent Change in On-Road Mobile Source Exhaust and total $PM_{2.5}$ Emissions, Years 2015-2050

County	CARE Status	Exhaust Emissions				Total $PM_{2.5}$	VMT
		Exhaust Only $PM_{2.5}$	Diesel PM	Benzene	1, 3 Butadiene		
Alameda	CARE Community	-89%	-93%	-79%	-76%	-18%	10%
	Remainder of County	-74%	-90%	-73%	-73%	7%	11%
Contra Costa	CARE Community	-88%	-92%	-76%	-75%	-8%	21%
	Remainder of County	-71%	-83%	-73%	-73%	14%	20%
Marin	Entire County	-77%	-91%	-74%	-74%	9%	13%
Napa	Entire County	-80%	-94%	-80%	-80%	2%	8%
San Francisco	CARE Community	-90%	-96%	-74%	-72%	-5%	20%
	Remainder of County	-88%	-98%	-73%	-73%	3%	12%
San Mateo	Entire County	-69%	-84%	-34%	-34%	22%	8%
Santa Clara	CARE Community	-86%	-92%	-73%	-70%	4%	23%
	Remainder of County	-68%	-88%	-67%	-67%	25%	22%
Solano	CARE Community	-89%	-92%	-79%	-77%	-3%	24%
	Remainder of County	-79%	-89%	-77%	-77%	17%	23%
Sonoma	Entire County	-80%	-95%	-86%	-86%	6%	11%
Regional Total	CARE Community	-88%	-93%	-76%	-73%	-8%	18%
	Remainder of Region	-74%	-91%	-71%	-70%	14%	15%
	Total	-83%	-93%	-74%	-71%	9%	17%

Notes: CARE = Community Air Risk Evaluation; $PM_{2.5}$ = fine particulate matter; PM = particulate matter; VMT = vehicle miles travelled. Percentages are rounded to the nearest whole number. Total $PM_{2.5}$ includes vehicle exhaust, entrained road dust, and tire and brake wear. Marin, Napa, San Mateo, and Sonoma Counties do not have CARE-designated areas. Emissions rates from EMFAC.

Sources: Data compiled by MTC and ABAG in 2021 based on data from BAAQMD 2020

Overall TAC and $PM_{2.5}$ exhaust emissions from diesel and gasoline vehicles decrease throughout the Bay Area between existing conditions in 2015 and the proposed Plan's horizon year 2050. Region-wide, for all TAC emissions (diesel PM, benzene, and 1, 3 butadiene), on-road vehicle exhaust is estimated to decrease between 71 and 93 percent. Region-wide $PM_{2.5}$ emissions from all on-road vehicle exhaust are expected to decrease by approximately 83 percent. The reductions in TAC and $PM_{2.5}$ exhaust emissions expected from 2015 to 2050 within CARE community and within areas without CARE community status vary by county. Areas without CARE status are considered non-CARE communities. As shown in Table 3.4-16, reductions in TAC and $PM_{2.5}$ exhaust emissions are greater in CARE communities than non-CARE Communities.

These reductions are largely attributed to the implementation of CARB's On-Road Heavy-Duty Diesel Vehicle Regulations, which requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent.

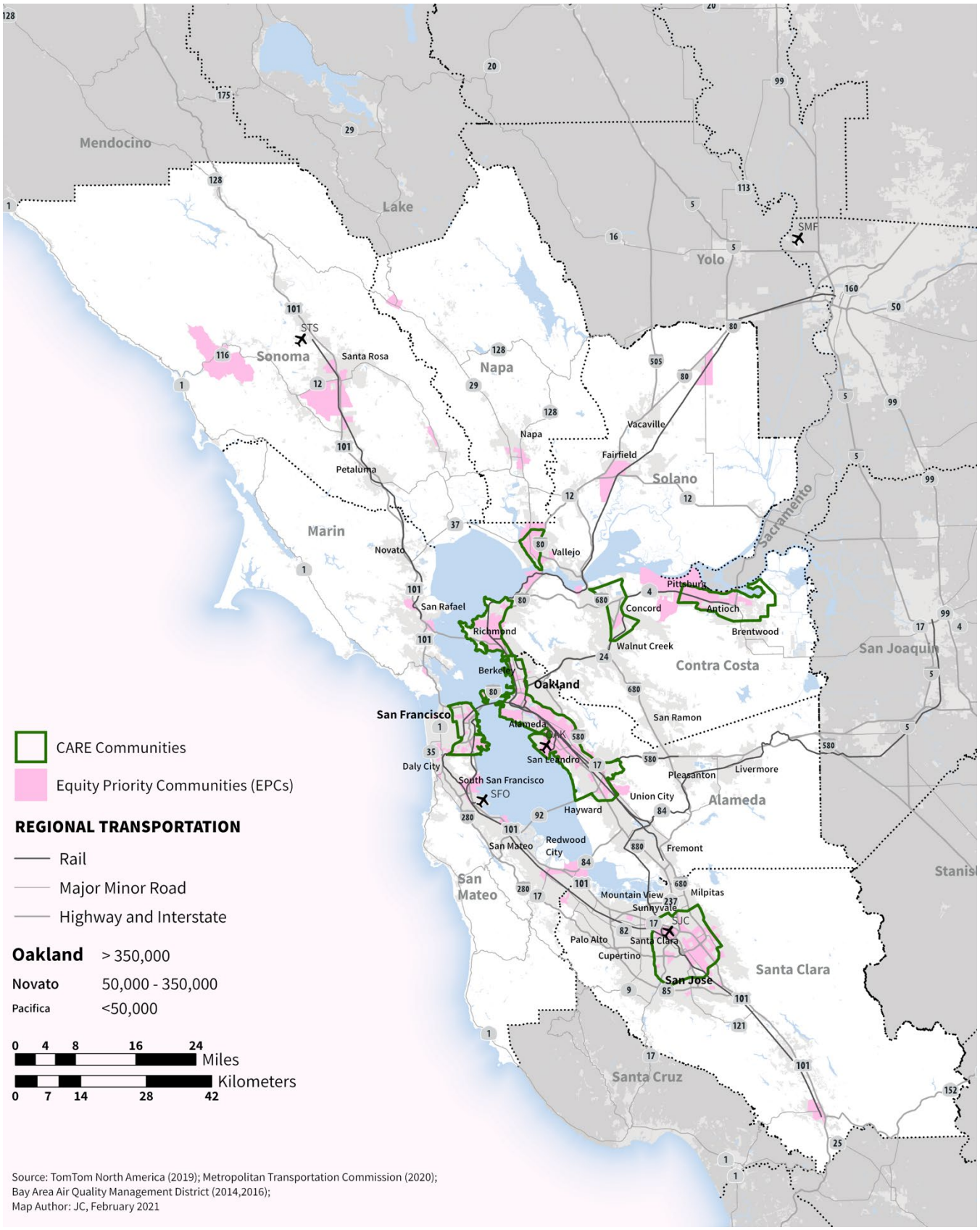

Figure 3.4-3: Designated CARE Communities and Equity Priority Communities

Sources contributing TAC and $PM_{2.5}$ emissions reductions in the 5-year timeframe also include:

- street sweeping, potentially reducing road dust emissions by 10 percent;
- cleaner locomotive engines;
- BAAQMD's Rule 11-18, which will potentially reduce TACs from the East Bay Municipal Utility District and Schnitzer Steel by an estimated 70 percent; and
- better enforcement and incentives discouraging backyard burning and limiting residential fuel combustion.

Total $PM_{2.5}$ includes exhaust from all vehicles, as well as, brake wear and tire wear, and does not include TACs from gasoline vehicles. Brake wear and tire wear emission rates are estimated in EMFAC2021.

When all sources of $PM_{2.5}$ are aggregated, the anticipated $PM_{2.5}$ emissions would increase over existing conditions by 9 percent, across all counties. Increases in total $PM_{2.5}$ emissions are generally higher for non-CARE communities than CARE communities. CARE communities in Alameda and Solano Counties would see an overall reduction in total $PM_{2.5}$ emissions (-18 percent and -3 percent, respectively) as would the CARE communities in total at the regional scale (-8 percent). This increase in total $PM_{2.5}$ emissions would be a potentially significant impact (PS).

This outcome may be explained by a number of factors. Emissions from gasoline and diesel on-road vehicles have been substantially reduced by stringent State and federal exhaust emission standards. CARB on-road Heavy-Duty Diesel Regulations are expected to reduce diesel PM by 85 percent by 2020 from 1998 conditions. According to EMFAC 2017 model runs for the MTC region, brake and tire wear from passenger vehicles is expected to represent approximately 82 percent of $PM_{2.5}$ from vehicles by 2050 (not including entrained road dust emissions). At the time of this writing, no regulations have been adopted that would reduce future levels of PM from tire and brake wear emissions (CARB 2018). Therefore, EMFAC2021 does not consider any improvements in brake and tire wear emissions in future year's emission estimates. This means that as VMT increases, so would $PM_{2.5}$ emissions from brake and tire wear.

Conclusion

Implementation of the proposed Plan's land use development pattern and transportation projects could expose sensitive receptors near TPAs to substantial concentrations of TAC emissions; implementation of sea level rise adaptation infrastructure projects are not anticipated to result in significant impacts to sensitive receptors. Approximately 8,900 acres overall (in the region) and 5,100 acres in TPAs in the region would be exposed to a cancer risk level greater than 100 in a million. Given the limitations of modeling tools and assumptions, sensitive receptor exposure numbers are an indication of relative exposure, and not a precise prediction. Actual exposures potentially could be lower because of the conservative emission modeling assumptions used in the cancer risk analysis.

While exhaust-related emissions would decrease in both CARE communities and non-CARE communities, total $PM_{2.5}$ emissions would increase in the Plan area as would total $PM_{2.5}$ emissions in the Santa Clara County CARE community. The projected increase in total $PM_{2.5}$ emissions in the Santa Clara County community CARE community from 2015 to 2050 would constitute a change in $PM_{2.5}$ exposure levels that disproportionally affect minority and low-income populations.

For these reasons, this impact would be **potentially significant (PS)** in 2050. Mitigation Measures AQ-4(a) through AQ-4(d) address this impact and are described below.

Mitigation Measures

Implement Mitigation Measure AQ-2

Mitigation Measure AQ-4(a) When locating sensitive receptors in TAC risk areas, as identified in **Figure 3.4-2**, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Install, operate and maintain in good working order a central heating, ventilation and air conditioning (HVAC) system or other air intake system in the building, or in each individual unit, that meets or exceeds a minimum efficiency reporting value (MERV) of 13 (MERV-16 for projects located in the West Oakland Specific Plan area) or higher (BAAQMD 2016). The HVAC system shall include the following features: Installation of a high efficiency filter and/or carbon filter to filter particulates and other chemical matter from entering the building. Either high efficiency particulate air (HEPA) filters or American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) certified 85 percent supply filters shall be used.
- Reduce emissions from diesel trucks through implementing the following measures, if feasible: installing electrical hook-ups for diesel trucks at loading docks; requiring trucks to use Transportation Refrigeration Units that meet Tier 4 emission standards; requiring truck-intensive projects to use advanced exhaust technology (e.g., hybrid) or alternative fuels; prohibiting trucks from idling for more than 2 minutes; and establishing truck routes to avoid sensitive receptors in the project. Implement a truck route program, along with truck calming, parking, and delivery restrictions.
- Install passive electrostatic filtering systems with low air velocities (i.e., less than 1 mph).
- Phase residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible.
- Locate sensitive receptors as far away from truck activity areas, such as loading docks and delivery areas, as feasible.
- Ensure that existing and new standby or emergency diesel generators meet CARB's Tier 4 emission standards, if feasible.
- Locate individual and common exterior open space and outdoor activity areas proposed as part of individual projects as far away as possible from emission source within the project site boundary, face them away major freeways, and shield them from the source (i.e., the roadway) of air pollution with buildings or otherwise buffer them to further reduce air pollution for project occupants.
- Locate air intakes and design windows to reduce PM exposure (e.g., windows nearest to the roadway do not open).
- If sensitive receptors are located near a distribution center, do not locate residents immediately adjacent to a loading dock or where trucks concentrate to deliver goods.
- Locate sensitive receptors in buildings in areas upwind of major roadway traffic to reduce exposure to reduce cancer risk levels and exposure to $PM_{2.5}$.
- Plant trees and/or vegetation between sensitive receptors and pollution source. Trees that are best suited to trapping PM shall be planted, including one or more of the following species: pine (*Pinus nigra* var. *maritima*), cypress (x *Cupressocyparis leylandii*), hybrid popular (*Populus deltoids* x *trichocarpa*), California pepper tree (*Schinus molle*), and redwood (*Sequoia sempervirens*).

- Reduce emissions from diesel trucks by establishing truck routes to avoid residential neighborhoods or other land uses serving sensitive populations, such as hospitals, schools, and child care centers. A truck route program, along with truck calming, parking and delivery restrictions, shall be implemented to direct traffic activity at non-permitted sources and large construction projects.

These BMPs are consistent with recommendations in BAAQMD's CEQA Guidelines (BAAQMD 2017c) and Planning Healthy Places (BAAQMD 2016).

Mitigation Measure AQ-4(b) MTC and ABAG shall partner with BAAQMD and local lead agencies to develop a program to install air filtration devices in existing residential buildings, and other buildings with sensitive receptors, located near freeways or sources of TACs and $PM_{2.5}$.

Mitigation Measure AQ-4(c) MTC and ABAG shall partner with BAAQMD to develop a program to provide incentives to replace older locomotives and trucks in the region to reduce TACs and $PM_{2.5}$.

Mitigation Measure AQ-4(d) Implementing agency shall implement the strategies identified in the CARB Technical Advisory to reduce air pollution exposure near high-volume roadways to less-than-significant levels, where feasible. Examples of effective strategies include (CARB 2017b):

- Using speed reduction mechanisms, such as roundabouts to reduce the frequency of stop-and-go driving common among streets that support stop signs;
- Using traffic signal management to limit the frequency of stop-and-go driving and vehicle idling;
- Establishing and enforcing speed limit reductions of high-speed roadways;
- Using design elements that promote air flow and pollutant dispersion along street corridors to optimize air flow, building downwash, and pollution dispersal;
- Incorporating bike lanes and sidewalks to promote alternative, zero-pollution modes of transportation; and
- Constructing solid barriers directly adjacent to high-volume roadways, such as sound walls to improve downwash.

Significance after Mitigation

Site-specific analysis would be needed when a project is proposed in the Plan area to determine the actual level of exposure and whether feasible mitigation exists for the project to implement to reduce its level of cancer risk exposure to less than 100 in a million and $PM_{2.5}$ concentrations less than 0.8 $\mu g/m^3$.

The proposed Plan could result in changes in total $PM_{2.5}$ exposure levels that disproportionally impact minority and low-income communities. These impacts would vary across counties.

The vehicle speed reduction measures listed under Mitigation Measure AQ-4(e) would result in reduced stop-and-go driving and hard accelerations thereby reducing emissions rates. While each vehicle reaches its optimal fuel economy at a different speed (or range of speeds), gas mileage usually decreases rapidly at speeds above 50 mph. Aggressive driving (speeding, rapid acceleration and braking) wastes gas and lowers gas mileage by approximately 15–30 percent at highway speeds and 10–40 percent in stop-and-go traffic (Oak Ridge National Laboratory 2017).

The mitigation measures identified above would result in reduced emissions and lower exposure levels near sensitive receptors. Projects taking advantage of CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above to address

site-specific conditions. However, the exact reductions are not known at this time. Therefore, this impact would be **significant and unavoidable (SU).**

Impact AQ-5: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people (LTS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Construction

The level of impact associated with odor emissions depends on numerous factors, including: the frequency, intensity, duration, offensiveness, and location of the source; wind speed and direction; and the sensitivity of the receptors. Offensive odors can be unpleasant and can lead to distress among members of the public. In addition, manifestations of a person's reaction to offensive odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

Individual descriptions of an odor reflect the nature of the smell experience. If a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the concentration in the air. When an odor sample is progressively diluted, the odor concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odor reaches a level that is no longer detectable.

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals can smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. Odor sources commonly associated with negative human response include wastewater treatment plants, sanitary landfills, composting facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting operations, rendering plants, food packaging plants, and cannabis. Several of these sources are located within the Plan area of the proposed Plan.

Project-related construction activities could result in odorous diesel exhaust emissions from construction equipment and odors associated with asphalt paving. Construction equipment and processes are generally similar between land use and transportation projects. Construction-generated odorous emissions, however, would be temporary and not be generated at any one location for an extended period. Diesel exhaust fumes would also dissipate rapidly from the source with an increase in distance. Therefore, these activities would not result in the frequent exposure of receptors to objectionable odorous emissions, and this would be a less-than-significant (LTS) impact.

Operation

Projected development associated with the proposed Plan is generally related to new housing, commercial facilities, and transportation-related projects (e.g., extension of rail, widening of roadways, improvements to interchanges). These types of projects typically would not introduce new operational sources of odors to the area. However, facilities that may emit objectionable odors, would be subject to local zoning designations that limit odiferous businesses to areas where substantial numbers of residents or other sensitive receptors would not be affected (e.g., commercial areas). Furthermore,

BAAQMD Regulation 7, Odorous Substances, places general limitations on odorous substances and specific emission limitations on certain odorous compounds. The regulation also provides a process for receiving odor complaints, identifying sources of objectionable odors, and assisting the owner or facility responsible for the odor to find a way to reduce emissions.

Jurisdictions may choose to adopt an optional air quality element or include policies related to air quality in other general plan elements. In general, local planning policies related to air quality are established to reduce exposure to air pollutants and safeguard public health and may address density; compact development; alternative transportation modes; energy conservation; cleaner-fuel vehicles; reductions for particulate emissions from roads, construction sites, and fireplaces; and public education programs. This impact would be less than significant (LTS).

Conclusion

Because objectionable odors associated with construction of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would be regulated through BAAQMD regulations or would otherwise be temporary and because operational uses would be subject to local zoning ordinances as well as local air district permitting processes, this impact would be **less than significant (LTS)**.

Mitigation Measures

None required.

3.5 BIOLOGICAL RESOURCES

This section describes the common and sensitive vegetation, terrestrial wildlife, and aquatic biological resources known or with potential to occur in the Plan area. Biological resources include common vegetation and habitat types, sensitive natural communities and other areas of ecological significance, and special-status plant and animal species. Potential impacts of Plan implementation are analyzed, and mitigation measures are identified for those impacts determined to be significant. The information and analysis presented are regional in scope, as appropriate for a program-level EIR.

Comments received on the Notice of Preparation expressed the importance of analyzing effects on wildlife movement corridors, fish passage, threatened and endangered species and their habitats, shallow water habitats (e.g., eelgrass beds, tidal mudflats, salt and brackish tidal marshes, other wetlands), and native plants, as well as the effects of artificial lighting on wildlife. These items are addressed in this section for the proposed Plan. Effects of the alternatives are addressed in Chapter 4, "Alternatives."

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." (CEQA Guidelines Section 15083.) Neither the CEQA Guidelines nor Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.5.1 Environmental Setting

SPECIAL-STATUS SPECIES

Special-status species are defined as species that are legally protected or that are otherwise considered sensitive by federal, State, or local resource agencies. As noted previously, the high diversity of vegetation and wildlife found in the Bay Area is a result of soil, topographic, and microclimate diversity that combine to promote relatively high levels of endemism.[1] This, in combination with the rapid pace of development in the region, has resulted in a relatively high degree of endangerment for local flora and fauna. Several species known to occur in the Bay Area are considered special-status species because of their recognized rarity or vulnerability to habitat loss or population decline. Some of these species are listed and receive specific protection defined in federal or State endangered species laws. Other species have not been formally listed as threatened or endangered but have been designated as "rare" or "sensitive" on the basis of adopted policies and expertise of State resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies, such as counties, cities, and special districts, to meet local conservation objectives.

[1] "Endemism" refers to the degree to which organisms or taxa are restricted to a geographical region or locality and are thus individually characterized as endemic to that area.

Special-status species are species, subspecies, or varieties in one or more of the following categories, regardless of their legal or protection status:

- officially listed by California under the California Endangered Species Act (CESA) or the federal government under the Endangered Species Act (ESA) as endangered, threatened, or rare;
- a candidate for State or federal listing as endangered, threatened, or rare under CESA or ESA;
- taxa (i.e., taxonomic category or group) that meet the criteria for listing, even if not currently included on any list, as described in CCR Section 15380 of the State CEQA Guidelines;
- species identified by the California Department of Fish and Wildlife (CDFW) as species of special concern;
- species listed as fully protected under the California Fish and Game Code;
- species afforded protection under local planning documents; and
- taxa considered by the CDFW to be "rare, threatened, or endangered in California" and assigned a California Rare Plant Rank (CRPR) of 1 or 2. The CDFW system includes rarity and endangerment ranks for categorizing plant species of concern, and ranks 1 and 2 are summarized as follows:
  - CRPR 1A: plants presumed to be extinct in California;
  - CRPR 1B: plants that are rare, threatened, or endangered in California and elsewhere;
  - CRPR 2A: plants presumed to be extinct in California but common elsewhere; and
  - CRPR 2B: plants that are rare, threatened, or endangered in California but more common elsewhere.

The term "California species of special concern" is applied by CDFW to animals not listed under the ESA or CESA but that are considered to be declining at a rate that could result in listing, or that historically occurred in low numbers and known threats to their persistence currently exist. CDFW's fully protected status was California's first attempt to identify and protect animals that were rare or facing extinction. Most species listed as fully protected were eventually listed as threatened or endangered under CESA; however, some species remain listed as fully protected but do not have simultaneous listing under CESA. Fully protected species may not be taken or possessed at any time and no take permits can be issued for these species except for scientific research purposes, for relocation to protect livestock, or as part of a natural community conservation plan (NCCP).

A list of special-status plant and wildlife species was generated through a query of the California Natural Diversity Database (CNDDB), a California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants search, and a U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) electronic records search of the nine counties in the Plan area (CNDDB 2020, CNPS 2020, USFWS 2020). Generalized habitat for these special-status plant and wildlife species that may occur in the plan area and their listing status are provided in **Table C-1** in Appendix C. Additional occurrences of special-status plant and animal species not reported in the California Natural Diversity Database are likely and presumed to exist in habitats suitable for the species throughout the Plan area.

CRITICAL HABITAT

The USFWS and National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) designate critical habitat for certain species that they have listed as threatened or endangered. "Critical habitat" is defined in Section 3(5)(A) of the ESA as those lands (or waters) within a listed species' current range that contain the physical or biological features that are considered essential to the species' conservation, as well as areas outside the species' current range that are determined to be essential to its conservation. Critical habitat may include an area that is not currently occupied by the species but that may be needed for its recovery. Given the large scale at which critical habitat is mapped, it may also include areas that are not suitable for a species and would not be occupied. A critical habitat designation applies only to activities performed by federal agencies or that involve a federal permit, license, or funding, and that are likely to destroy or adversely affect the area of critical habitat. Critical habitat has been designated for 30 species in the Bay Area. Of these, critical habitat units for California red-legged frog, California tiger salamander, Central Coast steelhead, Alameda whipsnake, and marbled murrelet are the most widespread throughout the region.

See **Figures 3.5-1** through **3.5-4** for the locations of critical habitat units throughout the Bay Area and **Table 3.5-1** for a summary of critical habitat by county.

SENSITIVE NATURAL COMMUNITIES

Sensitive natural communities are those native plant communities that are defined by CDFW as having limited distribution Statewide or within a county or region and that are often vulnerable to environmental effects of projects (CDFW 2018). These communities may not contain special-status plants or their habitat (CDFW 2018). CDFW designates sensitive natural communities based on their State rarity and threat ranking using NatureServe's Heritage Methodology. Natural communities with rarity ranks of S1 to S3, where S1 is critically imperiled, S2 is imperiled, and S3 is vulnerable, are considered sensitive natural communities to be addressed in the environmental review processes of CEQA and its equivalents (CDFW 2018). Oak woodlands are protected in California by State law and many local policies and plans, and federal, State, and most local agencies also consider wetlands and riparian habitat as sensitive communities.

Sensitive natural communities are generally identified at the alliance level of vegetation classification hierarchy using the Manual of California Vegetation (Sawyer et al. 2009). Known occurrences of sensitive natural communities are included in the CNDDB; however, no new occurrences have been added to the CNDDB since the mid-1990s when funding was cut for this portion of the CNDDB program. No Statewide law requires protection of all sensitive natural communities, but CEQA requires consideration of the potential impacts of a project on biological resources of Statewide or regional significance. Sensitive communities in the Bay Area include coastal salt marsh; brackish and freshwater wetlands, including marshes, seasonal wetlands, and vernal pools; riparian forests and woodlands; and several types of coastal scrub, chaparral, and perennial grasslands.

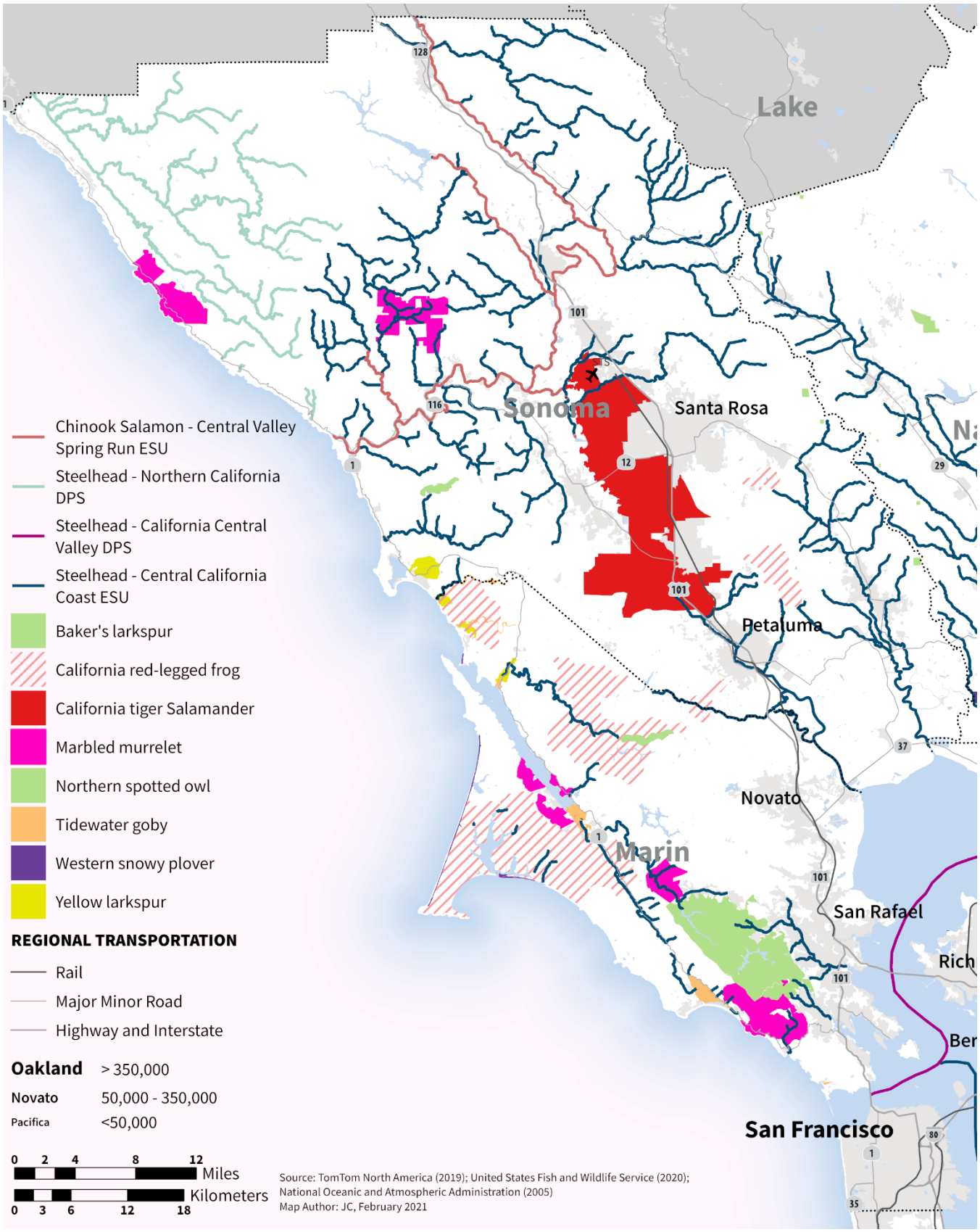

Figure 3.5-1: Critical Habitat: Sonoma and Marin Counties

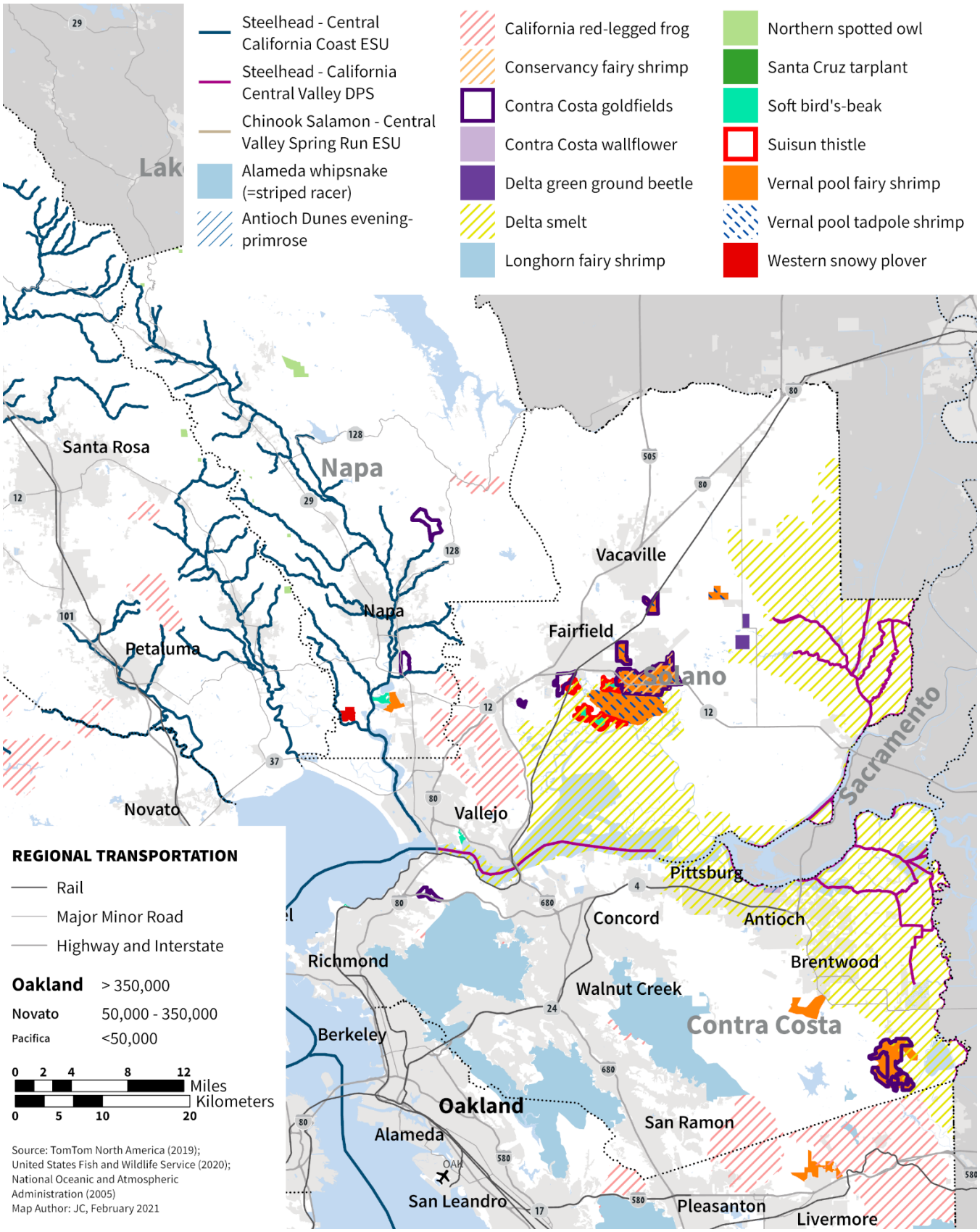

Figure 3.5-2: Critical Habitat: Napa, Solano, and Contra Costa Counties

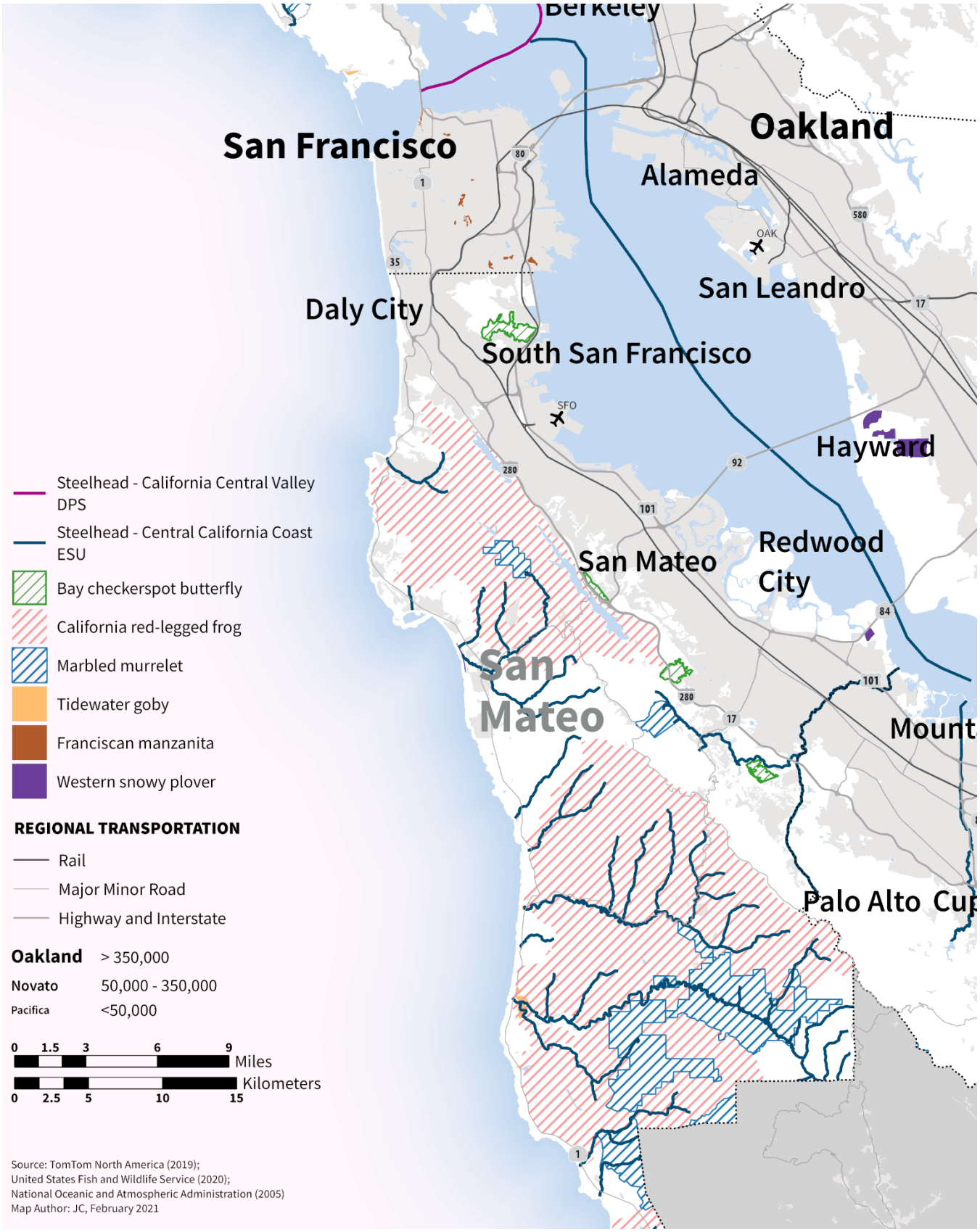

Figure 3.5-3: Critical Habitat: San Francisco and San Mateo Counties

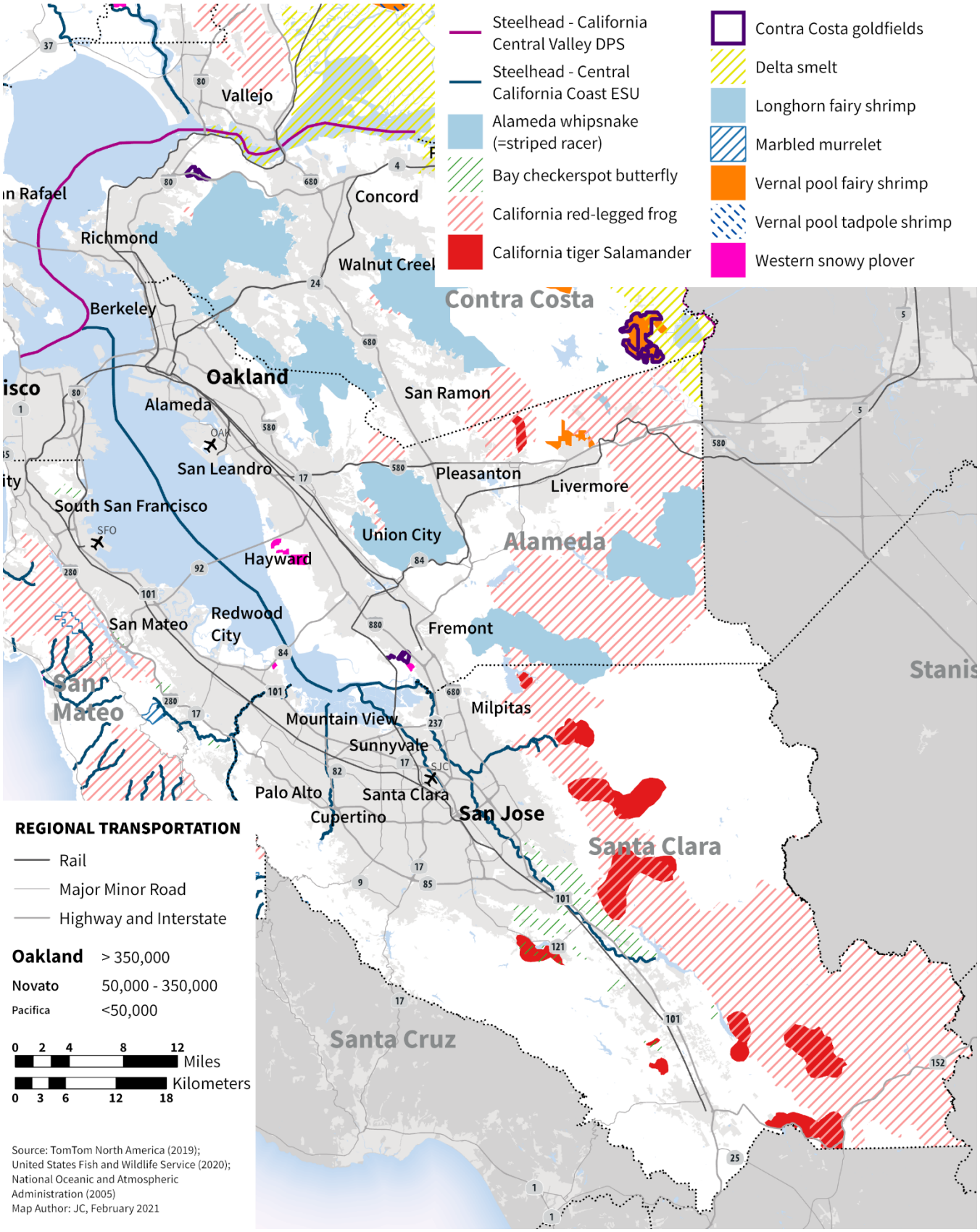

Figure 3.5-4: Critical Habitat: Alameda and Santa Clara Counties

Table 3.5-1: Critical Habitat in the Bay Area

Species	County								
	Contra Costa	Alameda	Santa Clara	San Mateo	San Francisco	Marin	Sonoma	Napa	Solano
Antioch Dunes evening primrose	✓								
Baker's larkspur						✓	✓		
Contra Costa goldfields	✓	✓						✓	✓
Contra Costa wallflower	✓								
Franciscan manzanita					✓				
Santa Cruz tarplant	✓								
Soft bird's beak	✓							✓	✓
Suisun thistle									✓
Yellow larkspur						✓	✓		
Delta smelt	✓	✓							✓
Chinook salmon California coastal ESU							✓		
Chinook salmon Central Valley spring-run ESU									✓
Steelhead northern California DPS							✓		
Steelhead South/Central California Coast DPS			✓						
Steelhead Central California Coast DPS			✓	✓		✓	✓	✓	
Steelhead California Central Valley DPS	✓								✓
Tidewater goby				✓		✓	✓		
Bay checkerspot butterfly			✓	✓					
Delta green ground beetle									✓
Conservancy fairy shrimp									✓
Longhorn fairy shrimp	✓	✓							
Vernal pool fairy shrimp	✓	✓						✓	✓
Vernal pool tadpole shrimp		✓							✓
California red-legged frog	✓	✓	✓	✓		✓	✓	✓	✓
California tiger salamander		✓	✓				✓		✓
Alameda whipsnake	✓	✓	✓						
Marbled murrelet				✓		✓	✓		
Northern spotted owl						✓	✓	✓	
Western snowy plover		✓		✓		✓			
Stellar sea lion				✓					

Notes: DPS = distinct population segment; ESU = evolutionarily significant unit.

NATURAL COMMUNITIES OF THE BAY AREA

The Bay Area supports numerous distinct natural communities[2] composed of a diversity of vegetative types that provide habitat for a wide variety of plant and wildlife species. Broad habitat categories in the region include grasslands, coastal scrub and chaparral, woodlands and forests, riparian systems and freshwater aquatic habitat, and wetlands. Urban and otherwise disturbed habitats, such as agricultural fields, also provide natural functions and values as wildlife habitat and are also considered in this EIR, as are the aquatic and estuarine resources of the Bay Area. The following discussion summarizes the natural communities located within the Bay Area and references special-status species associated with these communities.[3]

Grasslands

Natural Community Summary

Grasslands within the Bay Area include two basic types: nonnative annual grasslands and perennial grasslands, including, among others, serpentine bunchgrass and valley needlegrass grasslands (Holland 1986). Nonnative annual grasslands make up the vast majority of grassland habitat occurring throughout the Bay Area and consist of a sparse to dense cover of primarily introduced annual grasses associated with a variety of broadleaf herbs and, occasionally, native or introduced perennial grasses. The most abundant species are typically nonnative annual grasses in the genera *Bromus, Avena, Festuca*, and *Hordeum*. Broadleaf species common to Bay Area grasslands are quite variable but often include filaree (*Erodium* spp.), yellow star-thistle (*Centaurea solstitialis*), lupines (*Lupinus* spp.), peppergrass (*Lepidium* spp.), Indian paintbrush (*Castilleja* spp.), and California poppy (*Eschscholzia californica*). In addition to considerable site-to-site variation that is largely based on soils and management practices, there is also much year-to-year variation in species composition in response to the timing and amount of precipitation.

Serpentine bunchgrass and valley needlegrass grasslands are both native perennial grasslands with limited distribution in the Bay Area. The first has limited distribution because of its dependency upon serpentine soils, which are scattered throughout the Coast Ranges. Serpentine bunchgrass grasslands are most widespread in Marin County, on the San Mateo peninsula, and in southern Santa Clara County. This open grassland community is dominated by native perennial bunchgrasses of the genera *Bromus, Melica, Poa, Calamagrostis,* and *Festuca*. Native herbaceous associates include California poppy, tarweed (*Hemizonia* spp.), and lotus (*Lotus* spp.). Valley needlegrass grasslands typically occur on seasonally moist, fine-textured soils and often intergrade with oak woodland communities. This formerly extensive grassland type is dominated by clump-forming purple needlegrass (*Stipa pulchra*) and a variety of native and introduced grasses and herbs.

Grassland habitats of all types are used by a wide variety of wildlife. Reptile species typically found in grasslands include western fence lizard (*Sceloporus occidentalis*), western terrestrial garter snake (*Thamnophis elegans*), and western rattlesnake (*Crotalus viridis*). Mammals within this habitat include black-tailed jackrabbit (*Lepus californicus*), western harvest mouse *(Reithrodontomys megalotis*),

[2] Natural communities are assemblages of species that reoccur because of responses to similar combinations of environmental conditions and are not dependent on human intervention. For this discussion, native vegetation pertains to those species present in California before European settlement, whereas species such as wild oats and brome grasses, which were introduced with colonization and dominate much of the current California landscape, are considered nonnative. Vegetation communities dependent on human intervention, such as irrigated agriculture or landscaped or urbanized areas, are considered introduced communities.

[3] Certain plant and wildlife species are protected under federal and/or State endangered species laws or are otherwise protected through a variety of mechanisms. These species are collectively referred to as "special-status species." See Appendix C for categories of special-status species.

California vole (*Microtus californicus*), and coyote (*Canis latrans*). Bird species that use grasslands for foraging habitat include raptors such as turkey vulture (*Cathartes aura*), American kestrel (*Falco sparverius*), and red-tailed hawk (*Buteo jamaicensis*), as well as a variety of insect- and seed-eating birds, such as white-crowned sparrow (*Zonotrichia leucophrys*), Brewer's blackbird (*Euphagus cyanocephalus*), mourning dove *(Zenaida macroura*), meadowlark (*Sturnella neglecta*), and lesser goldfinch (*Carduelis psaltria*).

Special-Status Plants

Many special-status plant species associated with grasslands occur in particular microhabitats (e.g., specific soil or hydrologic conditions) or areas that support a relatively low abundance of introduced annual grasses and forbs. Many species are now restricted to serpentine soils or thin soils with low nutrient content that introduced species are unable to colonize. These include white-rayed pentachaeta (*Pentachaeta bellidiflora*), San Francisco popcorn flower (*Plagiobothrys diffusus*), most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*), Tiburon jewel-flower (*Streptanthus niger*), Tiburon Indian paintbrush (*Castilleja affinis* ssp. *neglecta*), Tamalpais lessingia (*Lessingia micradenia* var. *micradenia*), Contra Costa goldfields (*Lasthenia conjugens*), fountain thistle (*Cirsium fontinale* var. *fontinale*), Santa Cruz tarplant (*Holocarpha macradenia*), Marin western flax (*Hesperolinon congestum*), Brewer's western flax (*Hesperolinon breweri*), Diablo helianthella (*Helianthella castanea*), diamond-petaled California poppy (*Eschscholzia rhombipetala*), caper-fruited tropidocarpum (*Tropidocarpum capparideum*), and recurved larkspur (*Delphinium recurvatum*). Most of these species may also occur in vegetation communities other than grassland with their distribution generally restricted to specific soil types, hydrologic regimes, elevation range, and geographic distribution. See Table C-1 in Appendix C for a complete list of special-status species with potential to occur in the Plan area.

Special-Status Wildlife

A variety of special-status wildlife species are associated with grassland habitats of the Bay Area, including crotch bumble bee (*Bombus crotchii*), western bumble bee (*Bombus occidentalis*), callippe silverspot butterfly (*Speyeria callippe callippe*), mission blue butterfly (*Icaricia icarioides missionensis*), bay checkerspot butterfly (*Euphydryas editha bayensis*), California tiger salamander (*Ambystoma californiense*), western spadefoot toad (*Scaphiopus hammondii*), California red-legged frog (*Rana draytonii*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), San Joaquin whipsnake (*Masticophis flagellum ruddocki*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus hudsonius*), golden eagle (*Aquila chrysaetos*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), grasshopper sparrow (*Ammodramus savannarum*), and San Joaquin kit fox (*Vulpes macrotis mutica*).

Coastal Scrub and Chaparral

Natural Community Summary

Coastal scrub and sage scrub plant communities in the Bay Area are characterized on the basis of the dominant species: California buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemesia californica*), coyote brush (*Baccharis pilularis*), and black sage (*Salvia mellifera*) (Sawyer et al. 2009). Coastal scrub communities are particularly dominant in the drier southern slopes and on exposed rocky slopes and bluffs within the Coast Ranges in the Bay Area. Coastal scrub is best considered as a collection or assemblage of different vegetation series, with various intergrades between the above-described plant communities. Coastal scrubs often intergrade with various chaparral types and occur in a vegetative mosaic with grasslands and woodlands based on soil type, slope, aspect, and available moisture. Generally, these are communities of dense, low shrubs with sparse understory except in scattered grassy openings.

Chaparral is dominated by hard-leaved evergreen shrubs, generally with little or no herbaceous ground cover or overstory trees. Chamise (*Adenostoma fasciculatum)* and a variety of manzanita species (*Arctostaphylos* spp.) are the dominant or codominant species throughout Bay Area chaparral communities. Gaps in chaparral support primarily grassland species, ranging from nonnative herbaceous annuals and grasses to native perennial bunchgrasses, small ferns, and bulbiferous species.

Coastal scrub and chaparral habitat provide dense vegetative cover for many common small mammals and reptiles, including deer mouse (*Peromyscus maniculatus*), California mouse (*Peromyscus californicus*), brush rabbit (*Sylvilagus bachmani*), western fence lizard, common garter snake (*Pituophis catenifer*), common kingsnake (*Lampropeltis getulus*), and western rattlesnake. Bird species that nest in shrub dominated habitats include California quail (*Callipepla californica*), California scrub jay (*Aphelocoma californica*), bushtit (*Psaltriparus minimus*), California thrasher (*Toxostoma redivivum*), spotted towhee (*Pipilo maculatus*), sage sparrow (*Amphispiza belli*), and Bewick's wren (*Thryomanes bewickii*). Coastal scrub and chaparral provide important foraging habitat for black-tailed deer (*Odocoileus hemionus columbianus*) and other large mammals that prey upon smaller mammals and reptiles in scrub and chaparral habitat, including coyote, gray fox (*Urocyon cinereoargenteus*), and raccoon (*Procyon lotor*).

Special-Status Plants

Similar to Bay Area grasslands, distribution of rare plants and wildlife in scrub and chaparral communities often coincides with the distribution of uncommon geological features. In the case of coastal scrub plant communities, an array of plants and wildlife have adapted to serpentine-derived soils in both scrub habitats and grasslands. Conditions such as slope, aspect, precipitation, temperature, degree of exposure, and the presence of suitable soil conditions often control the distribution of rare species.

Special-status serpentine-adapted scrub species include coyote ceanothus (*Ceanothus ferrisae*), Presidio clarkia (*Clarkia franciscana*), Nicasio ceanothus (*Cenothus decomutus*), Mt. Diablo bird's beak (*Cordylanthus nidularius*), Marin checker lily (*Fritillaria affinis* var. *tristulis*), fragrant fritillary (*Fritillaria liliacea*), Crystal Springs lessingia (*Lessingia arachnoidea*), smooth lessingia (*Lessingia micradenia* var. *glabrata*), Sharsmith's harebell (*Campanula sharsmithiae*), Marin checkerbloom (*Sidalcea hickmanii* var. *viridis*), San Francisco campion (*Silene verecunda* var. *verecunda*), pink creamsacs (*Castilleja rubicundula* var. *rubicundula*), Tiburon paintbrush, and Tamalpais jewel-flower (*Streptanthus batrachopus*). Plants not specifically adapted to serpentine habitats include Mt. Day rockcress (*Boechera rubicundula*), San Francisco Bay spineflower (*Chorizanthe cuspidata* var. *cuspidata*), woolly-headed spineflower (*Chorizanthe cuspidata* var. *villosa*), yellow larkspur (*Delphinium luteum*), supple daisy (*Erigeron supplex*), Mt. Diablo buckwheat (*Eriogonum truncatum*), coast wallflower (*Erysisum ammophilum*), robust monardella (*Monardella villosa* var. *globosa*), Lime Ridge navarretia (*Navarretia gowenii*), Marin County navarretia (*Navarretia rosulata*), Napa checkerbloom (*Sidalcea hickmanii* ssp. *napaensis*), north coast phacelia (*Phacelia insularis* var. *continentis*), and Metcalf Canyon jewel flower (*Streptanthus albidus* ssp. *albidus*). In addition to these species, 17 species of manzanita and eight species of ceanothus considered to be of special status occur in Bay Area chaparral habitats.

Special-Status Wildlife

Relatively few special-status wildlife species are found within coastal scrub or chaparral habitats. Some of these are highly specialized invertebrates whose life histories are intimately dependent upon serpentine-associated species, including callippe silverspot butterfly and two non-serpentine-dependent species, San Bruno elfin butterfly (*Incisalia mossii bayensis*) and mission blue butterfly.

In Contra Costa, Alameda, and northeastern Santa Clara Counties, chaparral and scrub habitats and adjacent grasslands support Alameda whipsnake, which is federally and State listed as threatened. Other special-status wildlife occurring in Bay Area chaparral and scrub communities include northern

California legless lizard (*Aniella pulchra*), California glossy snake (*Arizona elegans occidentalis*), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), ringtail (*Bassariscus astutus*), pallid bat (*Antrozous pallidus*), and coast horned lizard (*Phrynosoma blainvillii*). See **Table C-1** in Appendix C for a complete list of special-status species with potential to occur in the Plan area.

Woodlands and Forest

Natural Community Summary

The diverse topography, soils, and climate of the Bay Area region support a wide range of woodland and forest types, from the oak savannas of the dry interior to the redwood forests of the coastal hills and mountains.

Bay Area woodlands either are dominated by a single oak species, including coast live oak (*Quercus agrifolia*), blue oak (*Quercus douglasii*), California black oak (*Quercus kelloggii*), or valley oak (*Quercus lobata*), or are classified as mixed hardwood woodlands composed of a variety of tree species, including one or more oaks, and most often, big-leaf maple (*Acer macrophyllum*), tan oak (*Notholithocarpus densiflorus*), California bay (*Umbellaria californica*), madrone (*Arbutus menziesii*), and California buckeye (*Aesculus californica*). Woodland understory vegetation is dependent on canopy cover, which can range from oak savanna with widely spaced trees and annual grasslands as understory, to a denser but still relatively open mixed woodland canopy often seen on north- and east-facing slopes or in canyons, which supports both shrubs and herbaceous vegetation. Here the shrub layer of the understory often contains toyon (*Heteromeles arbutifolia*), snowberry (*Symphoricarpos albus*), poison oak (*Toxicodendron diversilobum*), gooseberry (*Ribes* spp.), ocean spray (*Holodiscus discolor*), and California blackberry (*Rubus ursinus*). The herb layer can consist of nonnative grasses, such as soft chess (*Bromus mollis*) and ripgut brome (*Bromus diandrus*), and perennial native bunchgrasses, such as blue wildrye (*Elymus glaucus*), intermixed with native and nonnative wildflowers, including mission bells (*Fritillaria affinis*), chickweed (*Stellaria media*), bedstraw (*Galium aparine*), mugwort (*Artemesia douglasiana*), fiesta flower (*Pholistoma auritum*), and miner's lettuce (*Claytonia perfoliata*). Where canopy cover is most dense, understory is sparse or absent and is typically made up of herbaceous species.

Bay Area oak and mixed woodlands provide water, foraging, nesting, cover, and migratory and dispersal corridors for a variety of wildlife species. Insect eaters such as ash-throated flycatcher (*Myiarchus cinerascens*), oak titmouse (*Parus inornatus*), and dark-eyed junco (*Junco hyemalis*) are woodland foliage gleaners. Bark gleaner species, such as California scrub jay, Steller's jay (*Cyanocitta stelleri*), and acorn woodpecker (*Melanerpes formicivorus*), feed on insects, as well as acorns. California quail and California towhee (*Pipilo crissalis*) are ground foragers in this habitat. Cooper's hawk (*Accipiter cooperi*) and sharp-shinned hawk (*Accipiter striatus*) are often associated with woodland habitat, where they hunt small birds. Mammals such as gray squirrel (*Sciurus griseus*) forage and nest in the canopy of the trees, whereas long-tailed weasels (*Mustela frenata*) hunt on the ground for shrews (*Sorex* spp.) and California voles. Larger mammals, such as black-tailed deer, use the oak understory for shelter and food from acorns, berries, and foliage. Amphibians such as Pacific slender salamander (*Batrachoseps attenuatus*), arboreal salamander (*Aneides lugubris*), and ensatina (*Ensatina eschscholtzii*) live under the cover of fallen leaf litter.

Bay Area forest types are generally found at higher elevations of the Coast Ranges in areas with adequate moisture and are either dominated by a mix of hardwood species on drier slopes, as noted above for mixed woodlands, sometimes with one or more coniferous tree species, including coast redwood (*Sequoia sempervirens*) and Douglas fir (*Pseudotsuga menziesii*), or are dominated by conifers, with tanoak and big-leaf maple as common associates. Typical understory species include wood rose (*Rosa gymnocarpa*), coastal wood fern (*Dryopteris arguta*), ocean spray, bracken fern (*Pteridium aquilinum*), yerba buena (*Clinopodium douglasii*), hazelnut (*Corylus cornuta*), creeping

snowberry (*Symphoricarpos mollis*), and poison oak. Blue blossom (*Ceanothus thyrsiflorus*) and toyon are common in sunnier openings.

Redwood forest typically occupies coastal areas where fog drip and precipitation create moist and humid conditions. Redwood and Douglas fir dominate the canopy, their fallen needles forming a thick layer of duff. Several hardwood tree species are also associated with redwood forest, including tanoak, California bay, big-leaf maple, madrone, and several oak species. The redwood forest understory is often sparse where canopy is dense, and slopes are steep but contains a diversity of species generally not found in adjacent plant communities. These include huckleberry (*Vaccinium ovatum*), hazelnut, thimbleberry (*Rubus parviflorus*), sword fern (*Polystichum munitum*), and redwood sorrel (*Oxalis oregana*). Redwood violet (*Viola sempervirens*), western trillium (*Trillium ovatum*), red clintonia (*Clintonia andrewsiana*), and several fern species often occur on moister slopes along ravines.

Mixed hardwood forest wildlife is similar to that described above for woodland habitats. Redwood and Douglas fir forest wildlife is generally lower in diversity than other forest types, in part because the canopy density of second-growth forest precludes the establishment of many understory plants. Moist conditions in the understory support amphibians, such as yellow-eyed salamander (*Ensatina eschscholzii xanthopicta*) and California slender salamander (*Batrachoseps attenuatus*), as well as coastal rubber boa (*Charina bottae*). Birds found in the redwood forest include brown creeper (*Certhia americana*), varied thrush (*Ixoreus naevius*), chestnut-backed chickadee (*Poecile rufescens*), and Steller's jay.

Special-Status Plants

Special-status plant species associated with woodland habitats are often also found in adjacent chaparral and scrub habitats. In the Bay Area, these species include Anderson's manzanita (*Arctostaphylos andersonii*), rayless ragwort (*Senecio aphanactis*), hooked popcorn-flower (*Plagiobothrys uncinatus*), Mt. Diablo phacelia (*Phacelia phacelioides*), Baker's navarretia (*Navarretia leucocephala* ssp. *bakeri*), showy madia (*Madia radiata*), Mt. Hamilton lomatium (*Lomatium observatorium*), Jepson's linanthus (*Linanthus jepsonii*), coast lily (*Lilium maritimum*), Contra Costa goldfields, drymaria-like western flax (*Hesperolinon drymarioides*), Diablo helianthella, talus fritillary (*Fritillaria falcata*), Hillsborough chocolate lily (*Fritillaria biflora* var. *ineziana*), San Mateo woolly sunflower (*Eriophyllum latilobum*), Brandegee's eriastrum (*Eriastrum brandegeae*), western leatherwood (*Dirca occidentalis*), Hospital Canyon larkspur (*Delphinium californicum* ssp. *interius*), robust spineflower (*Chorizanthe robusta* var. *robusta*), Keck's checkerbloom (*Sidalcea keckii*), big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*), Marin manzanita (*Arctostaphylos virgata*), twisted horsehair lichen (*Bryoria spiralifera*), Mt. Diablo fairy lantern (*Calochortus pulchellus*), large-flowered fiddleneck (*Amsinckia grandiflora*), and Sharsmith's onion (*Allium sharsmithae*).

Special-Status Wildlife

Special-status wildlife species associated with woodlands include those described for grassland and riparian habitats, as well as purple martin (*Progne subis*) and other species, such as tree swallow (*Tachycineta bicolor*), Bullock's oriole (*Icterus bullockii*), and many other nesting birds, which are protected under the Migratory Bird Treaty Act and the California Fish and Game Code (see Section 3.5.2, "Regulatory Setting," below). Bay Area forests in San Mateo, Marin, Sonoma, and Napa Counties support the federally listed and State-listed marbled murrelet (*Brachyramphus marmoratus*) and the federally listed and California species of special concern northern spotted owl (*Strix occidentalis caurina*). Special-status amphibians that may occur within forest and woodland habitats include California giant salamander (*Dicamptodon ensatus*) and Santa Cruz black salamander (*Aneides niger*). Forest and woodland habitats in the Bay Area also support special-status mammal species, including Sonoma tree vole (*Arborimus pomo*), ringtail, and mountain lion (*Puma concolor*).

Riparian

Natural Community Summary

Riparian plant communities are tree- or shrub-dominated communities that occur along streams, rivers, and other aquatic features. Riparian forests, woodlands, and scrub are often separated from one another depending on the amount and density of tree canopy versus shrub canopy. Forests support a closed or nearly closed canopy of trees with variable understory, while woodlands have an open canopy of trees with an understory that is primarily grassy or herbaceous. Shrubs, rather than trees, dominate riparian scrub habitat, which is common both in the coastal mountains of San Mateo, Marin, and Sonoma Counties and in the more arid regions of the east and south Bay Area. The composition and density of riparian vegetation is very much dependent upon the duration of flowing or near-surface water, the amplitude and periodicity of flow (brief, high-velocity flows versus more sustained flows), and the texture of the substrate (cobble, gravel, sand, silt, clay). Different reaches of a stream may support different types of riparian vegetation. The major rivers, streams, and other surface waters that support riparian vegetation in the Bay Area are presented in **Figure 3.10-1** of Section 3.10, "Hydrology and Water Quality." The most well-developed riparian vegetation occurs in relatively undisturbed reaches of the largest Bay Area streams, including Sonoma Creek, the Russian River, the Napa River, Putah Creek, Alameda Creek, Coyote Creek, the Guadalupe River, San Francisquito Creek, Llagas Creek, and others listed in Section 3.10.

Typical dominant species in the forest, woodland, and scrub habitats along Bay Area rivers and streams are Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), various species of willow (*Salix* spp.), coast live oak, valley oak, and white alder (*Alnus rhombifolia*). Where they are not modified by urbanization, lower stream reaches typically intergrade into broad freshwater to brackish emergent wetlands dominated by cattails (*Typha* spp.) and bulrush (*Scirpus* spp.). Where the riparian habitat has been degraded, through either alteration of the hydrology or direct disturbance to vegetation, including along many urban stream reaches, the nonnative blue gum eucalyptus (*Eucalyptus globulus*), fennel (*Foeniculum vulgare*), poison hemlock (*Conium maculatum*), perennial pepperweed (*Lepidium latifolium*), giant reed (*Arundo donax*), or French broom (*Genista monspessulana*) are often dominant, as seen in portions of most large Bay Area streams. Upper stream reaches are also often lacking riparian cover because of long-standing grazing, agricultural practices, or channelization because of urbanization. Most remaining riparian vegetation is afforded regulatory protection by CDFW. A discussion of specific regulations is provided in Section 3.5.2, "Regulatory Setting," below.

Within the urbanized portions of the Bay Area, riparian habitats, even though often degraded, support the densest and most diverse wildlife communities available. The diversity of plant species, multilayered vegetation, and perennial water provide a variety of foods and microhabitat conditions for wildlife. Mature willows, oaks, sycamores, and other riparian trees provide high-quality nesting habitat for the region's birds.

Special-Status Plants

Special-status riparian plants in the Bay Area include western leatherwood, Mason's lilaeopsis (*Lilaeopsis masonii*), Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*), and Davidson's bush mallow (*Malacothamnus davidsonii*). See **Table C-1** in Appendix C for a complete list of special-status species with potential to occur in the Plan area.

Special-Status Wildlife

Special-status birds that nest in Bay Area riparian corridors include yellow warbler (*Setophaga petechia*), yellow-breasted chat (*Icteria virens*), and long-eared owl (*Asio otus*). Habitat destruction, habitat fragmentation, and nest parasitism by the brown-headed cowbird (*Molothrus ater*) are suspected causes of the decline of some riparian bird species. Western red bat (*Lasiurus blossevillii*), a

California species of special concern, often roosts in tree foliage in riparian corridors. Riparian forest habitat also supports special-status mammals, including ringtail and mountain lion.

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), federally listed as threatened, is dependent upon the elderberry bush (*Sambucus nigra* ssp. *caerulea*) throughout its entire life history. Elderberry bushes occur Statewide and commonly occur in riparian corridors but may also be present in isolated stands or in woodlands outside riparian habitats. The range of valley elderberry longhorn beetle includes portions of Solano County and eastern Contra Costa and Alameda Counties.

Aquatic Habitat

Natural Community Summary

Rivers and Streams

Rivers and streams of the Bay Area have several common ecological attributes:

- As a result of urbanization, many smaller streams on the San Francisco Peninsula, in south San Francisco Bay, in the East Bay, and in portions of the North Bay have been channelized or otherwise developed for flood control or agriculture.
- Most of these waterways are small, seasonal streams, and in the case of urbanized streams, many maintain perennial flows from urban runoff sources during late summer months.
- There are a handful of native streams and rivers in each county that account for the majority of freshwater flows to San Francisco Bay and provide the greatest opportunities for special-status plants and wildlife species.

The Bay Area is drained by many small to midsized rivers and creeks spread throughout the region. The Sacramento–San Joaquin River Delta (Delta) contributes the majority of the freshwater input to San Francisco Bay; however, this discussion concentrates on other tributaries in the region that provide important riverine and aquatic habitat. In the North Bay, Petaluma River, Sonoma Creek, and Napa River account for much of the freshwater flows into San Pablo Bay. Relatively smaller, though biologically important, contributions are made by Gallinas Creek, Novato Creek, Corte Madera Creek, and Miller Creek in Marin County. In general, there are few impediments or obstructions in these creeks and their watersheds. These tributaries are less channelized, offering habitat for listed native salmonids, including coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss irideus*). The Russian River in Sonoma County also provides good habitat for salmonids. Solano County watersheds, including the Putah Creek watershed, are also relatively undeveloped. Lake Berryessa limits the availability of headwater habitats in Putah Creek to anadromous fish, but this creek still provides valuable aquatic resources.

Stream resources in the East Bay, in the South Bay, and on the San Francisco Peninsula have been degraded by urban development, particularly adjacent to and within stream courses. As a result of these changes, only a handful of major streams in these areas support native fisheries and special-status fisheries. These include Alameda Creek, which drains the largely undeveloped watershed of the Sunol Valley and Livermore-Amador Valley; Coyote Creek, Guadalupe River, and Los Gatos Creek in the South Bay; and San Francisquito Creek, Permanente Creek, and San Mateo Creek on the San Francisco Peninsula. In Gilroy and Morgan Hill, Llagas Creek transports flows southward to the Pajaro River. Major dams or other fish impediments that prevent fish from reaching the upper watersheds are present in all of these streams, with the exception of San Francisquito Creek.

Habitat for common fish species occurs primarily in the streams listed in Section 3.10, “Hydrology and Water Quality,” although other, smaller streams in the Bay Area can and do support them.

Lacustrine

Lacustrine habitats are permanent water bodies that do not support emergent vegetation (except around their margins) and are not subject to tidal exchange; they include natural and constructed lakes and ponds, oxbows, flooded gravel pits, and flooded islands. Vegetation can include submerged plants, such as pondweeds (*Potamogeton* spp.) and algae in deepwater habitat, while near-shore habitat may support smartweeds (*Polygonum* spp.), cattails, spikerush (*Eleocharis* spp.), and other freshwater wetland vegetation. Lakes and ponds may support willow scrub along the shoreline. Bay Area reservoirs are typically stocked with game fish, including rainbow trout (*Oncorhynchus mykiss*), striped bass (*Morone saxatilis*), largemouth bass (*Micropterus salmoides*), sunfish (*Lepomis* spp.), brown bullhead catfish (*Ameiurus nebulosus*), and channel catfish (*Ictalurus punctatus*), among others. Resident waterfowl using lacustrine habitat include a variety of ducks, such as mallard (*Anas platyrhinchos*), and American coot (*Fulica americana*), Canada goose (*Branta canadensis*), and wading birds, such as great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), and great egret (*Ardea alba*).

Special-Status Plants

With the exception of several species, such as eel-grass pondweed (*Potamogeton zosteriformis*) and watershield (*Brasenia schreberi*), there are few special-status plants occurring in freshwater aquatic habitat of the region.

Special-Status Wildlife

As noted above, special-status fish occur in a limited number of rivers and streams in the Bay Area. Species include the federally listed tidewater goby (*Eucyclogobius newberryi*); coho salmon central California evolutionarily significant unit (ESU); steelhead northern California distinct population segment (DPS), central California coast DPS, and south/central California coast DPS; chinook salmon California coastal ESU (*Oncorhynchus tshawytscha*); and Sacramento splittail (*Pogonichthys macrolepidotus*). Several species of limited distribution and rarity occur exclusively in the lower reaches of drainages near and within the Delta, such as longfin smelt (*Spirinichus thaleichthys*) and Delta smelt (*Hypomesus transpacificus*), which is State and federally listed as threatened.

Suitable steelhead and coho spawning habitat is found in streams and rivers where there is less development. Steelhead require higher-gradient, upper reaches of streams, with access to the ocean during emigration and spawning, and cool year-round water temperatures for the juveniles' rearing habitat. Steelhead populations are documented from San Francisquito Creek, Green Valley Creek, Suisun Creek, San Pablo Creek, Coyote Creek, Steven's Creek, Guadalupe River, Corte Madera, Miller Creek, Novato Creek, Sonoma Creek, Napa River, Huichica Creek, Petaluma River, San Lorenzo Creek, San Leandro Creek, and Alameda Creek, and they are known to sporadically migrate into and occasionally breed in smaller streams throughout the Bay Area.

California freshwater shrimp (*Syncaris pacifica*), federally listed as endangered, occurs in low-gradient, structurally diverse perennial streams in the northern Bay Area (USFWS 1998). Of the 17 streams that support this species, those in the Bay Area include Sonoma Creek, the Napa River, and Huichica Creek, which drain to San Pablo Bay, and Laguna de Santa Rosa (Santa Rosa Creek) and its tributaries, which drain to the Russian River. The 1998 Recovery Plan for this species addresses the long-term protection of aquatic and riparian habitat as criteria for species delisting.

Bridges of various rivers and streams provide nesting opportunities for birds protected under the federal Migratory Bird Treaty Act and the California Fish and Game Code (see Section 3.5.2, "Regulatory Setting," below), including barn swallow (*Hirundo rustica*) and cliff swallow (*Petrochelidon pyrrhonota*), and purple martin, a California species of special concern. Bat colonies may also roost under bridges in the Bay Area, including *Myotis* species, Mexican free-tailed bat (*Tadarida brasiliensis*),

and Townsend's big-eared bat (*Corynorhinus townsendii*). Breeding and nonbreeding bat roosts are protected by California Fish and Game Code Section 4150.

California red-legged frog, federally listed as threatened, breeds in the upper reaches of most Bay Area riparian corridors and in the lower reaches within select drainage systems and ponds. The greatest concentrations of this species in the Bay Area occur near Sears Point, in several drainages and channels that traverse Interstate 580 in the Livermore-Amador Valley, and in drainages on the San Francisco Peninsula, although potential and occupied habitat occurs elsewhere throughout the region. Foothill yellow-legged frog (*Rana boylii*) breeds within perennial cobble streams with suitable pool habitat throughout the Bay Area.

San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), federally and State listed as endangered, occurs on the San Francisco Peninsula, where riparian habitats meet open water and freshwater marshlands. Habitats within the peninsula corridor occur in marshlands near San Francisco International Airport and in tributary streams to the Crystal Springs Reservoir (near Interstate 280). Some riparian habitats in the Bay Area also support small populations of western pond turtle (*Actinemys marmorata)*.

Special-status birds that use lacustrine habitat in the Bay Area include bald eagle (*Haliaeetus leucocephalus*), which is the State listed as endangered and fully protected, and osprey (*Pandion halietus*), which is protected under Section 3503.5 of the California Fish and Game Code (see Section 3.5.2, "Regulatory Setting," below, for further details). Migratory waterfowl species that forage, overwinter, rear their brood, or otherwise rely on lacustrine habitat in the Bay Area at some time during the year include wood duck (*Aix sponsa*), gadwall (*Anas strepera*), American wigeon (*Anas americana*), northern pintail (*Anas acuta*), green-winged teal (*Anas carolinensis*), canvasback (*Aythya valisineria*), bufflehead (*Bucephala albeola*), common goldeneye (*Bucephala clangula*), hooded merganser (*Lophodytes cucullatus*), common merganser (*Mergus merganser americanus*), and ruddy duck (*Oxyura jamaicensis*). See **Table C-1** in Appendix C for a complete list of special-status species with potential to occur in the Plan area.

San Francisco Bay Aquatic Resources

Natural Community Summary

The San Francisco Bay and Delta make up the Pacific Coast's largest estuary, encompassing roughly 1,600 square miles of waterways and draining more than 40 percent of California's fresh water. The Sacramento and San Joaquin Rivers flow from northern California's inland valleys into the Delta's winding system of islands, sloughs, canals, and channels before emptying into San Francisco Bay and the Pacific Ocean. Major transportation corridors bridge the open waters of San Francisco Bay, and many others are located close to the bay.

The marine environment varies widely between the six transportation corridors that cross the open waters of the San Francisco Bay. Most of the transbay corridors consist of open water habitat—that is, habitat below the low-tide line (also known as subtidal habitat).

Eelgrass (*Zostera marina*) may occur near the footings of bridges in the transbay corridors and is considered a sensitive habitat by CDFW. Eelgrass is an important habitat for many organisms and may influence benthic community structure by stabilizing sediments, providing forage and detritus food sources, and creating a refuge and nursery for small organisms. Eelgrass beds also provide an important attachment substrate for Pacific herring eggs and thus support an important Bay Area commercial fishery (USFWS 1994). As the largest estuary on the west coast, the San Francisco Bay also supports millions of birds that depend on the bay for rest and refueling on migratory routes.

More than 100 species of fish are described from the San Francisco Bay system (USFWS 1983). The majority of these are native species that live year-round in San Francisco Bay, though a few, such as striped bass (*Morone saxatilis*), have been introduced. Anadromous fish also use San Francisco Bay seasonally during their migrations to and from spawning grounds throughout the Bay Area and in California's Central Valley. The species composition within the bay varies by season and changes to reflect the regularly changing physical conditions created by the freshwater flow from the San Joaquin and Sacramento Rivers and other tributaries into San Francisco Bay. Native fish commonly found within the bay include such diverse species as starry flounder (*Platichthys stellatus*), California halibut (*Paralichthys californicus*), leopard shark (*Triakis semifasciata*), tule perch (*Hysterocarpus traski*), Pacific herring (*Clupea harengus pallasi*), northern anchovy (*Engraulis mordax*), and sturgeons (*Acipenser* spp.). Nonnative fish species in the bay include largemouth bass, threadfin shad (*Dorosoma petenense*), and yellowfin goby (*Acanthogobius flavimanus*).

The benthic invertebrate community of the bay is composed of various annelids, mysid shrimp, copepods, amphipods, shrimp, crabs, and other macroinvertebrates. All of these organisms provide important food sources for estuary fish and bird species.

Riprap occurs along many areas of the bay shore and can provide some, but not all, of the habitat values and functions that naturally occurring rocky shore habitat would provide, including a substrate for marine plant and sessile intertidal organisms, such as mussels (*Mytilus* spp.) and barnacles. Rocky shore habitat also provides cover for invertebrates such as rock crabs (*Cancer antennarius* and *Cancer productus*) and for fish such as plainfin midshipmen (*Porichthys notatus*), which are known to seek cover and to spawn under concrete slabs. The marine plants, clams, mussels, barnacles, annelids, and crustaceans inhabiting rocky shore habitat are food sources for larger marine invertebrates, fishes, birds, and marine mammals.

Special-Status Wildlife

The two marine mammals most commonly found in San Francisco Bay are the California sea lion (*Zalophus californianus*) and the harbor seal (*Phoca vitulina*). Both species forage in the open waters of the bay and bask on exposed rocks, piers, or wharves throughout the bay. The federal Marine Mammal Protection Act protects both species.

NOAA Fisheries recognizes several threatened and endangered species that occur in San Francisco Bay. These include loggerhead sea turtle (*Caretta caretta*), leatherback turtle (*Dermochelys coriacea*), olive ridley sea turtle (*Lepidochelys olivacea*), and several fish species, including coho salmon, steelhead, Delta smelt, and Sacramento splittail. The goby, smelt, and splittail are resident species; the salmonids, however, are expected to use open water habitats of the bay only seasonally or infrequently. Although California brown pelican (*Pelecanus occidentalis californicus*) and Steller sea lion (*Eumetopias jubatus*) are now delisted, brown pelican is still a fully protected species under the California Fish and Game Code, and Steller sea lion is still protected under the Marine Mammal Protection Act.

Wetlands

Natural Community Summary

Coastal Marsh and Estuaries

Coastal salt marshes around San Francisco Bay (including historically diked tidal marshes) are dominated by perennial pickleweed (*Salicornia pacifica*), alkali heath (*Frankenia salina*), spearscale (*Atriplex triangularis*), marsh gumplant (*Grindelia stricta* var. *angustifolia*), saltgrass (*Distichlis spicata*), and other salt-tolerant plants that are also tolerant of regular inundation or soil saturation. Tidal salt marshes are typically bisected by a network of sloughs and small channels that facilitate tidal reach into the interior of the marsh. These channels are subject to more frequent and deeper flooding and

therefore support different plant species, such as smooth cordgrass (*Spartina foliosa*) and alkali bulrush (*Scirpus maritimus*). As tidal effects and salinity decrease, coastal salt marsh intergrades with brackish marsh, especially in areas where larger rivers meet the bay.

In more extensive slough systems, such as those in the North Bay and South Bay, the transition zones between sloughs and creeks are increasingly dominated by species adapted to brackish and fresh water, such as California bulrush (*Scirpus californicus*) and cattails. Extensive coastal marsh communities are present in the lower reaches of Sonoma Creek and the Napa River and in patches along U.S. Highway 101 in Palo Alto and Mountain View.

There are relatively few terrestrial animals in the salt marsh; however, the nonnative red fox (*Vulpes vulpes*) and house mouse (*Mus musculus*), as well as the native California vole and black- tailed jackrabbit can be found in marshes around the bay. Resident bird species include marsh wren (*Cistothorus palustris*), and raptors typical of Bay Area salt marsh habitats include northern harrier, red-tailed hawk, and American kestrel. Migratory shorebirds that forage in the mudflats during low tide include black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), and several sandpipers. During high tide, a few of the ducks that may be found in salt marsh environments include northern shoveler, American wigeon, northern pintail, gadwall (*Anas strepera*), and canvasback.

Freshwater Wetlands

Freshwater emergent wetlands, or marshes, occur along slow-moving streams and rivers, along lakeshores, and in stockponds and other artificial water bodies and are dominated by perennial vegetation, such as cattails, bulrush, or spikerush. Freshwater marsh habitat provides nesting and foraging opportunities, as well as cover, for a number of bird species, amphibians, and small mammals. Species commonly associated with freshwater emergent wetlands include great blue heron, great egret, black phoebe (*Sayornis nigricans*), red-winged blackbird (*Agelaius phoeniceus*), raccoon, Sierran treefrog (*Pseudacris sierra*), and California vole. Larger mammals may use these wetlands for water or forage.

Freshwater seeps and wet meadows occur on permanently moist soil and are dominated by perennial grasses, sedges (*Carex* spp.), and rushes (*Juncus* spp.). In the Bay Area, these wetlands typically occur on grazed hillsides or at the base of grassland slopes. Seasonal wetland habitat consists of vernal pools, alkali marshes, alkali sink scrub habitats, and other seasonal wetlands with intermittent hydrologic conditions. Seasonal wetlands are dominated by herbaceous vegetation and pond surface water or maintain saturated soils at the ground surface for enough of the year to support facultative or obligate wetland plant species.

Vernal pools are seasonal freshwater pools that form in depressions over an impermeable soil layer (claypan or hardpan) or parent material. The vegetation in vernal pools consists primarily of annuals with low cover and a short life cycle. Vernal pools support a distinctive flora with a high number of endemic and rare species. Ephemeral seasonal wetlands habitat that supports vernal pool species occurs in the eastern Livermore-Amador Valley, Solano County, the city of Fremont, and the Brentwood area; near the Napa County Airport; and in the Santa Rosa Plain. In addition, alkali meadows and seeps in Contra Costa County support a similar assemblage of vernal pool endemic species.

Special-Status Plants

Special-status plants found in Bay Area salt marshes include Point Reyes bird's beak (*Chloropyron maritimum* ssp. *palustre*), soft bird's beak (*Chloropyron molle* ssp. *molle*), Humboldt bay owl's clover (*Castilleja ambigua* ssp. *humboldtiensis*), and California seablite (*Suaeda californica*). Rare plants in brackish marshes include Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*), and Suisun marsh aster.

Special-status plants of seasonal wetlands and vernal pools include Solano grass (*Tuctoria mucronata*), vernal pool smallscale (*Atriplex persistens*), Jepson's coyote thistle (*Eryngium jepsonii*), Santa Lucia dwarf rush (*Juncus luciensis*), San Joaquin saltbush (*Atriplex joaquiniana*), Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*), Contra Costa goldfields, alkali-sink goldfields (*Lasthenia chrysantha*), Point Reyes meadowfoam (*Limnanthes douglasii* ssp. *sulphurea*), and alkali milk vetch (*Astragalus tener* var. *tener*). Several highly endangered species occur in vernal pools of the Santa Rosa Plain, including Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*), and Sonoma sunshine (*Blennosperma bakeri*), which are all listed as federal and State endangered species.

Special-Status Wildlife

Rare and endangered wildlife species that occur in tidal marshes of the Bay Area include California Ridgway's rail (*Rallus obsoletus obsoletus*), California black rail (*Laterallus jamaicensis coturniculus*), western snowy plover (*Charadrius alexandrinus nivosus*), Alameda song sparrow (*Melospiza melodia pusillula*), San Pablo song sparrow (*Melospiza melodia samuelis*), salt marsh common yellowthroat (*Geothlypis trichas sinuosa*), salt marsh harvest mouse (*Reithrodontomys raviventris*), San Pablo vole (*Microtus californicus sanpabloensis*), Suisun shrew (*Sorex ornatus sinuosus*), and salt marsh wandering shrew (*Sorex vagrans*).

Freshwater emergent wetlands and adjacent grassland habitats in Solano County support populations of giant garter snake (*Thamnophis gigas*), federally and State listed as threatened. Freshwater emergent wetlands throughout the region support California red-legged frog, and vernal pools and other seasonal wetlands of sufficient depth and duration of inundation support California tiger salamander in the Santa Rosa Plain, East Bay, and elsewhere. Special-status invertebrates found in seasonal wetlands and vernal pools, primarily in the East Bay and Solano County, include longhorn fairy shrimp (*Branchinecta longiantenna),* vernal pool fairy shrimp (*Branchinecta lynchi*), and vernal pool tadpole shrimp (*Lepidurus packardi*).

Jurisdictional Waters

As described in detail in Section 3.5.2, "Regulatory Setting," below, activities such as discharge of fill or alteration that would affect most streams, rivers, and wetlands in the Bay Area are regulated by the U.S. Army Corps of Engineers (USACE), the San Francisco Regional Water Quality Control Board (RWQCB), and CDFW. The Bay Conservation and Development Commission (BCDC) regulates activities in and adjacent to San Francisco Bay, and the California Coastal Commission regulates activities along the California coast.

Jurisdictional wetlands in the Bay Area include tidal, brackish, and freshwater marshes; seasonal wetlands; seeps; and vernal pools. Rivers and streams are considered "other waters" and are regulated as such by the wetland permitting agencies. Compliance with regulations concerning wetlands and other waters would be required on a project-level basis under the proposed Plan.

Urban/Agricultural/Ruderal

Natural Community Summary

Urban

Urban development and landscaped areas support few biological resources and provide limited wildlife habitat but do provide foraging or nesting habitat for generalist,[4] and sometimes nonnative, wildlife species that can tolerate human presence and activities. These include birds and small mammals such as

[4] "Generalist" species can occupy and thrive in a variety of natural or developed areas.

California scrub jay, California towhee, house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), raccoon, Virginia opossum (*Didelphis virginica*), and house mouse. Although these areas often do not provide suitable habitat for many specialized species of native wildlife because of higher human activity levels and the resources available, they may support a greater diversity of native wildlife species under appropriate conditions.

Agricultural

The Bay Area supports agricultural lands farmed for feed and grain, produce, orchards, vineyards, and other crops, such as commercial nurseries. Agricultural lands do not typically provide habitat for a wide variety of species but when situated in proximity to undeveloped open space, rivers, and marshes may attract many of the wildlife species associated with these habitats to forage in croplands. Common species occurring in agricultural lands include small mammals, such as voles and mice, and birds, such as mourning doves, European starlings (*Sturnus vulgaris*), and several blackbird species. Special-status species commonly associated with agricultural lands include giant garter snake and burrowing owl. Croplands are also important foraging habitats for numerous raptors, including the red-tailed hawk, northern harrier, and white-tailed kite.

Ruderal

Ruderal (disturbed and weedy) habitats are most prevalent in areas subject to frequent and often severe vegetation and soil disturbances, including overgrazed rangeland, disced or fallow fields, construction sites, levees, vehicle parking lots, and railroad or other public utility rights-of-way. This habitat type occurs throughout the region and is replacing annual grasslands where pressures are particularly high. Where vegetated, these sites are dominated by opportunistic, weedy nonnative plant species, such as perennial pepperweed, black mustard (*Brassica nigra*), mayweed (*Anthemis cotula*), wild radish (*Raphanus sativus*), yellow star-thistle, Italian thistle (*Carduus pycnocephalus*), fennel, poison hemlock, pampas grass (*Cordateria jubata*), and bristly ox-tongue (*Helminthotheca echioides*).

Ruderal habitats provide limited foraging or nesting habitat for disturbance-tolerant and nonnative birds and small mammals, such as house sparrow, European starling, house finch, mourning dove, golden-crowned sparrow (*Zonotrichia atricapilla*), Norway rat (*Rattus norvegicus*), house mouse, California ground squirrel (*Otospermophilus beechyi*), and other rodents. Killdeer (*Charadrius vociferous*) commonly forage and nest on gravel or bare ground, including open dirt and fractured pavement. Ruderal habitat can also provide refuge for reptiles, such as western fence lizard, alligator lizard (*Elgaria multicarinata)*, and gopher snake.

Special-Status Plants

Special-status plants are not expected to regularly occur in urban, agricultural, or ruderal environments because of the degree of disturbance to soils and vegetation, as well as habitat fragmentation, found in these areas. However, although these plants are not expected to regularly occur, they can occasionally be found within these areas.

Special-Status Wildlife

In general, most special-status wildlife species are not expected to occur in urban or other highly disturbed areas. The exception to this would be bats and birds. For example, bats could use underutilized or abandoned buildings in urban areas for roosting, and raptors such as Cooper's hawk and red-tailed hawk are known to nest with regularity in urban areas as well. Bats and raptors are also known to forage in agricultural fields. Burrowing owl sometimes nests within agricultural areas and in ruderal grasslands adjacent to urban development.

MIGRATORY CORRIDORS AND LINKAGES

The Bay Area encompasses large areas of wildlands that provide habitat for both common and rare plants and wildlife. Some of these areas were mapped as Essential Connectivity Areas (ECAs) for the California Essential Habitat Connectivity Project, which was commissioned by the California Department of Transportation and CDFW with the purpose of making transportation and land use planning more efficient and less costly, while helping reduce dangerous wildlife-vehicle collisions (Spencer et al. 2010). The ECAs were not developed for the purposes of defining areas subject to specific regulations by CDFW or other agencies.

The ECAs are not regulatory delineations but are identified as lands likely important to wildlife movement between large, mostly natural areas at the Statewide level. The ECAs form a functional network of wildlands that are considered important to the continued support of California's diverse natural communities. The ECAs were not developed for the needs of particular species but were based primarily on the concept of ecological integrity, which considers the degree of land conversion, residential housing impacts, road impacts, and status of forest structure (for forested areas) (Spencer et al. 2010). The Conservation Land Network (CLN) has also been established as a scientifically based analysis that focuses on biodiversity and local migratory conditions previously unavailable in the Bay Area and identifies the most essential lands needed to sustain biological diversity. The CLN analysis presents data at a somewhat finer resolution than the ECAs, which are shown in **Figure 3.5-5**. In addition, consideration was given to the degree of conservation protection and areas known to support high biological values, such as mapped critical habitat and hotspots of species endemism (Spencer et al. 2010). ECAs were mapped on a Statewide level and should be considered coarse-scale polygons that can inform land planning efforts but that should eventually be replaced by more detailed linkage designs, developed at finer resolution at the regional and ultimately local scale based on the needs of particular species and ecological processes. There are a total of 13 ECAs mapped within the nine-county Bay Area (see Figure 3.5-5). As seen in this figure, ECAs occur within all nine Bay Area counties and are typically centered along the region's mountain ranges. These areas are composed primarily of wildlands but may also include some agricultural and developed areas (mostly rural residential) and many are bisected by major roadways.

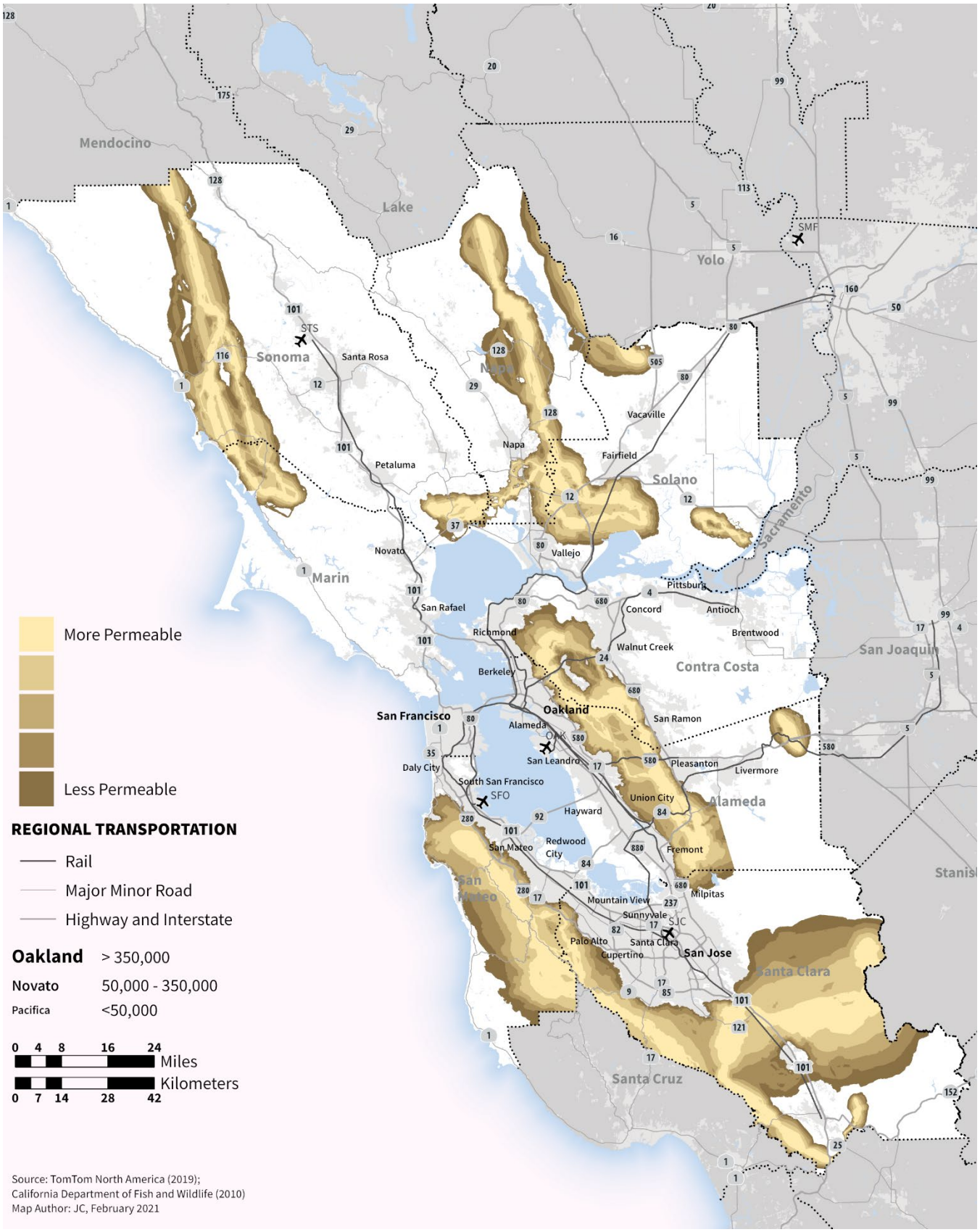

Figure 3.5-5: Essential Connectivity Areas

3.5.2 Regulatory Setting

The regulations and policies of various federal and State agencies (e.g., USACE, U.S. Environmental Protection Agency [EPA], USFWS, CDFW) mandate protection of wetlands, some special-status plant and wildlife species, and aquatic and terrestrial communities in the region. USACE has primary federal responsibility for administering regulations that concern waters and wetlands, while USFWS, NOAA Fisheries, and CDFW have lead responsibility for determining potential project effects on federally listed and State-listed species and other species of concern.

FEDERAL REGULATIONS

National Environmental Policy Act

The National Environmental Policy Act of 1969 (NEPA) was one of the first laws to establish a broad national framework for protecting the environment. Its purposes include "[t]o declare a national policy which will encourage productive and enjoyable harmony between man and his environment; [and] to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." NEPA ensures that all branches of government consider the environment before undertaking major federal actions that could significantly affect the environment.

Environmental assessments and environmental impact statements, which assess the likelihood of impacts from alternative courses of action, are required from all federal agencies and are the most visible NEPA requirements. The documents must include discussion of the environmental impacts of the alternatives, including the proposed action; any adverse environmental effects that cannot be avoided if the proposal is implemented; the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity; and any irreversible or irretrievable commitments of resources that would be involved in the proposal if it is implemented.

Federal Endangered Species Act

Under the ESA, the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered (16 United States Code [USC] 1533[c]). Pursuant to the requirements of the ESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed or proposed species may be present in the project region and whether the proposed project would result in a "take"[5] of such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the ESA, or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3][4]). Project-related impacts on these species or their habitats would be considered significant in this EIR. The "take" prohibition of the ESA applies to any action that would adversely affect a single member of an endangered or threatened species.

[5] "Take," as defined in Section 9 of the ESA, is broadly defined to include intentional or accidental "harassment" or "harm" to wildlife. "Harass" is further defined by the U.S. Fish and Wildlife Service as an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, and sheltering. "Harm" is defined as an act that actually kills or injures wildlife. It may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Marine Mammal Protection Act

The Marine Mammal Protection Act (50 CFR 216) prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. This act defines "take" as hunting, harassing, capturing, or killing any marine mammal or attempting to do so. "Harassment" is defined as any act of "pursuit, torment, or annoyance" that has the potential to injure a marine mammal or cause disruption of essential behavioral patterns, including feeding, sheltering, migration, breeding, nursing, or breathing. The majority of the act's provisions are related to commercial fishing and subsistence hunting. The act also outlines procedures for obtaining permits for take of small numbers of marine mammals, incidental to otherwise legal activities. Under this act, NOAA Fisheries has regulatory authority for the protection of sea lions, seals, dolphins, porpoises, and whales, and USFWS has authority regarding sea otters, walrus, manatees, and polar bears.

Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

The federal Migratory Bird Treaty Act (16 USC, Section 703, Supplement I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs.

The federal Bald and Golden Eagle Protection Act prohibits persons within the United States (or other places subject to U.S. jurisdiction) from "possessing, selling, purchasing, offering to sell, transporting, exporting or importing any bald eagle or any golden eagle, alive or dead, or any part, nest or egg thereof." This act also prohibits "taking" of bald and golden eagles, with "take" defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturbance includes causing direct injury, a decrease in productivity, or nest abandonment.

Clean Water Act

The Clean Water Act (CWA) is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which set the basic structure for regulating discharges of pollutants to waters of the United States. Although the purpose of the act is primarily to maintain water quality for both human and environmental benefits, regulations developed pursuant to this act deal extensively with permitting of actions in wetlands. These regulations provide more specific protection for wetland habitats—most of which are important ecologically—than any other laws. EPA has primary authority under the CWA to set standards for water quality and for effluents, but USACE has responsibility for permitting dredge and fill in wetlands.

Section 404 of the CWA requires project proponents to obtain a permit from USACE before performing any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, tidally influenced waters, and all other waters where the use, degradation, or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States.

In accordance with Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredged or fill material must obtain water quality certification from the appropriate RWQCB indicating that the action would uphold State water quality standards.

Marine Protection, Research, and Sanctuaries Act of 1972

This legislation allowed for establishment of marine sanctuaries, such as the Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuaries off the coast of Marin and Sonoma Counties and the San Francisco Peninsula, respectively. This act provides increased protection from a variety of

human influences on the marine resources within the sanctuaries. Among their important uses, the national marine sanctuaries provide an essential fishery, recreational opportunities, and habitat for a myriad of rare and common shorebirds, marine mammals, and other wildlife. Section 103 of this act regulates the transportation of dredged materials in ocean waters. This act is implemented through a permit granted by USACE, which uses EPA's ocean disposal criteria to regulate the disposal of dredged materials.

Magnuson-Stevens Fishery Management and Conservation Act

The Magnuson-Stevens Fishery Management and Conservation Act (Magnuson-Stevens Act) (16 USC Section 1801 et seq.) is the primary law governing management of commercial and recreational marine fisheries in the United States. The purpose of this federal law is sevenfold: conserve fishery resources, support enforcement of international fishing agreements, promote fishing in line with conservation principles, provide for the implementation of fishery management plans to achieve optimal yield, establish regional fishery management councils to steward fishery resources, develop underutilized fisheries, and protect essential fish habitat (EFH).

The Magnuson-Stevens Act requires federal agencies to consult with NOAA Fisheries when a project has the potential to adversely affect EFH. State agencies are not required to consult with NOAA Fisheries; however, NOAA Fisheries is required to develop EFH conservation recommendations for any State agency activity that would affect EFH. Similar in concept to Critical Habitat in ESA, EFH protection measures recommended by NOAA Fisheries or a regional fisheries management council are advisory and not prescriptive.

Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act prohibits the obstruction or alteration of any navigable water of the United States. Under this act, USACE must authorize any excavation or deposition of materials into such waters or any work that could affect the course, location, condition, or capacity of such waters.

Coastal Zone Management Act of 1972

This act established the authority for creating coastal zone management areas and the California Coastal Commission. Coastal zone management criteria are established by the commission and must be followed by federal, other government, or private entities performing any activities within the coastal zone.

U.S. Department of Transportation Act, Section 4(F)

Per Section 4(f) of the U.S. Department of Transportation Act (49 U.S. Code Section 303), the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned and accessible parks, recreation areas, and wildlife and waterfowl refuges of national, state, or local significance or land from historic sites of national, state or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and such program, and the project includes all possible planning to minimize harm resulting from the use.

STATE REGULATIONS

California Endangered Species Act

Under CESA, CDFW has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code Section 2070). CDFW also maintains a list of "candidate species," which are species formally noticed as being under review for addition to either the list of endangered species or the list of threatened species. In addition, CDFW maintains lists of "species of special concern," which serve as "watch lists." Pursuant to the requirements of CESA, an agency reviewing a proposed project

within its jurisdiction must determine whether any species State listed as endangered or threatened could be present on the project site and determine whether the proposed project could have a potentially significant impact on such species. In addition, CDFW encourages informal consultation on any proposed project that may affect a candidate species. Project-related impacts on species on the CESA endangered or threatened lists would be considered significant in this EIR. Impacts on "species of concern" would be considered significant under certain circumstances, discussed below.

California Fish and Game Code

Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take. CDFW has informed nonfederal agencies and private parties that their actions must avoid take of any fully protected species.

Sections 3503 and 3503.5—Protection of Bird Nests and Raptors

Section 3503 of the Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 of the California Fish and Game Code states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the order Falconiformes or Strigiformes), including their nests or eggs. Typical violations include destruction of active nests as a result of tree removal or disturbance caused by project construction or other activities that cause the adults to abandon the nest, resulting in loss of eggs and/or young.

Section 4150—Protection of Nongame Mammals

Section 4150 states that all mammals occurring naturally in California that are not game mammals, fully protected mammals, or fur-bearing mammals are "nongame mammals." Nongame mammals or parts thereof may not be taken or possessed except as provided in the code or in accordance with regulations adopted by the California Fish and Game Commission. Nongame mammals that may be taken or possessed are primarily those that cause crop damage.

Section 1602—Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports fish or wildlife resources are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do any of the following without first notifying CDFW:

- substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake; or
- deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation (CCR Title 14, Section 1.72). CDFW jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A streambed alteration agreement must be obtained for any diversion or alteration that would substantially adversely affect a fish or wildlife resource in a river, stream, or lake.

Section 1360–1372—Oak Woodlands Conservation Act and California

The California Oak Woodlands Conservation Act (Fish and Game Code sections 1360–1372) was enacted to protect oak woodland habitats that were being diminished by development, firewood harvesting,

and agricultural conversions. The Oak Woodlands Conservation Program was established as a result of the act and is intended to provide project funding opportunities for private landowners, conservation organizations, and cities and counties to conserve and restore oak woodlands. The program authorizes the Wildlife Conservation Board to purchase oak woodland conservation easements and provide grants for land improvements and oak restoration efforts.

Section 21083.4 of CEQA requires counties to determine if a project within their jurisdiction may result in conversion of oak woodlands that would have a significant adverse effect on the environment. If the lead agency determines that a project would result in a significant adverse effect on oak woodlands, mitigation measures to reduce the significant adverse effect of converting oak woodlands to other land uses are required.

Natural Community Conservation Plan Act

An NCCP is a broad-based ecosystem approach to planning for the protection and perpetuation of biological diversity that began under the State's NCCP Act (Fish and Game Code Section 2800), legislation broader in its orientation and objectives than the ESA and CESA. An NCCP identifies and provides for the regional or areawide protection of plants, animals, and their habitats while allowing compatible and appropriate economic activity. The primary objective of the NCCP program is to conserve natural communities at the ecosystem level while accommodating compatible land use. The program is intended to anticipate and prevent the controversies and gridlock caused by species' listings by focusing on the long-term stability of wildlife and plant communities and including key interests in the process. Like regional habitat conservation plans (HCPs), NCCPs can allow for take of listed species while promoting overall conservation of the species through landscape-level protections. In 2011, SB 618 authorized CDFW to permit the incidental take of Fully Protected species if the species is covered and conserved in an NCCP.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, waters of the State fall under the jurisdiction of the appropriate RWQCB. The RWQCB must prepare and periodically update water quality control plans (basin plans). Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control point and nonpoint sources of pollution to achieve and maintain these standards. The RWQCB's jurisdiction includes federally protected waters, as well as areas that meet the definition of "waters of the State." Waters of the State are defined as any surface water or groundwater, including saline waters, within the boundaries of the State. In addition to water quality certifications under Section 401 of the federal CWA, discharges to waters of the State, including wetlands, must meet the RWQCB waste discharge requirements.

Delta Conveyance (Formerly California WaterFix and Bay Delta Conservation Plan)

In May 2019, the California Department of Water Resources (DWR) took formal action to rescind State and federal permit applications for the California WaterFix project. As of August 2020, USACE issued a Notice of Intent for the development of an Environmental Impact Statement for the Delta Conveyance Project, which is a single tunnel project to modernize State Water Project infrastructure in the Delta. DWR expects permitting to be complete in mid-2024.

Sacramento-San Joaquin Delta Reform Act of 2009

In November 2009, the California Legislature enacted the Sacramento-San Joaquin Delta Reform Act (Delta Reform Act) (California Water Code Section 10610 et seq.), also known as Senate Bill (SB) 1 (Stats. 2009, 7th Ex. Sess., ch. 5) (SB X7-1), one of several bills passed at that time related to water supply reliability, ecosystem health, and the Delta. The Delta Reform Act created the Delta Stewardship Council (DSC), charged with developing and adopting the Delta Plan. The Delta Plan is a comprehensive, long-term management plan for the Delta that creates new rules and

recommendations to further the State's coequal goals for the Delta: Improve Statewide water supply reliability and protect and restore a vibrant and healthy Delta ecosystem, all in a manner that preserves, protects, and enhances the unique agricultural, cultural, and recreational characteristics of the Delta. The Delta Plan was unanimously adopted by DSC on May 16, 2013, and became effective with legally enforceable regulations on September 1, 2013. The following regulatory policies and recommendations are applicable to biological resources:

- Complete Bay Delta Conservation Plan (Recommendation WR R12).
- Restore Habitats at Appropriate Elevations (23 CCR Section 5006)).
- Protect Opportunities to Restore Habitat (23 CCR Section 5007).
- Expand Floodplains and Riparian Habitats in Levee Projects (23 CCR Section 5008).
- Prioritize and Implement Projects That Restore Delta Habitat (Recommendation ER R2).
- Avoid Introductions of and Habitat Improvements for Invasive Nonnative Species (23 CCR Section 5009).
- Prioritize and Implement Actions to Control Nonnative Invasive Species (Recommendation ER R7).

The Delta Plan was amended in February 2016 to include refined performance measures, which were again amended in April 2018. A September 2016 amendment made permanent an exemption for single-year water transfers to be considered as covered actions. Also, in April 2018, the Delta Plan was amended to revise Chapter 3 to include new text and recommendations for conveyance, storage, and operations, and to revise Chapter 7 to include new text and policy for setting priorities for State investments in Delta levees.

Under the Delta Reform Act, DSC is charged with reviewing and advising local and regional agencies regarding the consistency of local and regional planning documents, including the proposed Plan, with the Delta Plan. DSC's input includes reviewing the consistency of local and regional plans with the ecosystem restoration needs of the Delta and whether the lands set aside for natural resource protection are sufficient to meet the Delta's ecosystem needs. The Delta Reform Act requires that "covered actions," as defined, which include plans, programs, or projects within the primary or secondary zones of the Delta, be consistent with the Delta Plan.

The Delta Reform Act expressly provides that "covered actions" do not include (1) regional transportation plans, such as the proposed Plan, and (2) plans, programs, projects, activities (and any infrastructure necessary to support those plans, programs, projects, or activities) within the secondary zone of the Delta that has been determined to be consistent with the proposed Plan (California Water Code Section 85057.5). However, DSC reviews any plan that includes land within the Delta zones, whether or not it is a covered action. Metropolitan planning organizations that have a planning area crossing these boundaries are required to follow a consultation procedure with DSC. This procedure includes early coordination to determine consistency of a proposed plan with the Delta Plan. MTC and ABAG consulted with DSC on December 12, 2019, and January 22, 2020, on the application of the law, the geography under DSC authority, and the policies established by the DSC, and will follow the Delta Reform Act's consultation requirements.

California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the California Native Plant Protection Act (NPPA), which directed CDFW to carry out the legislature's intent to "preserve, protect, and enhance endangered plants in this state." The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. CESA expanded upon the original NPPA and enhanced legal protection for plants. CESA established threatened and endangered species categories and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, there are three listing categories for plants in California: rare, threatened, and endangered.

California Coastal Act

The California Legislature enacted the California Coastal Act in 1976 to regulate coastal development throughout the State. The act created a "coastal management zone" that generally extends 3 miles seaward and up to 5 miles inland from the mean high tide line. In particularly important and generally undeveloped areas where there can be considerable impact on the coastline from inland development, the coastal zone may extend to a maximum allowable limit. In developed urban areas, the coastal zone generally extends inland for a much shorter distance. Each city or county government whose jurisdiction includes land in the coastal zone must develop a Local Coastal Program for the area. The Local Coastal Program guides planning, conservation, and use of coastal resources; must be consistent with the Coastal Act; and must be certified by the California Coastal Commission. Any person wishing to develop land within the coastal zone must obtain a permit from the relevant city or county, and the development plan must be consistent with the policies of the act.

Z'berg-Nejedly Forest Practice Act

The Z'berg-Nejedly Forest Practice Act (FPA) ensures that logging on privately owned lands in California is done in a manner that will preserve and protect fish, wildlife, forests, and streams. This act established a nine-member State Board of Forestry whose mandate was the control over forest practices and forest resources in California. The Board of Forestry sets forest management policies that are implemented by the California Department of Forestry and Fire Protection (CAL FIRE).

The FPA requires that a Timber Harvest Plan (THP) be prepared by a Registered Professional Forester (RPF) for timber harvest on virtually all nonfederal land. THPs are submitted to CAL FIRE for its review and approval. The THP process is the functional equivalent of an EIR under CEQA.

California Forest Practice Rules

Additional rules enacted by the State Board of Forestry are also enforced to protect fish, wildlife, forests, and stream resources. The purpose of the Forest Practice Rules is to implement the provisions of the FPA in a manner consistent with other laws, including but not limited to, the Timberland Productivity Act of 1982, CEQA, the Porter-Cologne Water Quality Control Act, and CESA. The provisions of the rules are followed by RPFs in preparing THPs, and by the CAL FIRE director in reviewing such plans to achieve the FPA policies. CAL FIRE ensures that private landowners abide by these laws when harvesting trees. Although there are specific exemptions in some cases, compliance with the FPA and Board rules apply to all commercial harvesting operations for landowners of small parcels, ranchers owning hundreds of acres, and large timber companies with thousands of acres.

A THP that does not comply with all forestry and environmental regulations is returned to the RPF. It is approved only after the RPF and landowner agree to make the changes necessary to ensure compliance with all laws. CAL FIRE follows up on approved THPs with site inspections and can shut down operations and cite or fine RPFs, Licensed Timber Operators, and landowners if illegal operations are found.

California Wildlife Action Plan 2015

CDFW developed the State Wildlife Action Plan, 2015 Update (SWAP 2015) as a comprehensive plan for conserving California's fish and wildlife and their vital natural habitats for future generations. SWAP 2015 establishes a strategic vision of the integrated conservation efforts needed to sustain the tremendous biodiversity of fish and wildlife resources found in the State. Significant climate-related changes to California's environment have been documented in the last decade, including sea level rise, natural community shifts, increased prevalence of invasive species, increased number and intensity of wildfires, and prolonged drought. SWAP 2015 has considered these climate-induced effects, as well as other pressures on wildlife populations and habitats, and identifies Statewide and regional conservation strategies to protect the State's natural resources.

Employing an ecosystem approach to conserve and manage diverse habitats and species, SWAP 2015 provides a blueprint for actions necessary to address the highest priorities for conserving California's aquatic, marine, and terrestrial resources. Its implementation relies on making important and helpful conservation information more accessible to resource managers and the public, and on developing lasting partnerships with a broad array of governments, agencies, organizations, businesses, and citizens. SWAP 2015 describes key conservation factors crucial to the sustainability of California ecosystems, and for each geographic province, it provides specific conservation strategies that will reduce or ameliorate adverse impacts on ecological systems or enhance the quality vital to the natural landscapes of California.

REGIONAL AND LOCAL REGULATIONS

Habitat Conservation Plans

East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan

The *East Contra Costa County HCP/NCCP* (2006), overseen by the East Contra Costa County Habitat Conservancy, covers the eastern one-third of Contra Costa County (174,018 acres). It allows Contra Costa County, the Contra Costa County Flood Control and Water District, the East Bay Regional Park District, and the cities of Brentwood, Clayton, Oakley, and Pittsburg to streamline environmental permitting for activities and projects in the region that are covered by the HCP. The HCP also provides for comprehensive species, wetlands, and ecosystem conservation, and contributes to the recovery of endangered species in California while allowing for limited take of 28 listed and nonlisted ("covered") species. By implementing the HCP, the above-mentioned signatories will have a 30-year permit from USFWS and CDFW that authorizes take of covered species and will avoid project-by-project permitting that is generally costly and time consuming.

Santa Clara Valley Habitat Plan

The City of San José, Santa Clara County, the Santa Clara Valley Transportation Authority, the Santa Clara Valley Water District, the City of Gilroy, and the City of Morgan Hill initiated a collaborative process to prepare and implement an HCP/NCCP for the Santa Clara Valley. The final HCP/NCCP, called the *Santa Clara Valley Habitat Plan*, and associated EIR were released in 2012. In 2013, the HCP/NCCP was adopted by all local participating agencies, and permits were issued from USFWS and CDFW. The HCP/NCCP targets specific areas of the county where land development activities and the continued survival of endangered, threatened, or other species of concern are in conflict. The goal of the HCP/NCCP is to provide the means for conservation of these species, thereby contributing to their recovery while allowing for compatible and appropriate development to occur.

Conservation Strategies

East Alameda County Conservation Strategy

The East Alameda County Conservation Strategy (EACCS) is a collaborative effort to preserve endangered species by developing and adopting a guide to long-term protection of endangered species. The inventory area for this conservation strategy includes the cities of Dublin, Pleasanton, and Livermore, as well as unincorporated areas of eastern Alameda County. Annual grassland, seasonal and permanent wetlands, riparian woodland, oak woodland, and scrub communities within the inventory area are known to support several listed or sensitive wildlife species, including California tiger salamander, San Joaquin kit fox, Alameda whipsnake, and California red-legged frog.

The EACCS describes current biological conditions in the region, which present a baseline for species habitat with which to compare future development. It also provides a long-term regional conservation strategy to protect species by prioritizing habitats that should be protected or restored.

From a regulatory perspective, the EACSS is intended to streamline and simplify the issuance of Section 404 permits for future projects. It standardizes avoidance, minimization, mitigation, and compensation requirements to comply with federal, State, and local laws and regulations relating to biological and natural resources in the study area. The core of the EACCS for the covered species is the application of standardized mitigation ratios for each species to offset project impacts. In May 2012, USFWS issued a Programmatic Biological Opinion (Programmatic BO) for USACE-permitted projects using the EACCS for projects that may affect one or more of the species covered in the EACCS and Programmatic BO. The Programmatic BO is issued to USACE for permits, enforcement actions, or mitigation banks that are under the agency's jurisdiction. Eligible projects may be appended to the Programmatic BO to obtain individual incidental take authorization. To be eligible, individual projects must be consistent with the EACCS and fall under the list of activities covered by the Programmatic BO. Covered activities include residential, commercial, and industrial development and associated infrastructure (roads and utilities); infrastructure projects, such as transmission lines, road construction and maintenance, trail construction and maintenance, bridge construction and maintenance, solar projects, wind energy projects, and culvert installation and maintenance; and restoration projects, including pond and stream restoration and enhancement, fish barrier removal and modification, and wetland construction and maintenance.

Santa Rosa Plain Conservation Strategy

The Santa Rosa Plain Conservation Strategy (2005) creates a long-term program to mitigate potential adverse effects on listed species related to future development on the Santa Rosa Plain, which is located in central Sonoma County, bordered on the south and west by the Laguna de Santa Rosa, on the east by the foothills, and on the north by the Russian River. The plain and adjacent areas are characterized by vernal pools, seasonal wetlands, and associated grassland habitat that supports several species of flora and fauna listed under the ESA as threatened or endangered, including the threatened California tiger salamander and four endangered plant species: Burke's goldfields, Sonoma sunshine, Sebastapol meadowfoam, and many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha*).

The conservation strategy was created to (1) provide a plan for local agencies, developers, and community groups that would preserve and enhance populations and habitat of the listed species; (2) support the issuance of a USFWS authorization for incidental take of California tiger salamander and listed plants that may occur in the course of carrying out a broad range of activities on the plain; and (3) protect stakeholders' (public and private) interests. It is based in part on the Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan (1995).

The conservation strategy addresses various aspects of urban and rural growth and its effects on the above-listed species, mitigation for impacts on these listed species and wetlands, and the conservation and recovery of the listed species and their habitat. It identifies the Southwest Santa Rosa Preserve System and nine "conservation areas" throughout the plain as the locations where mitigation for project-related impacts on listed species and vernal pools should be directed. The designation of conservation areas is based on the following factors: (1) known distribution of California tiger salamander, (2) presence of suitable California tiger salamander habitat, (3) presence of large blocks of natural or restorable land, (4) adjacency to existing preserves, and (5) known location of the listed plants. A critical component of the conservation strategy is that 350–900 acres of actual preserve land ultimately will be established within each conservation area.

While local jurisdictions participating in the conservation strategy have adopted the Santa Rosa Plain Conservation Strategy Planning Agreement, numerous important implementation issues still must be resolved before the conservation strategy can be put into full effect. However, the USFWS Programmatic BO (2007) can still be invoked for projects that have suitable habitat for California tiger salamander, Burke's goldfields, Sonoma sunshine, Sebastapol meadowfoam, and many-flowered navarretia and that would affect wetlands in the Santa Rosa Plain.

Bay Conservation and Development Commission Acts and Plans

Suisun Marsh Preservation Act of 1977 and Suisun Marsh Protection Plan

The *Nejedly-Bagley-Z'berg Suisun Marsh Act* was enacted in 1974 to require the San Francisco BCDC and CDFW to prepare a plan (later called the *Suisun Marsh Protection Plan*) to preserve the integrity and ensure continued wildlife use of the Suisun Marsh, approximately 85,000 acres of tidal marsh, managed wetlands, and waterways in southern Solano County. The Suisun Marsh is the largest remaining brackish wetland complex in San Francisco Bay, more than 10 percent of California's remaining wetland area, and a wildlife habitat of international importance. The Suisun Marsh Preservation Act (PRC Sections 29000–29612) was enacted in 1977 to incorporate the findings and policies contained in the *Suisun Marsh Protection Plan* of 1976 into State law, and to empower BCDC to implement the plan through its regulatory authority.

The *Suisun Marsh Protection Plan*, in brief, proposes (1) a primary management area encompassing the 89,000 acres of tidal marsh, managed wetlands, adjacent grasslands, and waterways over most of which BCDC now has jurisdiction and (2) a secondary management area of approximately 22,500 acres of significant buffer lands. Under specific guidelines in each area, Solano County would be responsible for preparing and administering a local protection program. BCDC would represent the State's interest, serving as the land use permitting agency for major projects in the primary management area, and as an appellate body with limited functions in the secondary management area.

San Francisco Bay Plan

The San Francisco Bay Plan (Bay Plan) was developed by BCDC in 1968, and its provisions are currently maintained and carried out by BCDC. Since the adoption of the Bay Plan, implementing legislation has been amended several times, but the general character, scope of authority, and area of jurisdiction are largely unchanged. The Bay Plan provides the findings and policies to guide future uses of the bay and shoreline, certain waterways, salt ponds and managed wetlands, and the maps that apply these policies to BCDC's jurisdiction.

City and County General Plans

The most comprehensive land use planning for the San Francisco Bay Area region is provided by city and county general plans, which local governments are required by State law (California Government Code Section 65300 et seq.) to prepare as a guide for future development. Issues pertaining to biological resources are described primarily in the conservation and open space elements of general plans. These elements typically address tree removal and protection policies, conservation of native vegetation, preservation of open space and wildlife habitat corridors, and protection of sensitive species.

Tree Protection Policies and Regulations

Many jurisdictions also have adopted Tree Protection regulations in local municipal codes, as well as Oak Woodlands Conservation plans enacted pursuant to Section 1360-1372 of the California Fish and Game Code, described above.

3.5.3 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the Plan Bay Area 2040 EIR (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NOAA Fisheries (Criterion BIO-1a);
- have substantial adverse impacts on designated critical habitat for federally listed plant and wildlife species (Criterion BIO-1b);
- have a substantial adverse effect on riparian habitat, State- or federally protected wetlands (including but not limited to marsh, vernal pool, coastal), or other sensitive natural communities identified in local or regional plans, policies, or regulations, or by CDFW or USFWS, through direct removal, filling, hydrological interruption, or other means (Criterion BIO-2);
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites (Criterion BIO-3);
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, or with provisions of an adopted Habitat Conservation Plan (HCP); Natural Community Conservation Plan (NCCP); or other approved local, regional, or State HCP (Criterion BIO-4); or
- have the potential to substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species (Criterion BIO-5).

METHOD OF ANALYSIS

This program-level EIR evaluates potential impacts on biological resources based on the location of the proposed Plan's footprints associated with the forecasted development pattern (i.e., the land use growth footprint), sea level rise adaptation infrastructure (i.e., sea level rise adaptation footprint), and transportation projects (i.e., transportation system footprint) relative to the known distribution of and potential distribution of sensitive biological resources throughout the Bay Area. The effects of the proposed Plan policies are presented qualitatively and are generally captured in the evaluation of the physical effects of the project. Quantitative results are presented for the region (i.e., the entire growth footprint, often summarized by county) and for the portions of the land use growth footprint specifically within transit priority areas (TPAs). TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county.

For this impact assessment, a geographic information system (GIS) was used to digitally overlay the proposed Plan's footprints associated with forecasted land use development, sea level rise adaptation infrastructure, and transportation projects onto documented locations of critical habitat for federally listed species and wetlands and other waters. Potential impacts were determined by evaluating whether the projected footprints would occur within the potential range of a special-status species, whether projected growth and projects would potentially directly encroach upon an area of ecological

significance (e.g., sensitive natural community or habitat, designated critical habitat, important wildlife corridor), or whether the planned development and projects could involve the filling of wetlands. Existing data and other resources used to identify potentially affected biological resources included the CNDDB (CNDDB 2020), NWI mapping (NWI 2020), and mapping by the California Essential Habitat Connectivity Project. A quantitative analysis of the potential for impacts (e.g., acres of critical habitat, acres of mapped wetland types potentially affected) was performed.

The GIS-based approach for this programmatic analysis likely overestimates actual impacts because of the coarse level of the analysis and resource-mapping limitations. For example, as described previously, many special-status species occurrences from the CNDDB indicate only presence within a general area at the time of observation. In addition, many CNDDB species locations are historical, and habitat no longer occurs for the species because of urbanization. Therefore, a land use growth footprint, sea level rise adaptation infrastructure footprint, and transportation project polygon intersection with a special-status species polygon simply indicates that the species may, or did once, occur in that area and that projects within those areas may affect that species if habitat for the species still occurs within or adjacent to the specific project site. Conversely, because the CNDDB is a positive occurrence database (i.e., only known occurrences that were voluntarily reported by an observer are included), it does not predict where all special-status species may occur, and some species may be underrepresented.

This analysis assumes that impacts on biological resources would be most likely to occur where land use development, sea level rise adaptation infrastructure, and transportation projects could affect ecologically sensitive or significant areas. Projects most likely to affect sensitive biological resources are those involving major ground-disturbing activity. Road widenings, highway extensions, interchange projects, bridges, and rail extensions (e.g., the New Transbay Rail Crossing) in rural areas or in or over water bodies or wetlands also have a higher likelihood of affecting sensitive biological resources. Laws and regulations protecting special-status species, areas of ecological significance, and wetland resources are effective incentives for project proponents to design alternatives that either avoid or substantially reduce impacts on these resources.

This evaluation of biological resource impacts assumes that construction and development under the proposed Plan would adhere to applicable federal, State, and local regulations and would conform to applicable standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts. For additional information on analysis methodology, refer to Section 3.1.3, "General Methodology and Assumptions."

IMPACTS AND MITIGATION MEASURES

Impact BIO-1a: Have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NOAA Fisheries (PS)

Special-status species that could occur in the plan area are described in Section 3.5.1, "Environmental Setting," and are listed in **Table C-1** in Appendix C. The list of species that would be potentially affected was generated from a GIS-based analysis of project proximity to documented special-status species occurrences, as well as proximity to critical habitat designated by USFWS and NOAA Fisheries (CNDDB 2020; USFWS 2020). Additionally, nonlisted species (i.e., not listed under the federal ESA or CESA) that are not consistently tracked by CDFW in the CNDDB but are afforded protections under the California Fish and Game Code and the Migratory Bird Treaty Act were also considered.

Focused biological resource surveys to determine the locations and extent of special-status species populations have not been conducted in support of this programmatic EIR; detailed and site-specific surveys are more appropriately conducted when project-level detail is available. Therefore, this analysis conservatively assumes that special-status species would be present within the impact footprint of regional growth/land use changes, a sea level rise adaptation infrastructure project, or a transportation project if the project is mapped as containing or located near a known species occurrence. Known occurrences are those mapped in reliable data sources (e.g., CNDDB, USFWS Environmental Conservation Online System). However, CNDDB includes historical occurrences for species that may no longer be extant at a given location, and this may lead to an overestimation of development impacts on special-status species in this EIR. Conversely, the CNDDB records are limited to those voluntarily reported and do not represent a comprehensive inventory of special-status species in an area. These projects could adversely affect special-status plant and wildlife species. While less development is expected to occur outside TPAs, it would have the same general types of impacts.

Land Use Impacts

Construction and Operation

As described in Chapter 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.7 million residents and 1.4 million jobs, resulting in 1.4 million new households. The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that result in focused housing and job growth concentrated primarily in or adjacent to already urban and built-up areas and along existing transit corridors. As shown in Table 2-16 in Chapter 2, "Project Description," the land use growth footprint covers 39,400 acres of land in the Bay Area. In addition, the proposed Plan incorporates environmental strategies that would limit new construction outside of the existing development or areas otherwise suitable for growth and would protect high-priority natural lands (e.g., wildland-urban interface lands). These strategies include environmental corridors, stream conservation areas, and riparian buffers. Nonetheless, implementation of the land use development pattern under the proposed Plan could result in regional impacts on special-status species. Potential regional effects on special-status species could occur as a result of habitat fragmentation, increased human intrusion into wildland areas, introduction of invasive species, disruption of migratory corridors, and a resulting regional reduction in biological diversity.

Potential localized effects on special-status species include the temporary and permanent removal or conversion of vegetation and habitat necessary for species breeding, feeding, dispersal, or sheltering. Construction of projects and ongoing operations could result in direct mortality of special-status plants and wildlife, entrapment of wildlife in open trenches, and general disturbance because of noise or vibration during pile driving, earthmoving, and other construction activities for species present in disturbance areas. Construction-generated fugitive dust accumulation on surrounding vegetation and construction-related erosion, runoff, and sedimentation could degrade the quality of adjacent vegetation communities, affecting their ability to support special-status plants and wildlife. Habitat fragmentation and disruption of migratory corridors could also occur on a local level, potentially affecting local populations by making them more vulnerable to extirpation.

Because land use changes under the proposed Plan could result in the disturbance or loss of special-status plant and wildlife species and habitats, this impact would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

Construction and Operation

As described in Chapter 2, "Project Description," sea level rise adaptation infrastructure could include the implementation of elevated highways/roadways, levees, sea walls, tidal gates, and marsh land restoration. Potential effects of sea level rise adaptation infrastructure on special-status plant and

wildlife species are generally like those described above for land use development under the proposed Plan. In this case, most potential impacts on special-status species would occur in association with adaptation infrastructure that would result in earthmoving or vegetation removal activities (e.g., elevated highway/roadway, levees, sea walls, tidal gates) that are currently within or adjacent to occupied habitat or habitat suitable for special-status species. While marsh land restoration projects would likely benefit special-status species that occur in marsh habitats, overall, these projects could also result in temporary adverse effects on these resources.

Because the implementation of sea level rise adaptation infrastructure may result in construction that results in the disturbance or loss of special-status plant and wildlife species and habitats, this impact would be potentially significant (PS).

Transportation System Impacts

Construction

Construction of proposed transportation projects could affect adjacent wetlands, woodlands, shrublands, and grasslands, as well as associated plant and wildlife species. Because the proposed transportation projects are mainly concentrated along existing transportation corridors, where existing conditions in adjacent habitat areas typically represent the result of past and ongoing disturbance, regional habitat loss and fragmentation is expected to be lower than if projects were entirely new construction or sited in previously undeveloped areas. Nonetheless, these and other transportation projects - particularly new rail projects located in areas that have not been subject to previous ground disturbance - could contribute to regional and local habitat loss and fragmentation.

Implementation of proposed transportation projects would include construction of a new Transbay rail crossing between Oakland and San Francisco. Future construction methods for the crossing are not known at this time. In-water construction activities associated with construction of a tunnel could result in noise, vibration, or other physical impacts on the aquatic bay environment, potentially resulting in adverse effects on special-status aquatic wildlife and habitat, including special-status fish, marine mammals protected by the federal Marine Mammal Protection Act (e.g., harbor seal, California sea lion) and habitats designated as EFH. Due to these potential effects and the potential for habitat loss and fragmentation noted above, construction impacts would be potentially significant (PS).

Operation

Long-term increases in the volume of vehicular traffic and major expansions of existing roads or development of new roads in rural areas are expected to result in increased vehicle-related wildlife mortalities and injuries of common and special-status wildlife species. This effect would be most pronounced in rural areas, where roads traverse larger expanses of natural habitats.

Because the proposed Plan transportation projects may result in the disturbance or loss of special-status plant and wildlife species and habitats, this impact would be potentially significant (PS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects could result in adverse effects on special-status species, particularly with respect to habitat loss, fragmentation, and degradation. Because the proposed Plan could result in the disturbance or loss of special-status plant and wildlife species and habitats, this impact would be **potentially significant (PS)**. Mitigation Measure BIO-1(a) addresses this impact and is described below.

Mitigation Measures

Mitigation Measure BIO-1(a) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Implementing agencies shall require project sponsors to prepare biological resource assessments for specific projects proposed in areas known or likely to contain habitat suitable for special-status plants and wildlife. The assessment shall be conducted by qualified professionals pursuant to adopted protocols and agency guidelines, where applicable. Where the biological resource assessments establish that mitigation is required to avoid and minimize direct and indirect adverse effects on special-status plant and wildlife species, or compensate for unavoidable effects, mitigation shall be developed consistent with the requirements or standards of CEQA, USFWS, CDFW, and local regulations and guidelines, in addition to requirements of any applicable and adopted HCP/NCCP or other applicable plans developed to protect species or habitat.

- In support of CEQA, NEPA, CDFW, USFWS, and NOAA Fisheries review and permitting processes for individual proposed Plan projects, pre-project biological surveys shall be conducted as part of the environmental review process to determine the presence and extent of sensitive habitats and species in the project vicinity. Surveys shall follow established methods and shall be conducted at times when the subject species is most likely to be identified. In cases where impacts on State- or federally listed plant or wildlife species are possible, formal protocol-level surveys may be required on a species-by-species basis to determine the local presence and distribution of these species. Coordination with CDFW, USFWS, and NOAA Fisheries, as appropriate, shall be conducted early in the planning process at an informal level for projects that could adversely affect federal or State candidate, proposed, threatened, or endangered species to determine the need for consultation or permitting actions. Projects shall obtain incidental take authorization from the permitting agencies, as required, before project implementation.

- A species and habitat compensation plan shall be prepared for unavoidable direct impacts on special-status plant species and shall be reviewed and approved by the resource agencies and lead agency prior to project approval. The plan shall identify effective methods for reestablishing the affected species and habitat, including but not limited to seed collection, salvage of root masses, and planting seeds and/or root masses in an area with suitable conditions. The plan shall also specify a monitoring program designed to evaluate success in reestablishing the affected species and habitat, and remedial measures that shall be followed if the project is not meeting specified performance criteria. The monitoring program shall be designed to evaluate the current and probable future health of the resources, and their ability to sustain populations in keeping with natural populations following the completion of the program. Remedial measures are highly dependent upon the species and habitats in question, but generally shall include but not be limited to invasive species management, predator control, access control, replanting and reseeding of appropriate habitat elements, regarding, and propagation and seed bulking programs.

- Project designs shall be reconfigured, whenever practicable, to avoid special-status species and sensitive habitats. Projects shall minimize ground disturbances and transportation project footprints near sensitive areas to the extent practicable.

- Temporary access roads and staging areas shall not be located within the areas containing sensitive plants or wildlife species wherever feasible, to avoid or minimize impacts on these species.

- Project activities in the vicinity of sensitive resources shall be completed during the period that best avoids disturbance to plant and wildlife species present to the extent feasible.

- Individual projects shall minimize the use of in-water construction methods in areas that support sensitive aquatic species, especially when listed species could be present.
- If equipment needs to operate in any watercourse with flowing or standing water where special-status species may be affected, a qualified biological resource monitor shall be present to alert construction crews to the possible presence of such special-status species.
- If project activities involve pile driving or vibratory hammering in or near water, interim hydroacoustic threshold criteria for protected fish species shall be adopted as set forth by the Interagency Fisheries Hydroacoustic Working Group, as well as other avoidance methods to reduce the adverse effects of construction to sensitive fish, piscivorous birds, and marine mammal species.
- A qualified biologist shall locate and fence off sensitive resources before construction activities begin and, where required, shall inspect areas to ensure that barrier fencing, stakes, and setback buffers are maintained during construction.
- For work sites located adjacent to special-status plant or wildlife populations, a biological resource education program shall be provided for construction crews and contractors (primarily crew and construction foremen) before construction activities begin.
- Biological monitoring shall be considered for areas near identified habitat for State- and federally listed species, and a "no take" approach shall be taken whenever feasible during construction near special-status plant and wildlife species.
- Mitigation Measure NOISE-1 shall be implemented when permanent or temporary noise has been identified as a potential impact on wildlife.
- Nighttime lighting shall be directed at the construction or project site and away from sensitive habitats. Light glare shields shall be used to reduce the extent of illumination onto adjoining areas. Permanent lighting shall be shielded and directed at intended use areas.
- Fencing and/or walls shall be built to avoid temporary or permanent access of humans or domestic animals from development areas into areas occupied by special status species. Spoils, trash, or any debris shall be removed offsite to an approved disposal facility.
- Project activities shall comply with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures protective of special-status species.
- Compensatory mitigation for unavoidable loss of habitat or other impacts on special-status species may be achieved in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through Regional Advance Mitigation Planning (RAMP), as deemed appropriate by the permitting agencies.

Significance after Mitigation

To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M) because these mitigation measures would require pre-project surveys and biological monitoring, avoidance or minimization of project-related disturbance or loss of special-status species, and coordination with permitting agencies as required prior to project implementation.

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the

above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact BIO-1b: Have substantial adverse impacts on designated critical habitat for federally listed plant and wildlife species (PS)

Land Use Impacts

Construction and Operation

As shown in **Tables 3.5-2, 3.5-3, and 3.5-4**, land use growth footprints within the Plan area overlap with a total of 3,900 acres of land designated by USFWS as critical habitat for 11 federally listed species. Critical habitat for most species occurs within local units distributed throughout the region. Thus, where local impacts on critical habitat may occur, they could potentially aggregate to produce regionwide effects on the amount and quality of critical habitat. The majority of potential impacts are related to critical habitat for Delta smelt, Contra Costa goldfields, and Alameda striped racer (whipsnake). Development could also potentially affect smaller amounts of critical habitat for several other species, including vernal pool fairy shrimp, vernal pool tadpole shrimp, California red-legged frog, Conservancy fairy shrimp, California tiger salamander, Bay checkerspot butterfly, Franciscan manzanita, and Antioch Dunes evening primrose. Impacts would occur primarily in Contra Costa, Solano, Alameda, and Sonoma Counties.

Table 3.5-2: Acreage of Project Footprint within Critical Habitat

Status	Critical Habitat	Land Use Growth (acres)	Sea Level Rise Adaptation Infrastructure (acres)	Transportation Projects (acres)
Endangered Species	Antioch Dunes Evening Primrose	3	< 1	0
	California Tiger Salamander[1]	80	0	5
	Conservancy Fairy Shrimp	190	0	0
	Contra Costa Goldfields	490	< 1	80
	Franciscan Manzanita	7	0	0
	Suisun Thistle	0	< 1	0
	Tidewater Goby	0	5	0
	Vernal Pool Tadpole Shrimp	< 1	0	< 1
Threatened Species	Alameda Striped Racer (Whipsnake)	470	0	< 1
	Bay Checkerspot Butterfly	30	0	5
	California Red-Legged Frog	250	0	580
	California Tiger Salamander[1]	0	0	1
	Delta Smelt	2,300	320	350
	Vernal Pool Fairy Shrimp	60	0	40
	Western Snowy Plover	0	20	0

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100).

[1] California tiger salamander is considered endangered in Sonoma County and threatened in Central California.

Sources: Data compiled by MTC and ABAG 2021; U.S. Fish and Wildlife Service 2020

Impacts on critical habitat could include temporary or permanent habitat loss. Degradation of areas that have high conservation value for these species could also occur in association with proposed Plan development, where such development occurs within or adjacent to critical habitat, through the introduction of night lighting, increases in ambient noise levels, and the introduction of invasive species and predators. Plan development could also result in the introduction of, or increases in, additional vehicular or recreational pressures in areas designated as critical habitat. Although direct effects on salmonid critical habitat are not expected, disturbances outside critical habitat could generate erosion, sedimentation, or other water quality impacts on salmonid critical habitat downstream.

Because the land use changes and development under the proposed Plan may result in the loss or degradation of designated critical habitat for federally listed plant and wildlife species, this impact would be potentially significant (PS).

Table 3.5-3: Number of Species and Acreage of Project Footprint within Critical Habitat

Footprint		Number of Species	Total (acres)
Land Use Growth	Endangered Species	6	770
	Threatened Species	5	3,100
Sea Level Rise Adaptation	Endangered Species	4	7
	Threatened Species	2	340
Transportation Project	Endangered Species	3	90
	Threatened Species	6	970

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100.
Sources: Data compiled by MTC and ABAG in 2021; U.S. Fish and Wildlife Service 2020

Table 3.5-4: Number of Species and Acreage of Land Use Growth Footprint within Critical Habitat

County		Number of Species	Total (acres)
Alameda	County Total	3	270
	Within TPAs	0	0
Contra Costa	County Total	5	3,000
	Within TPAs	1	370
Marin	County Total	0	0
	Within TPAs	0	0
Napa	County Total	1	10
	Within TPAs	0	0
San Francisco	County Total	1	7
	Within TPAs	1	7
San Mateo	County Total	2	30
	Within TPAs	0	0
Santa Clara	County Total	0	0
	Within TPAs	0	0
Solano	County Total	4	430
	Within TPAs	0	0
Sonoma	County Total	1	80
	Within TPAs	0	0
Regional Total[1]	County Total	11	3,900
	Within TPAs	2	380

Notes: TPA acreages are a subset of county acreages. Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100).
[1] Total indicates total number of species in the region.
Sources: Data compiled by MTC and ABAG in 2021; U.S. Fish and Wildlife Service 2020

Sea Level Rise Adaptation Impacts

Construction and Operation

As shown in Tables 3.5-2, 3.5-3, and 3.5-5, the sea level rise adaptation footprint within the Plan area overlaps with approximately 320 acres of land designated by USFWS as critical habitat for six federally listed species. Critical habitat for most species occurs within local units distributed throughout the region. Thus, if local impacts occur, they could potentially aggregate to produce regionwide effects on the amount and quality of critical habitat. The majority of potential impacts are related to critical habitat for Delta smelt. Development could also potentially affect smaller amounts of critical habitat for several other species, including Suisun thistle, western snowy plover, tidewater goby, Antioch Dunes evening primrose, and Contra Costa goldfields. Impacts would occur primarily in Solano and Contra Costa Counties.

Table 3.5-5: Number of Species and Acreage of Sea Level Rise Adaptation Footprint within Critical Habitat

County	Number of Species	Total (acres)
Alameda	1	10
Contra Costa	2	80
Marin	1	2
Napa	0	0
San Francisco	0	0
San Mateo	1	6
Santa Clara	0	0
Solano	3	210
Sonoma	0	0
Regional Total	6	320

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum due to independent rounding.
Sources: Data compiled by MTC and ABAG in 2021; U.S. Fish and Wildlife Service 2020

Potential effects of sea level rise adaptation infrastructure projects on designated critical habitat are generally similar to those described above for land use development under the proposed Plan. In this case, most impacts on critical habitat would occur in association with sea level rise adaptation infrastructure projects that would result in earthmoving activities (e.g., elevated highway/roadway, levees, sea walls, tidal gates) in locations that are currently on the boundary of, or that traverse, critical habitat.

Because the proposed sea level rise adaptation infrastructure projects may result in permanent or temporary disturbance or loss of designated critical habitat for federally listed plant and wildlife species, this impact would be potentially significant (PS).

Transportation System Impacts

Construction and Operation

As shown in Tables 3.5-2, 3.5-3, and 3.5-6, the transportation project footprint within the Plan area overlaps with approximately 1,100 acres of land designated by USFWS as critical habitat for eight federally listed species. As noted in the land use discussion above, critical habitat for some species occurs within local units distributed throughout the region; therefore, local impacts could potentially combine to produce regional effects. The majority of potential impacts are related to critical habitat for California red-legged frog, Delta smelt, vernal pool fairy shrimp, and Contra Costa goldfields, with smaller amounts of critical habitat for California tiger salamander, vernal pool tadpole shrimp, Bay

checkerspot butterfly, and Alameda striped racer (whipsnake) potentially affected. Impacts would occur primarily in Contra Costa, Santa Clara, Alameda, and Solano Counties.

Table 3.5-6: Number of Species and Acreage of Transportation Projects Footprint within Critical Habitat

County	Number of Species	Total (acres)
Alameda	1	230
Contra Costa	5	430
Marin	0	0
Napa	1	8
San Francisco	0	0
San Mateo	1	< 1
Santa Clara	3	330
Solano	5	50
Sonoma	1	5
Regional Total	9	1,100

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum due to independent rounding.
California tiger salamander is considered endangered in Sonoma County and threatened in Central California and are counted separately as two different populations of the same species.
Source: Data compiled by MTC and ABAG in 2021; Critical Habitat, U.S. Fish and Wildlife Service (2020)

Potential effects of transportation projects on designated critical habitat are generally similar to those described above for land use development under the proposed Plan. In this case, most impacts on critical habitat would occur in association with widening (or otherwise expanding) roads that are currently on the boundary of, or that traverse, critical habitat, as well as constructing new rail projects within the boundaries of, or that traverse, critical habitat.

Because the proposed transportation projects may result in permanent or temporary disturbance or loss of designated critical habitat for federally listed plant and wildlife species, this impact would be potentially significant (PS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects has the potential to result in localized impacts, particularly with respect to habitat loss and degradation, and could adversely affect critical habitat for one or more species on a regional scale. Because the proposed Plan may result in the disturbance or loss of critical habitat, this impact would be **potentially significant (PS)**. Mitigation Measure BIO-1(b) addresses this impact and is described below.

Mitigation Measures

Mitigation Measure BIO-1(b) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, for projects that could affect designated critical habitat for federally listed plant and wildlife species that include those identified below:

- Coordination with USFWS and NOAA Fisheries, as appropriate based on the species, shall be conducted early in the environmental review process to determine the need for further mitigation, consultation, or permitting actions. Formal consultation is required for any project with a federal nexus when a listed species or designated critical habitat is likely to be adversely affected. Any conservation measures required by USFWS or NOAA Fisheries as part of formal consultation (e.g., through issuance of a biological opinion) would be implemented.

- Reconfigure project design to avoid or minimize adverse effects on protected species within designated critical habitats.
- Implementing agencies and/or project sponsors shall comply with existing local regulations and policies, including applicable HCP/NCCPs.
- Additionally, implementation of Mitigation Measure BIO-1(a), above, which includes an initial biological resource assessment and, if necessary, compensatory mitigation for unavoidable loss of habitat or other impacts on special-status species. Compensatory mitigation may be achieved in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through RAMP, as deemed appropriate by the permitting agencies.

Significance after Mitigation

To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M). These mitigation measures would require coordination or consultation with USFWS and NOAA Fisheries, as appropriate based on the species, for projects that could adversely affect critical habitat; avoidance or minimization of adverse effects on protected species within critical habitats; and compliance with applicable regulations and policies that protect critical habitat. Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, to address site-specific conditions.

As noted above in the Regulatory setting, pursuant to the requirements of the ESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed or proposed species may be present in the project region and whether the proposed project would result in a "take" of such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the ESA, or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. The "take" prohibition of the ESA applies to any action that would adversely affect a single member of an endangered or threatened species. "Take," as defined in Section 9 of the ESA, is broadly defined to include intentional or accidental "harassment" or "harm" to wildlife. "Harm" is defined as an act that actually kills or injures wildlife. It may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Further, because Mitigation Measure BIO-1(b) is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of Mitigation Measure BIO-1(b), this impact would be **less than significant with mitigation (LTS-M)**.

Impact BIO-2: Have a substantial adverse effect on riparian habitat, State- or federally protected wetlands (including but not limited to marsh, vernal pool, coastal), or other sensitive natural communities identified in local or regional plans, policies, or regulations, or by CDFW or USFWS, through direct removal, filling, hydrological interruption, or other means (PS)

Land Use Impacts

Construction and Operation

Table 3.5-7 summarizes the potential impacts that development within the land use growth footprint could have on State- or federally protected jurisdictional waters, including wetlands, "other waters" (e.g., streams, rivers, lakes, San Francisco Bay), and riparian habitat, based on NWI mapping (NWI 2020). Less than 2 percent of the land use growth footprint, located primarily in Alameda, Contra Costa, San Mateo, Santa Clara, Solano, and Sonoma Counties, was identified where future forecasted development could potentially affect wetlands and other waters directly or indirectly. The majority of

potentially affected wetlands were associated with estuarine and marine deepwater habitats around San Francisco Bay and the Carquinez Strait, or freshwater emergent wetlands and freshwater ponds in a variety of locations. The jurisdictional waters impact summaries in these tables were developed using a GIS-based analysis that compared proximity of land use growth footprints to existing NWI-mapped wetland features, where the land use growth footprint intersects, bridges, or could otherwise affect jurisdictional waters (NWI 2020). Because the analysis examined only mapped streams and wetlands, numerous smaller features not included in the NWI mapping that could be affected are not reflected. Conversely, proximity of the land use growth footprint to jurisdictional waters provides only a coarse indicator of actual impacts.

Table 3.5-7: Acreage of Land Use Growth Footprint within Wetlands

County		Estuarine and Marine Deepwater (acres)	Estuarine and Marine Wetland (acres)	Freshwater Emergent Wetland (acres)	Freshwater Forested/ Shrub Wetland (acres)	Freshwater Pond (acres)	Lake (acres)	Riverine (acres)
Alameda	County Total	110	3	20	3	20	4	10
	Within TPAs	60	2	8	1	4	4	5
Contra Costa	County Total	2	20	70	10	30	0	40
	Within TPAs	< 1	2	3	1	0	0	5
Marin	County Total	5	7	< 1	0	3	< 1	8
	Within TPAs	2	< 1	< 1	0	2	< 1	1
Napa	County Total	0	0	5	< 1	< 1	0	9
	Within TPAs	0	0	0	0	0	0	< 1
San Francisco	County Total	6	5	< 1	0	5	0	< 1
	Within TPAs	2	< 1	< 1	0	5	0	< 1
San Mateo	County Total	40	10	20	2	30	9	10
	Within TPAs	20	1	7	0	4	0	6
Santa Clara	County Total	< 1	< 1	9	10	40	0	10
	Within TPAs	0	< 1	< 1	9	20	0	4
Solano	County Total	< 1	< 1	40	< 1	20	0	30
	Within TPAs	< 1	0	2	0	0	0	1
Sonoma	County Total	10	2	10	10	20	0	20
	Within TPAs	< 1	0	< 1	< 1	2	0	< 1
Regional Total	County Total	170	50	180	40	160	10	150
	Within TPAs	90	5	20	10	30	5	20

Notes: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum due to independent rounding.
Sources: MTC/ABAG 2021; U.S. Fish and Wildlife Service 2020

Potential impacts of land use development projects under the proposed Plan on wetlands include the temporary disturbance, or permanent loss, of jurisdictional waters, including wetlands; loss or degradation of stream or wetland function; incremental degradation of wetland habitats; and fragmentation of streams and wetlands. Jurisdictional waters in the region vary from relatively small, isolated roadside areas, wet meadows, and vernal pools to major streams and rivers, bays and estuaries, and tidal, brackish, and freshwater marshes. Any fill of jurisdictional waters associated with proposed land development would be a significant impact.

In addition to direct habitat loss, implementation of forecasted development under the proposed Plan could increase the potential for stormwater runoff to carry a variety of pollutants into wetlands, rivers, streams, and San Francisco Bay through increases in the extent of impervious surfaces. Construction runoff often carries grease, oil, and heavy metals (because of ground disturbance) into natural drainages. Furthermore, particulate materials generated by construction could be carried by runoff into natural waterways and could increase sedimentation impacts.

Adverse effects on State- and federally protected wetlands would be addressed, if feasible, through avoidance of these resources. Where avoidance is not possible, and in accordance with USACE, EPA, USFWS, RWQCB, and CDFW guidelines, a standard of "no net loss" of wetland acreage and value is required. Mitigation to compensate for project-related loss of wetland acreage and functions would be based on project-specific wetland mitigation plans, subject to approval by USACE, RWQCB, CDFW, BCDC, and the California Coastal Commission where applicable. Impacts on jurisdictional waters would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

Construction and Operation

Table 3.5-8 summarizes the potential impacts that sea level rise adaptation infrastructure could have on jurisdictional waters, including wetlands, "other waters," and riparian habitat, based on NWI mapping (NWI 2020). Approximately 2,500 acres of land, located primarily in Alameda, Marin, San Mateo, Santa Clara, and Solano Counties, were identified where sea level rise adaptation infrastructure could have the potential to affect wetlands and other waters directly or indirectly (Table 3.5-8).

Table 3.5-8: Acreage of Sea Level Rise Adaptation Footprint within Wetlands

County	Estuarine and Marine Deepwater (acres)	Estuarine and Marine Wetland (acres)	Freshwater Emergent Wetland (acres)	Freshwater Forested/ Shrub Wetland (acres)	Freshwater Pond (acres)	Lake (acres)	Riverine (acres)
Alameda	100	160	20	0	40	50	30
Contra Costa	20	60	20	0	10	0	4
Marin	80	140	60	< 1	7	20	20
Napa	0	0	0	0	0	0	0
San Francisco	20	< 1	< 1	0	< 1	0	0
San Mateo	70	170	30	0	20	120	4
Santa Clara	60	250	40	< 1	10	310	9
Solano	50	250	90	0	10	30	9
Sonoma	5	20	4	0	3	0	9
Regional Total	400	1,100	260	1	100	540	80

Notes: Numbers less than 1 are shown as "<1"; Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum due to independent rounding.

Sources: Data compiled by MTC and ABAG in 2021; U.S. Fish and Wildlife Service 2020

Potential effects of sea level rise adaptation infrastructure projects on wetlands and other waters are generally similar to those described above for land use development under the proposed Plan. In this case, most impacts on wetlands and other waters would occur in association with sea level rise adaptation infrastructure projects that would result in earthmoving activities (e.g., elevated highway/roadway, levees, sea walls, tidal gates) in areas that contain or are adjacent to wetlands or other waters. Additionally, while marshland restoration projects would likely result in an overall

beneficial impact on wetlands and other waters, these projects could also result in temporary adverse effects on these resources.

Adverse effects on State- and federally protected wetlands would be addressed, if feasible, through avoidance of these resources. Where avoidance is not possible, and in accordance with USACE, EPA, USFWS, RWQCB, and CDFW guidelines, a standard of "no net loss" of wetland acreage and value is required. Mitigation for wetland impacts would be based on project-specific wetland mitigation plans, subject to approval by USACE, RWQCB, CDFW, BCDC, and CCC where applicable. Impacts on jurisdictional waters would be potentially significant (PS).

Transportation System Impacts

Construction and Operation

Table 3.5-9 summarizes the potential impacts proposed transportation projects could have on jurisdictional waters, including wetlands, "other waters" (e.g., streams, rivers, lakes, San Francisco Bay), and riparian habitat. Approximately 680 acres of land, located primarily in Alameda, Solano, San Francisco, Santa Clara, San Mateo, and Contra Costa Counties, were identified where transportation projects could have the potential to affect wetlands and other waters directly or indirectly (Table 3.5-9). As described above, the jurisdictional waters impact summaries in the tables were developed using a GIS-based analysis that compared transportation project proximity to existing NWI-mapped wetland features, where the project intersects, bridges, or could otherwise affect jurisdictional waters.

Table 3.5-9: Acreage of Transportation Projects Footprint within Wetlands

County	Estuarine and Marine Deepwater (acres)	Estuarine and Marine Wetland (acres)	Freshwater Emergent Wetland (acres)	Freshwater Forested/ Shrub Wetland (acres)	Freshwater Pond (acres)	Lake (acres)	Riverine (acres)
Alameda	80	60	20	2	4	< 1	10
Contra Costa	20	8	7	<1	< 1	0	10
Marin	0	0	< 1	0	0	0	7
Napa	< 1	1	< 1	0	0	0	2
San Francisco	170	3	0	0	< 1	0	0
San Mateo	20	30	7	0	4	< 1	10
Santa Clara	< 1	0	3	10	7	0	40
Solano	10	40	8	3	10	20	10
Sonoma	< 1	7	4	< 1	1	< 1	8
Regional Total	301	149	50	20	20	20	100

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum due to independent rounding.
Sources: Data compiled by MTC and ABAG in 2021; U.S. Fish and Wildlife Service 2020

Potential effects of transportation projects are similar to those discussed above for land use changes and development. Where feasible, State- and federally protected wetlands would be avoided. Where avoidance is not possible, and in accordance with USACE, EPA, USFWS, RWQCB, and CDFW guidelines, a standard of "no net loss" of wetland acreage and value is required. Mitigation for wetland impacts would be based on project-specific wetland mitigation plans, subject to approval by USACE, RWQCB, CDFW, and potentially CCC and BCDC. Impacts on jurisdictional waters resulting from implementation of transportation projects would be potentially significant (PS).

Conclusion

As discussed above, implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects could result in the potential to affect jurisdictional waters and other sensitive habitats. This would be a **potentially significant (PS)** impact. Mitigation Measure BIO-2 addresses this impact and is discussed below.

Mitigation Measures

Mitigation Measure BIO-2 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Implementing agencies shall require project sponsors to prepare biological resource assessments for specific projects proposed in areas containing, or likely to contain, jurisdictional waters or other sensitive or special-status communities. These assessments shall be conducted by qualified professionals in accordance with agency guidelines and standards. Where the biological resource assessments establish that mitigation is required to avoid and minimize direct and indirect adverse effects on State- or federally protected wetlands, or compensate for unavoidable effects, mitigation shall be developed consistent with the requirements or standards of USACE, EPA, RWQCB, and CDFW, and local regulations and guidelines, in addition to requirements of any applicable and adopted HCP/NCCP or other applicable plans developed to protect these resources. In keeping with the "no net loss" policy for jurisdictional waters (i.e., wetlands and other waters of the United States or State), project designs shall be configured, whenever possible, to avoid wetlands and other waters and avoid disturbances to wetlands and riparian corridors to preserve both the habitat and the overall ecological functions of these areas. Projects shall minimize ground disturbances and transportation project footprints near such areas to the extent practicable.

  - Project sponsors shall consult with USFWS, NMFS, USFS, CDFW where state-designated sensitive or riparian habitats provide potential or occupied habitat for federally listed rare, threatened, and endangered species afforded protection pursuant to the federal ESA, the MBTA during the breeding season, the California ESA, or Fully Protected Species afforded protection pursuant to the State Fish and Game Code and with the CDFW pursuant to the provisions of Section 1600 of the State Fish and Game Code as they relate to Lakes and Streambeds.

- Where avoidance of jurisdictional waters is not feasible, project sponsors shall minimize fill and the use of in-water construction methods, and place fill only with express permit approval from the appropriate resource agencies (e.g., USACE, RWQCB, CDFW, BCDC, and CCC) and in accordance with applicable existing regulations, such as the Clean Water Act or local stream protection ordinances.

- Project sponsors shall arrange for compensatory mitigation in the form of mitigation bank credits; on-site or off-site enhancement of existing waters; or wetland creation in accordance with applicable existing regulations and subject to approval by USACE, RWQCB, CDFW, BCDC, and/or CCC. If compensatory mitigation is required by the implementing agency, the project sponsor shall develop a restoration and monitoring plan that describes how compensatory mitigation will be achieved, implemented, maintained, and monitored. At a minimum, the restoration and monitoring plan shall include clear goals and objectives, success criteria, specifics on restoration/creation/enhancement (e.g., plant palette, soils, irrigation design standards and requirements), specific monitoring periods and reporting guidelines, and a maintenance plan. The following minimum performance standards (or other standards as required by the permitting agencies) shall apply to any wetland compensatory mitigation:

- Compensation shall be provided at a minimum 1:1 ratio for restoration, preservation, and creation but shall in all cases be consistent with mitigation ratios set forth in locally applicable plans (e.g., general plans, HCP/NCCPs) or in project-specific permitting documentation. Compensatory mitigation may be a combination of on-site restoration/creation/enhancement or off-site restoration, preservation, or enhancement. Compensatory mitigation may be achieved in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through RAMP, as deemed appropriate by the permitting agencies.

- In general, any compensatory mitigation shall be monitored for a minimum of 5 years and will be considered successful when at least 75 percent cover (or other percent cover considered appropriate for the vegetation type) of installed vegetation has become successfully established.

- If the restoration is not meeting success criteria, remedial measures shall be implemented and would typically include, but are not limited to, replanting, reseeding, grading adjustments, supplemental irrigation, access control, increased weed control, and extended maintenance and monitoring periods. After final success criteria have been met and relevant permitting agencies have approved the mitigation project as complete, all mitigation areas shall be permanently conserved (e.g., conservation easement) and managed in perpetuity.

- Salvage and stockpile topsoil (i.e., the surface material from 6 to 12 inches deep) and perennial native plants, when recommended by the qualified wetland biologist, for use in restoring native vegetation to areas of temporary disturbance within the project area. Salvage of soils containing invasive species, seeds and/or rhizomes shall be avoided as identified by the qualified wetland biologist.

- In accordance with CDFW guidelines and other instruments protective of sensitive or special-status natural communities, project sponsors shall avoid and minimize impacts on sensitive natural communities and habitats when designing and permitting projects. Where applicable, projects shall conform to the provisions of special area management or restoration plans, such as the Suisun Marsh Protection Plan and the East Contra Costa County HCP, which outline specific measures to protect sensitive vegetation communities.

- If any portion of a sensitive natural community is permanently removed or temporarily disturbed, the project sponsor shall compensate for the loss. If such mitigation is required by the implementing agency, the project sponsor shall develop a restoration and monitoring plan that describes how compensatory mitigation will be achieved, implemented, maintained, and monitored. At a minimum, the restoration and monitoring plan shall include clear goals and objectives, success criteria, specifics on restoration/creation/enhancement (e.g., plant palette, soils, irrigation design standards and requirements), specific monitoring periods and reporting guidelines, and a maintenance plan. The following minimum performance standards (or other standards as required by the permitting agencies) shall apply to any compensatory mitigation for sensitive natural communities:

  - Compensation shall be provided at a minimum 1:1 ratio for restoration and preservation but shall in all cases be consistent with mitigation ratios set forth in locally applicable plans (e.g., general plans, HCP/NCCPs) or in project-specific permitting documentation. Compensatory mitigation may be a combination of on-site restoration/creation/enhancement or off-site restoration, preservation, or enhancement. Compensatory mitigation may be achieved in advance of impacts through the purchase or creation of mitigation credits or the implementation of mitigation projects through RAMP, as deemed appropriate by the permitting agencies.

- In general, any compensatory mitigation shall be monitored for a minimum of 5 years and will be considered successful when at least 75 percent cover (or other percent cover considered appropriate for the vegetation type) of installed vegetation has become successfully established.

- If the restoration is not meeting success criteria, remedial measures shall be implemented and would typically include, but are not limited to, replanting, reseeding, grading adjustments, supplemental irrigation, access control, increased weed control, and extended maintenance and monitoring periods. After final success criteria have been met and relevant permitting agencies have approved the mitigation project as complete, all mitigation areas shall be permanently conserved (e.g., conservation easement) and managed in perpetuity.

- All construction materials, staging, storage, dispensing, fueling, and maintenance activities shall be located in upland areas outside of sensitive habitat, and adequate measures shall be taken to prevent any potential runoff from entering jurisdictional waters. Fueling of equipment shall take place within existing paved roads. Contractor equipment shall be checked for leaks prior to operation and repaired, as necessary.

- Construction activities shall be scheduled, to the extent feasible, to avoid sensitive times for biological resources and to avoid the rainy season when erosion and sediment transport is increased.

- Compliance with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures protective of wetlands and other waters or sensitive natural communities.

Significance after Mitigation

To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M). These measures would require that sensitive habitat (e.g., jurisdictional waters, sensitive natural communities) be avoided to the extent feasible and that sensitive habitats that cannot be avoided are restored following construction, or if the habitat cannot be restored, that the project proponent compensates for unavoidable losses in a manner that results in no net loss of sensitive habitats and meets applicable regulatory requirements.

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. Similar to Impact BIO-2(b), because Mitigation Measure BIO-2 is tied to existing regulations that are law and binding on responsible agencies and project sponsors, it is reasonable to determine that they would be implemented. Therefore, with the incorporation of Mitigation Measure BIO-2, this impact would be **less than significant with mitigation (LTS-M)**.

Impact BIO-3: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites (PS)

Land Use Impacts

Construction and Operation

As discussed in Section 3.5.1, "Environmental Setting," the Bay Area encompasses large areas of wildlands that provide habitat for both common and rare plants and wildlife, and some of these areas were mapped as Essential Connectivity Areas (ECAs). The ECAs are not regulatory delineations but have been identified by the California Essential Habitat Connectivity Project as lands likely important

to wildlife movement between large, mostly natural areas at the Statewide level. ECAs were mapped on a Statewide level and should be considered areas identified at a coarse scale that can inform land-planning efforts; however, ECAs do not include more detailed linkage designs developed at a finer resolution based on the needs of particular species and ecological processes. As shown in Figure 3.5-5, a total of 15 ECAs occur within the nine Bay Area counties and are typically centered along the region's mountain ranges. These areas are composed primarily of wildlands but may also include some agricultural and developed areas (mostly rural residential) and many are bisected by major roadways.

The proposed Plan's land use growth footprint overlaps with approximately 1,700 acres of mapped ECAs, primarily in Contra Costa (700 acres), Solano (330 acres), Santa Clara (210 acres), San Mateo (170 acres), Alameda (150 acres), and Napa Counties (150 acres) (**Table 3.5-10**). However, the land use growth footprint is concentrated primarily in or adjacent to already urban and built-up areas and along existing transit corridors where migratory corridors for wildlife have already been fragmented and degraded to the point that their function as linkages is either limited or lost entirely. On a local level, waterways, riparian corridors, and contiguous or semicontiguous expanses of habitat are likely to facilitate wildlife movement, even through urbanized areas in the region. In some cases, land use development projects may directly encroach on wildlife corridors, particularly when direct habitat removal occurs or when sites are located adjacent to open space or streams.

Table 3.5-10: Acreage of Land Use Growth Footprint within Essential Connectivity Areas

County		Total (acres)
Alameda	County Total	150
	Within TPAs	30
Contra Costa	County Total	700
	Within TPAs	70
Marin	County Total	0
	Within TPAs	0
Napa	County Total	150
	Within TPAs	0
San Francisco	County Total	0
	Within TPAs	0
San Mateo	County Total	170
	Within TPAs	0
Santa Clara	County Total	210
	Within TPAs	20
Solano	County Total	330
	Within TPAs	8
Sonoma	County Total	<1
	Within TPAs	0
Regional Total	County Total	1,700
	Within TPAs	120

Notes: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum due to independent rounding.

Sources: MTC/ABAG 2021; California Department of Fish and Wildlife 2010

Nursery sites are locations where fish or wildlife concentrate for hatching and/or raising young, such as nesting rookeries for birds (e.g., herons, egrets), spawning areas for native fish, fawning areas for mule deer (*Odocoileus hemionus*), and maternal roosts for bats. The locations of nursery sites in the

State are generally not mapped. While most of these sites would likely occur in undeveloped natural areas and the land use growth footprint is located primarily in or adjacent to already urbanized areas, development projects may result in loss or abandonment of wildlife nursery sites.

Construction of land use development and ongoing operations could result in substantial encroachment on local wildlife corridors or loss of wildlife nursery sites; therefore, this would be a potentially significant (PS) impact.

Sea Level Rise Adaptation Impacts

Construction and Operation

The proposed Plan's sea level rise adaptation footprint overlaps with approximately 380 acres of mapped ECAs, primarily in Solano (300 acres) and Sonoma Counties (80 acres) (Table 3.5-11). Potential effects of sea level rise adaptation infrastructure on wildlife corridors are generally similar to those described above for land use development under the proposed Plan. In some cases, sea level rise adaptation infrastructure may directly encroach on wildlife corridors, particularly when direct habitat removal occurs or when sites are located adjacent to open space or streams. Implementation of sea level rise adaptation infrastructure also may result in loss or abandonment of wildlife nursery sites. Substantial encroachment on local wildlife corridors or loss of wildlife nursery sites would be a potentially significant (PS) impact.

Table 3.5-11: Acreage of Sea Level Rise Adaptation Footprint within Essential Connectivity Areas

County	Total (acres)
Alameda	0
Contra Costa	0
Marin	0
Napa	< 1
San Francisco	0
San Mateo	0
Santa Clara	0
Solano	300
Sonoma	80
Regional Total	380

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum due to independent rounding.
Sources: Data compiled by MTC and ABAG in 2021; California Department of Fish and Wildlife 2010

Transportation System Impacts

Construction and Operation

Transportation projects could result in impacts on ECAs because of major transportation projects in Alameda, Contra Costa, Napa, Santa Clara, Solano, and Sonoma Counties and to a lesser degree in San Mateo County. The proposed Plan's transportation project footprint overlaps with approximately 1,900 acres of mapped ECAs (Table 3.5-12). The majority of potential effects would occur in Santa Clara (810 acres), Alameda (520 acres), Solano (310 acres), and Contra Costa (130 acres) Counties. Many of these transportation projects are expansions or enhancements of existing highways or other transportation routes with existing urban corridors established along them. In these areas, migratory corridors have already been fragmented and degraded to the point that their function as linkages is either limited or has been lost entirely. However, some transportation projects, particularly new rail projects, could be located in areas that have not been subject to previous disturbance and fragmentation.

Table 3.5-12: Acreage of Transportation Projects Footprint within Essential Connectivity Areas

County	Total (acres)
Alameda	520
Contra Costa	130
Marin	0
Napa	90
San Francisco	0
San Mateo	2
Santa Clara	810
Solano	310
Sonoma	60
Regional Total	1,900

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum due to independent rounding.
Sources: Data compiled by MTC in 2021; California Department of Fish and Wildlife 2010

As discussed for projected land development within land use growth footprints, proposed transportation projects may directly encroach on local wildlife corridors, particularly when direct habitat removal occurs or when sites are located adjacent to open space or streams. Additionally, as described above, transportation projects may result in loss or abandonment of wildlife nursery sites. Substantial encroachment on local wildlife corridors or loss of wildlife nursery sites would be a potentially significant (PS) impact.

Conclusion

Because implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects has the potential to result in land use changes and localized effects that would directly encroach on local wildlife corridors or result in loss or abandonment of wildlife nursery sites, this impact would be **potentially significant (PS)**. Mitigation Measure BIO-3 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure BIO-3(a) Implementing agencies shall require project sponsors to prepare detailed analyses for specific projects affecting ECA lands to determine the wildlife species that may use these areas and the habitats those species require. Projects that would not affect ECA lands but that are located within or adjacent to open space lands, including wildlands and agricultural lands, shall also assess whether significant wildlife corridors are present, what wildlife species may use them, and what habitat those species require. The assessment shall be conducted by qualified professionals and according to applicable agency standards.

Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Design projects to minimize impacts on wildlife movement and habitat connectivity and preserve existing and functional wildlife corridors.
- Design projects to promote wildlife corridor redundancy by including multiple connections between habitat patches.
- Conduct wildlife movement studies for projects that may fragment or constrict regional or local corridors and impede use to nursery sites. These studies will include, but would not be limited to, the following objectives: identify activity levels and directional wildlife movement trends within

the study area, assess current functionality of existing underpasses, and determine what species or groups of species exhibit sensitivity to the existing roadways. Movement studies shall identify project-specific measures to avoid or mitigate impacts on corridors and movement to nursery sites that may include, but are not limited to, developing alternative project designs that allow wider movement corridors to remain; provide for buffer zones adjacent to corridors, such as passive recreation zones; implement physical barriers that prevent human and/or domestic predator entry into the corridor or block noise and lighting from development; incorporate shielded and directed lighting in areas near corridors; implement a "natives only" landscaping policy within 200 feet of identified wildlife corridors; incorporate periodic larger habitat patches along a corridor's length; minimize the number of road crossings of identified wildlife corridors; and replace roadway culverts with bridges to allow for wildlife movement.

- For projects that cannot avoid significant impacts on wildlife movement corridors or native wildlife nursery areas, consult with CDFW to determine appropriate measures to minimize direct and indirect impacts and implement measures to mitigate impacts on wildlife corridors or native wildlife nursery sites.
- Conduct site-specific analyses of opportunities to preserve or improve habitat linkages with areas on- and off-site.
- Analyze habitat linkages and wildlife movement corridors on a broad scale for long linear projects with the possibility of adversely affecting wildlife movement to avoid critical narrow choke points that could reduce function of recognized movement corridor.
- Construct wildlife-friendly overpasses and culverts.
- Fence major transportation corridors in the vicinity of identified wildlife corridors.
- Use wildlife-friendly fences that allow larger wildlife, such as deer, to cross over and smaller wildlife to move under.
- For projects that require the placement of stream culverts in a fish spawning stream, follow USACE, NOAA Fisheries, USFWS, and CDFW permit conditions and design requirements to allow fish passage through the culverts.
- Limit wildland conversions in identified wildlife corridors.
- Retain wildlife-friendly vegetation in and around developments.
- Monitor and maintain fencing, under crossings, and/or other crossing structures as needed to ensure corridor permeability and functionality. Development and implementation of a fencing and wildlife crossing structure maintenance plan is recommended to maintain permeability for wildlife across corridors.
- Prohibit construction activities within 500 feet of occupied breeding areas for wildlife afforded protection pursuant to Title 14 Section 460 of the California Code of Regulations protecting fur-bearing mammals, during the breeding season.
- Comply with existing local regulations and policies, including applicable HCP/NCCPs, that exceed or reasonably replace any of the above measures to protect wildlife corridors.

Mitigation Measure BIO-3(b) Implementing agencies and/or project sponsors shall implement the following measures, where feasible and necessary based on project- and site-specific considerations:

- Implement Mitigation Measures BIO-1(a) and BIO-2.

Significance after Mitigation

To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M). These mitigation measures would require assessing whether significant wildlife corridors are present in project areas, minimizing wildland conversions in identified wildlife corridors, implementing wildlife-friendly design features, and complying with regulations and policies to protect wildlife corridors and wildlife nursery sites.

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Unlike Mitigation Measures BIO-1(b) and BIO-2, the above mitigation measure is not directly tied to existing regulations that are law and binding on responsible agencies and project sponsors. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact BIO-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, or with provisions of an adopted Habitat Conservation Plan (HCP); Natural Community Conservation Plan (NCCP); or other approved local, regional, or State HCP (LTS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Construction and Operation

Local Ordinances. Most counties and cities in the region have local ordinances and policies in place that protect native and nonnative trees in urban landscapes, as well as in unincorporated county lands. These ordinances and policies vary in their definitions of protected trees (e.g., certain species, minimum diameter at breast height, trees that form riparian corridors) and in the requirements for ordinance or policy compliance. Land use changes and development could result in removal of trees that are protected by local policies or ordinances. The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the proposed Plan could also result in conflicts with other local policies or ordinances that protect locally significant biological resources, such as creek or wetland protection ordinances. However, for most land use development projects and transportation projects, ground disturbances would occur within existing urban and built-up areas and existing transportation corridors. Because ground disturbances would be limited mostly to these existing disturbed areas, the potential removal of native trees and disturbances to other biological resources protected by local policies or ordinances are expected to be moderate.

All future land use development, sea level rise adaptation infrastructure, and transportation projects would be required to follow city and county development requirements, including compliance with local policies, ordinances, and applicable permitting procedures related to protection of biological resources. Additionally, project-level planning, environmental analysis, and compliance with existing local regulations and policies would identify potentially significant tree removal or other potential conflicts with local policies; minimize or avoid those impacts through the design, siting, and permitting process; and provide mitigation for any significant effects as a condition of project approval and permitting. Therefore, the potential for approved development projects, sea level rise adaptation projects, and transportation projects to conflict with local policies or ordinances protecting biological resources would be less than significant (LTS).

HCPs and Other Approved Plans. The San Bruno Mountain Area HCP (County of San Mateo 1982) was adopted by the County of San Mateo and the Cities of Brisbane, Daly City, and South San Francisco in 1982; however, no projects under the proposed Plan are located on lands covered under this HCP. Projects under the proposed Plan would occur on lands covered by several other adopted plans, as well as plans pending formal adoption, within the region. The East Contra Costa County HCP and NCCP (ECCC HCP/NCCP) (ECCC HCPA 2006) was adopted by Contra Costa County and the Cities of Brentwood, Clayton, Oakley, and Pittsburg and went into effect in 2008. Some of the proposed Plan's land use growth footprint and proposed sea level rise adaptation infrastructure projects are located within the ECCC HCP/NCCP urban development areas. Development within ECCC HCP/NCCP urban development areas, generally defined as areas within the county urban limit line, is a "covered activity." The Santa Clara Valley Habitat Plan (SCVHP) (County of Santa Clara et al. 2012) was approved and adopted in 2013 by the County of Santa Clara; the Santa Clara Valley Transportation Authority; the Santa Clara Valley Water District; and the Cities of San Jose, Gilroy, and Morgan Hill. Development within TPAs and in the land use growth footprint under the proposed Plan in Santa Clara County may qualify for coverage under the SCVHP. The Santa Rosa Plain Conservation Strategy (USFWS 2005) and the East Alameda County Conservation Strategy (EACCSSC 2010) have not yet been adopted, as of March 2021, by their local agency partners, but nonetheless influence projects requiring Section 7 or 10 consultation under the federal ESA within their boundaries. Programmatic biological opinions have been issued in each case that guide the development of avoidance and minimization measures for projects within areas covered by each conservation strategy, as well as compensatory mitigation measures. The Solano Multispecies Habitat Conservation Plan has not yet been adopted, as of March 2021, but may be approved and adopted during the Plan Bay Area planning horizon. Finally, several projects occur within the California Coastal Zone and are subject to the requirements of local coastal plans.

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects in the proposed Plan located within the ECCC HCP/NCCP and SCVHP boundaries must demonstrate consistency with the HCP/NCCP. For example, sponsors of covered projects are required to comply with the ECCC HCP/NCCP mitigation measures. For the ECCC HCP/NCCP, covered projects must submit a complete HCP/NCCP application package; submit required fees; fulfill the appropriate HCP survey requirements for wildlife, plants, wetlands, and sensitive habitats; and comply with all applicable conservation measures, outlined in Chapter 6 of the HCP. Activities that are not covered under that plan, as well as other projects elsewhere in the region where plans are underway or have not yet formally been adopted, must pursue individual project permitting for impacts on biological resources until such time as the specific activity/project is identified as a covered activity in an applicable plan. Typically, once a plan or conservation strategy has been developed for an area, wetland and wildlife agency permitting conditions and requirements for projects within that area will be consistent with that plan or strategy whether or not it has been adopted, as is the case for projects in the Santa Rosa Plain, for example. Because consistency with an adopted HCP or other conservation plan is a legal requirement, and because the design, approval, and permitting of future land use development pattern, sea level rise adaptation infrastructure, and transportation projects within an area covered by an HCP or other conservation plan are intended and expected to comply with that requirement, the impacts related to potential conflicts with the provisions of adopted HCPs, NCCPs, or other approved local, regional, or State habitat conservation plans would be less than significant (LTS).

Conclusion

As discussed above, implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would be required to follow city and county development requirements, including compliance with local policies, ordinances, and applicable permitting procedures related to protecting biological resources. Additionally, consistency with an adopted HCP or other conservation plan is a legal requirement, and the design, approval, and

permitting of future development and transportation projects within an area covered by an HCP or other conservation plan are intended and expected to comply with that requirement. Therefore, the potential for approved land use development and transportation projects to conflict with local policies or ordinances protecting biological resources, or with the provisions of adopted HCPs, NCCPs, or other approved local, regional, or State HCPs, would be **less than significant (LTS)**.

Mitigation Measures

None required.

Impact BIO-5: Have the potential to substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species (PS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Construction and Operation

As described in Impacts BIO-1a, BIO-1b, and BIO-2, implementation of the projected land use development pattern, sea level rise adaptation infrastructure, and transportation projects under the proposed Plan could adversely affect special-status species and sensitive natural communities. The degree to which Plan implementation could jeopardize a special-status species or sensitive natural community by substantially reducing the abundance, distribution, or viability of the species or natural community is unknown; however, because of their declining status, special-status species and sensitive natural communities are considered the most vulnerable to potential loss of viability. This impact would be **potentially significant (PS)**. Mitigation Measure BIO-5 addresses this impact and is described below.

Common species and habitats in the Plan area are relatively abundant and generally adapted to the types and magnitude of disturbances expected under the proposed Plan; therefore, Plan implementation is not expected to substantially reduce the abundance or distribution of any common species or habitat.

Mitigation Measures

Mitigation Measure BIO-5 Implementing agencies and/or project sponsors shall implement the following measures, where feasible and necessary based on project- and site-specific considerations:

- Implement Mitigation Measures BIO-1(a), BIO-1(b), BIO-2, and BIO-3(a).

Significance after Mitigation

To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M), for the same reasons described previously for implementation of Mitigation Measures BIO-1(a), BIO-1(b), BIO-2, and BIO-3(a).

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Although Mitigation Measures BIO-1(b) and BIO-2 are directly tied to existing regulations that are law and binding on responsible agencies and project sponsors, they would not apply to all areas considered sensitive natural communities. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

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3.6 CLIMATE CHANGE, GREENHOUSE GASES, AND ENERGY

This section evaluates the potential impacts related to greenhouse gas (GHG) emissions resulting from implementation of the proposed Plan and analyzes their potential contribution to global climate change. For information on the proposed Plan's discussion of sea level rise, please see Chapter 2, "Project Description." Additionally, this section evaluates the potential impacts related to energy consumption resulting from the implementation of the proposed Plan.

Comments received in response to the Notice of Preparation expressed concerns regarding GHG emissions associated with vehicle miles traveled (VMT), Senate Bill (SB) 288 and its relationship to GHG emissions, and climate and social equity. These issues are addressed in this section.

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." (CEQA Guidelines Section 15083.) Neither the CEQA Guidelines nor Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require they be considered. Consistent with these requirements, the comments received on the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.6.1 Environmental Setting

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

"Climate" is defined as the average statistics of weather, which include temperature, precipitation, and seasonal patterns, such as storms and wind, in a particular region. "Global climate change" refers to the long-term and irrevocable shift in these weather-related patterns. Found in ice cores and geological records, baseline temperature and carbon dioxide (CO_2) data extend back to previous ice ages thousands of years ago. Over the last 10,000 years, the rate of temperature change has typically been incremental, with warming and cooling occurring over the course of thousands of years. However, scientists have observed an unprecedented increase in the rate of warming over the past 150 years, roughly coinciding with the global industrial revolution, which has resulted in substantial increases in GHG emissions (defined below) into the atmosphere. The anticipated impacts of climate change in California range from water shortages to inundation from sea level rise. Transportation systems contribute to climate change primarily through the emissions of certain GHGs (CO_2, methane [CH_4], and nitrous oxide [N_2O]) from nonrenewable energy (primarily gasoline and diesel fuels) used to operate passenger, commercial, and transit vehicles. Land use changes contribute to climate change through construction and operational use of electricity and natural gas and through waste production.

Climate modeling capabilities have been greatly enhanced in recent years, allowing for the future range of climate change effects to be better understood. While there are limitations to representing the anticipated changes at a regional level, the global forecasted future trends will still apply at a local level, even if specifics are unknown.

The Intergovernmental Panel on Climate Change (IPCC) has reached consensus that human-caused emissions of GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increases

in global average surface temperature from 1951 to 2010 were caused by the anthropogenic increase in GHG concentrations and other anthropogenic forces together (IPCC 2014:3, 5).

IPCC predicts that the global mean surface temperature increase by the end of the 21st century (2081–2100), relative to 1986–2005, could range from 0.5 to 8.7 degrees Fahrenheit. Additionally, IPCC projects that global mean sea level rise will continue during the 21st century, very likely at a faster rate than observed from 1971 to 2010. For the period 2081–2100 relative to 1986–2005, the rise will likely range from 10 to 32 inches (0.26 to 0.82 meters) (IPCC 2014:10, 13).

According to the California Energy Commission (CEC), accelerating global climate change has the potential to cause adverse impacts in the Bay Area, including but not limited to:

- *Water Supply:* Changes in local rainfall, saltwater intrusion, seawater flooding the Sacramento–San Joaquin Delta (Delta), and a reduced Sierra Nevada snowpack can all threaten the Bay Area's water supply. The potential for larger storms may also threaten current water management systems and infrastructure.

- *Infrastructure*: Increased risks of flooding because of sea level rise, coastal erosion, more frequent and extreme storms, and stronger precipitation events may lead to damage, inoperability, or impairment of critical infrastructure, such as wastewater treatment plants, sewage, power plants, and transportation. This would affect not only daily commutes and activities but also emergency response. Increased wildfires also threaten much of the inland infrastructure and can have cascading effects with rainfall on areas that were recently burned. Increased temperatures may complicate this adaptation, as they are expected to increase roadway construction costs.

- *Agriculture:* Changes in temperatures, more extreme heat days, and the earlier onset of spring may lead to suboptimal growing conditions for grapes and other agricultural products that significantly contribute to the Bay Area economy and tourism.

- *Ecosystems and Biodiversity:* Increased temperatures and wind changes are expected to increase the size and severity of wildfires, damaging habitat resilience and connectivity. With sea level rise, the Bay Area's coastal wetlands are threatened and cannot naturally move inland because of existing developments, thus destroying this important ecosystem. This threatens the region's freshwater fish species and may allow nonnative species to thrive. Increased temperatures also result in increased fire risk.

- *Energy Demand, Supply, and Transmission:* Increasing wildfires attributable to climate change threaten the transmission and distribution of electricity. Coastal flooding may affect other energy infrastructure, including oil and gas refineries or terminals. These challenges may be exacerbated by more common temperature extremes, which could lead to increased demand. This could lead to rolling blackouts or other issues with the Bay Area's aging energy infrastructure.

- *Public Health:* Many Bay Area residences and businesses were not built with air conditioning to control temperatures on extreme heat days, which may lead to illness and mortality. Higher temperatures also lead to worsened air quality and potentially the spread of diseases and pests. Increased incidence and severity of wildfires may also contribute to worsening air quality. These changes will disproportionately burden vulnerable populations.

- *Tribal and Indigenous Communities:* Tribal relationships with the environment have been limited because of historic U.S. policy. For many tribes, modern land status and geographic allotments create challenges for them to adapt to a changing climate (CEC 2018).

Greenhouse Gases

Gases that trap heat in Earth's atmosphere are called greenhouse gases (GHGs). These gases play a critical role in determining Earth's surface temperature. Part of the solar radiation that would have been reflected into space is absorbed by these gases, resulting in a warming of the atmosphere. Without natural GHGs, Earth's surface would be about 60 degrees cooler (MSU 2011). This phenomenon is known as the greenhouse effect. However, scientists have proven that emissions from human activities—such as electricity generation, vehicle use, and even farming and forestry practices—have elevated the concentration of GHGs in the atmosphere beyond naturally occurring concentrations, enhancing the greenhouse effect, and contributing to the larger process of global climate change. The six primary GHGs are:

- carbon dioxide (CO_2), emitted when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned;
- methane (CH_4), produced through the anaerobic decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, incomplete fossil fuel combustion, and water and wastewater treatment;
- nitrous oxide (N_2O), typically generated as a result of soil cultivation practices, particularly the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning;
- hydrofluorocarbons (HFCs), primarily used as refrigerants;
- perfluorocarbons (PFCs), originally introduced as alternatives to ozone-depleting substances and typically emitted as byproducts of industrial and manufacturing processes; and
- sulfur hexafluoride (SF_6), primarily used in electrical transmission and distribution.

Although there are other contributors to global warming, these six GHGs are identified by the U.S. Environmental Protection Agency (EPA) as threatening the public health and welfare of current and future generations (EPA 2009). GHGs have varying potential to trap heat in the atmosphere, known as global warming potential (GWP), and atmospheric lifetimes. GWP reflects how long GHGs remain in the atmosphere, on average, and how intensely they absorb energy. Gases with a higher GWP absorb more energy per pound than gases with a lower GWP and thus contribute more to warming Earth. For example, one ton of CH_4 has the same contribution to the greenhouse effect as approximately 28 tons of CO_2; hence, CH_4 has a 100-year GWP of 28, while CO_2 has a GWP of one. GWP ranges from one (for CO_2) to 23,500 (for SF_6). GHG emissions are typically measured as metric tons of carbon dioxide equivalent ($MTCO_2e$) (IPCC 2014:731–737).

Greenhouse Gas Emission Sources

GHG emissions are attributable in large part to human activities. The total GHG inventory for California in 2017 was 424 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) (CARB 2019). This is less than the 2020 target of 431 $MMTCO_2e$ (CARB 2019) required to meet legislative targets included in the Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32). **Table 3.6-1** summarizes the Statewide GHG inventory for California by percentage.

Table 3.6-1: Statewide GHG Emissions by Economic Sector in 2017

Sector	Percent	$MMTCO_2e$
Transportation	41	174
Industrial	24	71
Electricity generation (in State)	9	29
Agriculture	8	12
Residential	7	5
Electricity generation (imports)	6	2
Commercial	5	1
Total	100	424

Note: $MMTCO_2e$ = million metric tons of carbon dioxide equivalent.
Source: CARB (2019)

As shown in Table 3.6-1, transportation, industry, and in-State electricity generation are the largest GHG emission sectors.

Local and regional agencies in the Bay Area have taken steps to measure, quantify, evaluate, and mitigate their contributions to GHG emissions and global climate change. For example, 79 cities and counties in the Bay Area have developed their own climate action plans (CAPs), and 103 have completed GHG emissions inventories (CARB 2021). Additionally, many cities, businesses, and municipal agencies are voluntary members of the Climate Action Registry, a private nonprofit organization originally formed by the State of California that serves as a voluntary GHG registry to protect and promote early actions to reduce GHG emissions by organizations.

In 2017, the Bay Area Air Quality Management District (BAAQMD) updated a baseline inventory of GHG emissions in the region for the year 2015 in the *2017 Clean Air Plan: Spare the Air, Cool the Climate*. According to that inventory, 86.6 million metric tons of CO_2e ($MMTCO_2e$) were emitted in the Bay Area in 2015 (BAAQMD 2017). Table 3.6-2 and Table 3.6-3 show the emissions breakdown by pollutant and source.

Table 3.6-2: 2015 Bay Area CO_2e Emissions by Pollutant

Pollutant	Percentage	CO_2e ($MMTCO_2e$ /Year)
Carbon Dioxide	90	78
Methane	3	3
Nitrous Oxide	2	2
HFC, PFC, SF6	5	4
Regional Total	100	87

Notes: $MMTCO_2e$ = million metric tons of carbon dioxide equivalent. Totals may not sum because of independent rounding.
Source: BAAQMD 2017:Table E

Table 3.6-3: 2015 Bay Area CO_2e Emissions by Source

Source Category	Percentage	CO_2e ($MMTCO_2e$ /Year)
On and Off-Road Transportation	40	35
Stationary Sources	24	21
Electricity / Co-Generation[1]	18	16
Buildings[2]	11	10
Waste Management	3	2
High Global Warming Potential Gases	3	3
Agriculture	1	1
Regional Total	100	88

Notes: $MMTCO_2e$ = million metric tons of carbon dioxide equivalent. Totals may not sum because of independent rounding.

[1] Includes imported electricity emissions (2.7 $MMTCO_2e$).

[2] Residential and commercial fuel use, excluding electricity.

Source: BAAQMD 2017:Table Ff

The Bay Area's transportation sector alone contributes 40 percent of the CO_2e GHG emissions, followed by stationary sources (e.g., oil refineries and stationary fuel usage) (24 percent), electricity generation and cogeneration (18 percent), buildings (11 percent), waste management (three percent), high GWP gases (three percent), and agriculture (one percent). Bay Area emissions by sector are illustrated in Figure 3.6-1.

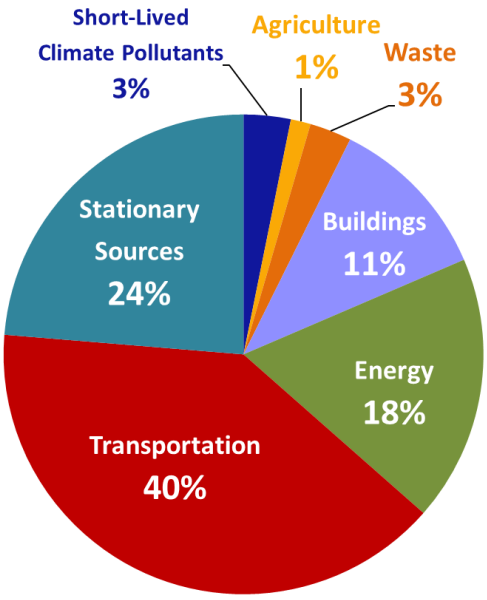

Figure 3.6-1: 2015 Bay Area Greenhouse Gas Emissions by Source, as a Percent of Total

Source: BAAQMD 2017: Figure 3-6.

Economic activity variations and the fraction of electric power generation in the region will cause year-to-year fluctuations in the emissions trends. Currently adopted policies and regulations would also affect future emission trends. Figure 3.6-2 shows the emission trends by major sources for the period of 1990–2050 alongside adopted GHG reduction targets.

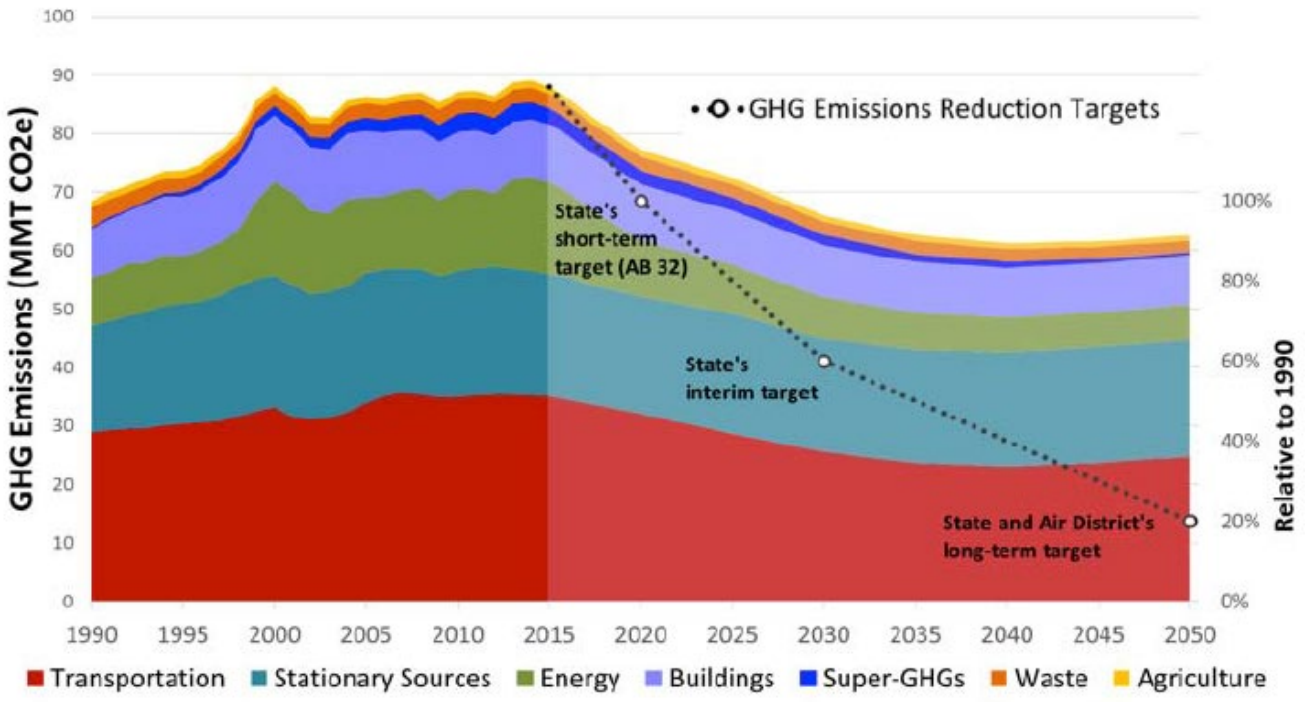

Figure 3.6-2: Bay Area Greenhouse Gas Emissions Trends by Major Source from 1990 to 2050

Source: BAAQMD 2017: Figure 3-9.

Sea Level Rise

Historical Data

Sea levels began rising globally at the end of the last ice age more than 10,000 years ago (USGS 2011). Data on ocean water levels are collected continuously from a worldwide network of more than 290 tidal gages, with hundreds more stations nationally (GLOSS 2021, NOAA 2021). New satellite-based sensors are extending these measurements. The data indicate that the global mean sea level is rising at an increasing rate, and sea level rise is already affecting much of California's coastal region, including the San Francisco Bay and its upper estuary (the Delta). Water level measurements from the San Francisco Presidio gage (CA Station ID: 9414290) indicate that mean sea level rose by an average of 0.08 ± 0.008 inch per year (reported as 2.01 ± 0.21 millimeters per year) from 1897 to 2006, equivalent to a change of about 8 inches in the last century (Heberger et al. 2009).

According to California's Ocean Protection Council Science Advisory Team, future sea level rise projections should not be based on linear extrapolation of historic sea level observations. For estimates beyond one or two decades, linear extrapolation of sea level rise based on historic observations is considered inadequate and would likely underestimate the actual sea level rise because of expected non-linear increases in global temperature and the unpredictability of complex natural systems (California Climate Action Team 2013).

Projected Climate Conditions

Global and regional climate models can be used to project the range of estimated sea level rise rates based on emission scenarios and climate simulations. Climate models continue to be developed and improved, and many models have been extended into Earth System models by including the representation of biogeochemical cycles important to climate change (IPCC 2014:743). Global climate models are based on well-established physical principles and have been demonstrated to reproduce observed features of recent climate and past climate changes. Global models provide information

about climate response to various scenarios but usually at a low resolution that does not provide the level of detail needed to make planning decisions at a local level.

On a regional scale (subcontinental and smaller), the confidence in model capability to simulate surface temperature is less than for the larger scale; however, regional-scale surface temperature simulation has continued to improve since the release of the IPCC Fourth Assessment Report. A region-based model can provide an evaluation of climate processes that are unresolved at the global model scale. Region-based climate models that provide locally relevant climate information are based on model output from global models, and the scale and resolution of the region-based climate models vary widely depending on the original application and intent of the developed model.

Global Climate Projections

To evaluate climate change effects such as sea level rise as part of the IPCC Fifth Assessment Report, IPCC developed future emission scenarios that differ based on varying combinations of economic, technological, demographic, policy, and institutional futures. Four emissions scenarios were developed and used by IPCC to represent a broad range of climate outcomes and develop sea level rise projections. The scenarios, or Representative Concentration Pathways (RCPs), document the projected future emissions, concentrations, and land-cover change projections.

The RCP 2.6 emissions scenario assumes very low GHG concentration levels, a scenario in which GHG emissions (and indirectly emissions of air pollutants) are reduced substantially over time. The RCP 4.5 emissions scenario is a stabilization scenario where the total change in energy in the atmosphere because of GHG emissions is stabilized before 2100 through implementation of a range of technologies and strategies for reducing GHG emissions. The RCP 6.0 emissions scenario is a stabilization scenario where the total change in energy in the atmosphere because of GHG emissions is stabilized after 2100 and assumes the implementation of a range of technologies and strategies for reducing GHG emissions. The RCP 8.5 emissions scenario is characterized by increasing GHG emissions over time leading to high GHG concentration levels (IAMC 2009).

Sea Level Rise Projections

IPCC projects that global mean sea level rise will likely range from 10 to 32 inches (0.26 to 0.82 meter) for the period 2081–2100 relative to 1986–2005. It is very likely that by the end of the 21st century, sea level will rise in more than 95 percent of the ocean area worldwide. About 70 percent of the coastlines worldwide are projected to experience a sea level change within ±20 percent of the global mean. Based on current understanding, only the collapse of marine-based sectors of the Antarctic ice sheet could cause global mean sea level to rise substantially above the likely range during the 21st century (IPCC 2014:13, 1140). Statewide guidance has also been issued by the California Ocean Protection Council (OPC) to help the region prepare for sea level rise. The State of California Sea-Level Rise Guidance Document: 2018 Update (OPC Guidance) offers a series of projections for the state using a set of probability distributions. The OPC Guidance used IPCC projections as a starting point, and includes the emissions scenarios; however, the absence of local projections and a lack of probabilities led to more localized projection analysis. The OPC Guidance specifies the projections of Kopp et. al 2014 as the best available for California. California projections are measured by emissions, time, and risk aversion. For 2050, the sea level rise projections are all still considered to be in a high emissions timeframe and range from 1.1 feet as the low risk averse choice, 1.9 feet as the medium-high risk averse choice, and 2.7 feet as the extreme risk averse choice. The OPC Guidance projection referenced in the proposed Plan comes from the projection that a 1-in-200 chance of exceeding 1.9 feet by the year 2050, characterizing this projection as a medium-high risk averse choice (OPC 2018). For more information on the document, see Regulatory Settings.

Sea Level Rise in San Francisco Bay

Overall sea level rise projections in the Bay Area were developed using two map sets. The San Francisco Bay Conservation and Development Commission's (BCDC's) Adapting to Rising Tides program has developed county-specific analyses of sea level rise projects for the nine Bay Area counties: Alameda, Contra Costa, Marin, Napa, San Mateo, San Francisco, Santa Clara, Solano, and Sonoma (BCDC 2021). Sea level rise projections for coastal areas outside of the bay were based on the National Oceanic and Atmospheric Administration (NOAA) Coastal Service Center's sea level rise inundation maps for the San Francisco Bay Area in 2017. Both maps depict sea level rise relative to a mean higher high-water condition in the bay. Table 3.6-4 present NOAA and BCDC sea level rise inundation information with 24 inches of sea level rise, as based on the OPC Guidance above.

Table 3.6-4: Projected Midcentury (2050) Sea Level Rise Inundation Zone by County

County	Areas Inundated by Sea Level Rise[1] (acres)	Total County Area[2] (Million acres)	Percent Inundated
Alameda	28,300	472,000	6
Contra Costa	6,700	457,100	1
Marin	14,200	321,200	4
Napa	210	30,000	1
San Francisco	15,900	286,600	6
San Mateo	9,300	815,400	1
Santa Clara	12,100	479,400	3
Solano	68,000	526,300	13
Sonoma	27,300	1,008,000	3
Regional Total	182,200	4,396,000	4

Note: Based on 24 inches of sea level rise.

[1] Includes disconnected low-lying areas.

[2] Excludes existing bodies of water within county boundaries.

Sources: Data compiled by MTC and ABAG in 2021 based on data from BCDC 2019, NOAA 2017.

Air Quality and Public Health

The negative effects of climate change on air quality in the Bay Area will affect public health, largely through increasing levels of ozone and fine particulate matter (PM). These pollutants will increase through emissions from wildfires and more frequent and longer-lasting heat waves. The health effects of exposure to both ozone and PM have historically been primarily associated with respiratory ailments, such as asthma and bronchitis. However, many epidemiological studies have also been published linking exposure to these pollutants, especially PM, with serious cardiovascular illness, including arteriosclerosis, strokes, and heart attacks, all of which can cause premature death (Raun and Ensor 2012).

Exposure to higher levels of ozone and fine PM tend to disproportionately affect the more vulnerable people in a population: children, the elderly, and the health impaired. In addition, many people affected by poor air quality are also subject to socioeconomic conditions that make them less able to prepare for and cope with these effects of climate change.

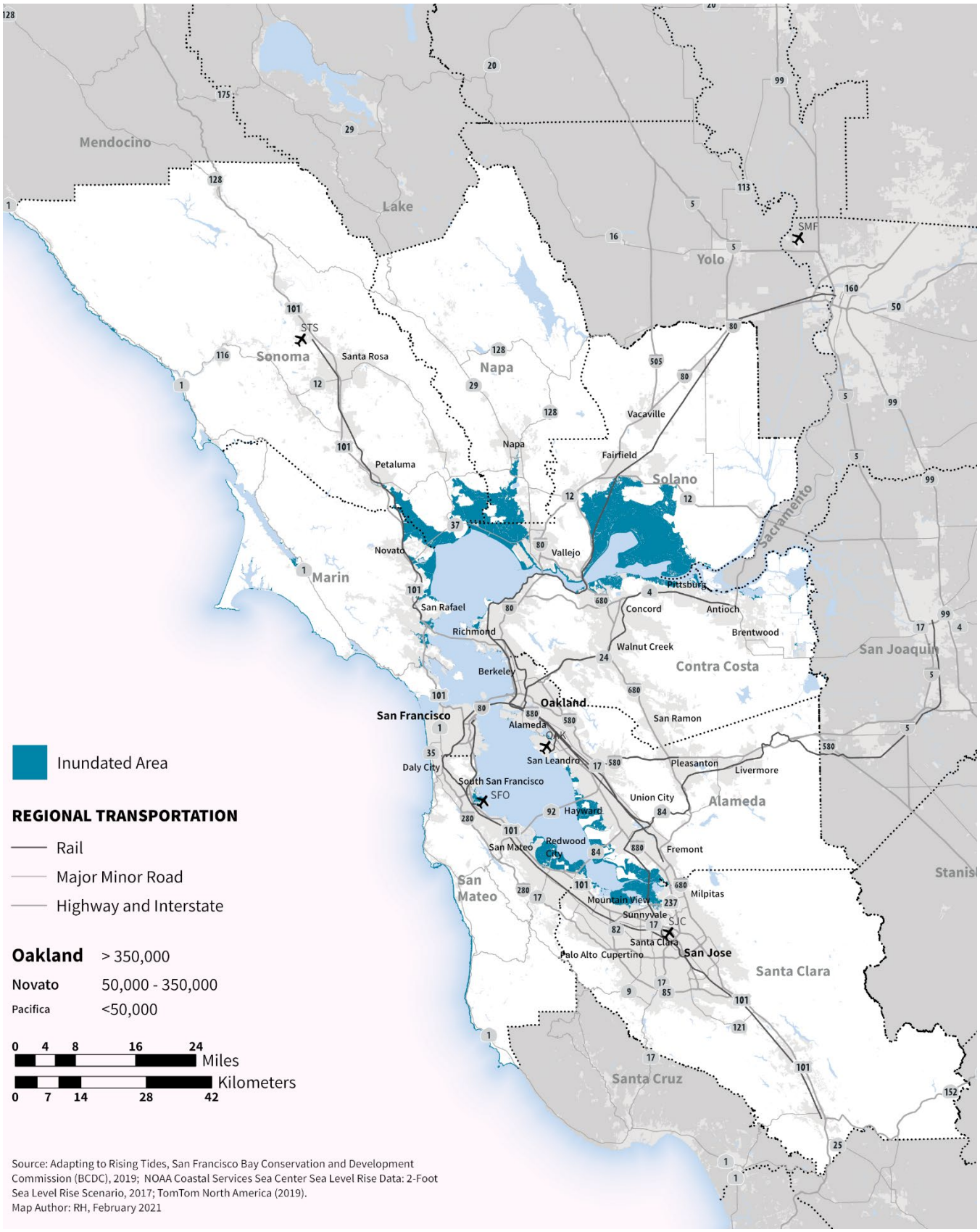

Figure 3.6-3: 24-Inch Sea Level Rise at Mean Higher High Water

Wildfires

Climate change is expected to increase the frequency and severity of wildfires in California by altering precipitation and wind patterns, changing the timing of snowmelt, and inducing longer periods of drought. In addition to the direct threat to human life and property, wildfires emit huge quantities of fine particles, such as black carbon, and can cause dramatic short-term spikes in pollution levels, greatly increasing population exposure to PM and other harmful pollutants.

According to the BAAQMD report *Understanding Particulate Matter: Protecting Public Health in the San Francisco Bay Area*, the rash of wildfires that swept across California in late June 2008 caused ambient concentrations of ozone and PM to soar to unprecedented levels (BAAQMD 2012). A study found not only that the PM concentrations from these fires reached high levels but that the PM they released was much more toxic than the PM more typically present in the California atmosphere (Wegesser et al. 2009). Smoke from wildfires can cause a variety of acute health effects, including irritation of the eyes and the respiratory tract, reduced lung function, bronchitis, exacerbation of asthma, and premature death. In addition to these health effects, wildfires also release immense quantities of CO_2 stored in trees and vegetation into the atmosphere. Therefore, to the extent that climate change increases wildfires, this will increase atmospheric concentrations of GHGs that contribute to climate change, establishing a feedback loop. See Section 3.9, "Hazards and Wildfire," for more information related to wildfire risks and the consequences of development in recognized fire hazard zones.

As stated in Section 3.9, climate change is expected to continue to produce conditions that facilitate a longer fire season, which, when coupled with human-caused changes in the seasonality of ignition sources, will produce more, longer, and bigger fires during more times of the year. As stated in Section 3.9, if greenhouse gas emissions continue to rise, the frequency of extreme wildfires burning over 25,000 acres could increase by 50 percent by 2100, and the average area burned Statewide could increase by 77 percent by the end of the century. In 2017, the Tubbs Fire caused substantial destruction in parts of Napa and Sonoma Counties. Believed to have been started by a private electrical system, the fire is the second most destructive in recent California history. In 2020, several large fires occurred in California as a result of lightning storms coupled with dry fuels. Currently the third largest fire in recent California history, the SNU Lightening Complex fires, burned 396,624 acres in Stanislaus, Santa Clara, Alameda, Contra Costa, Santa Cruz, and San Joaquin Counties in August 2020. At the same time, the LNU Lightening Complex fire burned an additional 363,200 acres in Sonoma, Lake, Napa, and Yolo Counties.

Heat

Rising temperatures attributable to climate change are likely to have negative effects on air quality and public health in the Bay Area. Ground-level ozone—the primary component of smog—is formed through photochemical reactions among precursor pollutants. The most important of these precursor pollutants are oxides of nitrogen and volatile organic compounds (VOCs). Higher temperatures lead to greater evaporative emissions of VOCs from sources such as fuel storage tanks and motor vehicle fuel tanks, as well as greater emissions of VOCs from biogenic sources, such as trees and vegetation. Increased demand for electricity to power air conditioners can also lead to higher emissions of ozone precursors from power plants. In addition to greater emissions of ozone precursors, ozone levels are also expected to increase because ozone formation is highly temperature sensitive, increasing rapidly as temperatures rise above 90 degrees Fahrenheit. As the Bay Area experiences more extreme heat days, with higher temperatures during both the days and evenings, higher ozone levels will make it more difficult for the region to attain and maintain air quality standards.

Increasing amounts of ground-level ozone pose a threat to human health. Breathing ozone can trigger a variety of health problems, such as asthma, bronchitis, impacts on lung function, and chest pains. Recent studies have linked premature death to even short-term exposure to ozone (Bell, Dominici and Samet

2005; Levy, Chemerynski, and Sarnat 2005; Ito, De Leon, and Lippmann 2005). The *Safeguarding California Plan* highlights those who are most vulnerable to health impacts, such as young children, the elderly, or pregnant people, and acknowledges that these people also may experience systemic, preventable differences in health status, called health inequities. These communities include people with lower incomes, some communities of color, people with existing health conditions, people experiencing homelessness, outdoor workers, incarcerated people, immigrants, and tribal communities (CNRA 2018, CALOES 2020). According to a 2011 report by the Union of Concerned Scientists, increases in ozone levels induced by climate change in California could result in nearly 443,000 additional cases of serious respiratory illnesses (Union of Concerned Scientists 2011).

ENERGY

Energy Types and Sources

California relies on a regional power system composed of a diverse mix of natural gas, renewable, hydroelectric, and nuclear generation resources. One-third of energy commodities consumed in California is natural gas. In 2018, approximately 34 percent of the natural gas consumed in the State was used to generate electricity. Large hydroelectric projects generated approximately 11 percent of the electricity used by the State, and renewable energy from solar, wind, small hydroelectric, geothermal, and biomass combustion generated 31 percent (CEC 2020a). Pacific Gas and Electric Company (PG&E) is the primary electricity and natural gas service provider in the Bay Area, North Coast, and Central Valley of the State. In 2018, 39 percent of PG&E's base power plan's electricity was generated by eligible renewable energy resources, as defined by the California Energy Commission (CEC) (i.e., biomass combustion, geothermal, small-scale hydroelectric, solar, and wind); 13 percent by large-scale hydroelectric resources; and 15 percent by natural gas (CEC 2019a). PG&E also offers its customers 50- and 100-percent solar choice options, which are 69 and 100 percent renewable, respectively.

Alternative Fuels

A variety of alternative fuels are used to reduce petroleum-based fuel demand. The use of these fuels is encouraged through various Statewide regulations and plans (e.g., Low Carbon Fuel Standard [LCFS] and the 2017 California Climate Change Scoping Plan [2017 Scoping Plan]). Conventional gasoline and diesel may be replaced (depending on the capability of the vehicle) with many transportation fuels, including:

- biodiesel,
- electricity,
- ethanol (E-10 and E-85),
- hydrogen,
- natural gas (methane in the form of compressed and liquefied natural gas),
- propane,
- renewable diesel (including biomass-to-liquid),
- synthetic fuels, and
- gas-to-liquid and coal-to-liquid fuels.

California has a growing number of alternative fuel vehicles through the joint efforts of the CEC, California Air Resources Board (CARB), local air districts, federal government, transit agencies, utilities, and other public and private entities. As of October 2020, more than 33,000 alterative fueling stations have been installed in California (AFDC 2020).

Commercial and Residential Energy Use

Homes in the United States built between 2000 and 2005 used 14 percent less energy per square foot than homes built in the 1980s and 40 percent less energy per square foot than homes built before 1950. However, larger home sizes offset these efficiency improvements. Primary energy consumption in the residential sector totaled 9.1 quadrillion British thermal units (Btu) in 2015 (the latest year the U.S. Energy Information Administration's [EIA's] *Residential Energy Consumption Survey* was completed) (EIA 2018). Energy consumption increased 24 percent from 1990 to 2009. However, because of projected improvements in building and appliance efficiency, the EIA 2012 Annual Energy Outlook made lower energy assumptions for the future, forecasting a 13-percent increase from 2009 to 2035 (EIA 2020).

Commercial buildings represent just under one-fifth of U.S. energy consumption, with office space, retail space, and educational facilities representing about half of commercial sector energy consumption. In aggregate, commercial buildings consumed 47 percent of building energy consumption and approximately 18 percent of U.S. energy consumption. In comparison, the residential sector consumed approximately 22 percent of U.S. energy consumption (EIA 2020).

Commercial and residential space heating (including on-site co-generation facilities at commercial buildings) comprises a large share of energy end use in the Bay Area. Other major energy users include industrial facilities (including oil refineries that consume energy in the production of gasoline and other fuels) and electricity-generating power plants, which burn fossil fuels (generally natural gas) to convert those fuels to electricity.

Electricity and natural gas consumption for the nine Bay Area counties in 2019 is shown in Table 3.6-5.

Table 3.6-5: Electricity and Natural Gas Consumption in the San Francisco Bay Area in 2019

County	Electricity (GWh)	Natural Gas (million therms)
Alameda	10,684	384
Contra Costa	9,639	1,205
Marin	1,355	70
Napa	1,043	40
San Francisco	5,604	229
San Mateo	4,325	214
Santa Clara	16,664	460
Solano	3,227	236
Sonoma	2,880	111
Regional Total	55,421	2,949

Note: GWh = gigawatt hours.
Sources: Data compiled by MTC/ABAG based on data from CEC 2020b; 2020c

Energy Use for Transportation

On-road vehicles use about 90 percent of the petroleum consumed in California. The California Department of Transportation (Caltrans) estimates that in 2006, over 3.2 billion gallons of gasoline and diesel fuel were consumed in the nine Bay Area counties—an increase of about eight million gallons over 2000 consumption levels (Caltrans 2009).

Vehicle Miles Traveled and Gasoline Consumption

According to Caltrans, total gasoline consumption in California is expected to increase by 57 percent from 2007 to 2030, and VMT is expected to increase by 61 percent in the same period (Caltrans 2009).

As noted in Section 3.6.2, "Regulatory Setting," below, several State mandates and efforts, such as SB 375 and SB 743, seek to reduce VMT. Despite the progress in reducing per capita VMT and per capita fuel consumption, the continued projected increases in total fuel consumption and VMT can be attributed to the overall forecasted increase in population; see Section 3.15, "Transportation," for more information on VMT and other travel-related data for the Bay Area, including the effect of the project.

Total gasoline use in California varies from year to year because of a variety of factors, such as gas prices, periods of economic growth and decline, and fuel economy of vehicles. Between January 2011 and July 2020, approximately 69.2 billion gallons of gasoline were purchased in California. During this period, the volume of gasoline purchased ranged from a minimum of approximately 710 million gallons in April 2020 due to the effects of COVID-19, to a maximum of approximately 1.51 billion gallons in July 2019 (California Department of Tax and Fee Administration 2020).

Long-term energy consumption trends for transportation are generally determined by fuel efficiency trends for motor vehicles, as motor vehicles are the predominant transportation mode for passengers and commercial goods.

Energy Used by Public Transit

Public transit energy consumption includes energy consumed for the operation of public buses, electrified and diesel rail systems, and ferries.

The energy efficiency of each of these modes may vary according to operating conditions and ridership. For example, if a ferry that uses 1.256 million Btu per mile carries 400 passengers on a trip, the energy use is approximately 3,140 Btu per passenger mile, while a bus carrying 30 passengers consumes 37,310 Btu per mile, which equates to about 1,245 Btu per passenger mile.

Energy Used by Private and Commercial Vehicles

Commercial vehicles, generally composed of light, medium, and heavy trucks, are typically fueled by diesel or gasoline and are part of the general fleet mix of vehicles present within the Bay Area transportation system.

3.6.2 Regulatory Setting

FEDERAL

U.S. Supreme Court Ruling

In *Massachusetts et al. v. Environmental Protection Agency et al.,* 549 U.S. 497 (2007), the Supreme Court of the United States ruled that CO_2 is an air pollutant as defined under the federal Clean Air Act (CAA) and that the U.S. Environmental Protection Agency (EPA) has the authority to regulate GHG emissions. In 2010, EPA started to address GHG emissions from stationary sources through its New Source Review permitting program, including operating permits for "major sources" issued under Title V of the CAA.

Regulations for Greenhouse Gas Emissions from Passenger Cars and Trucks and Corporate Average Fuel Economy Standards

In October 2012, EPA and the National Highway Traffic Safety Administration, on behalf of the U.S. Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 *Federal Register* [FR] 62624). These rules would increase fuel economy to the equivalent

of 54.5 miles per gallon, limiting vehicle emissions to 163 grams of CO_2 per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630).

However, on April 2, 2018, the EPA administrator announced a final determination that the current standards should be revised. On August 2, 2018, the U.S. Department of Transportation and EPA proposed the Safer Affordable Fuel-Efficient Vehicles Rule (SAFE Rule), which would amend existing CAFE standards for passenger cars and light-duty trucks by freezing the combined fuel-economy standards for vehicles for model years 2021 through 2026, which were previously set to increase in stringency throughout that period (NHTSA 2020).

The CAA grants California the ability to enact and enforce more strict fuel economy standards through the acquisition of an EPA-issued waiver. Each time California adopts a new vehicle emission standard, the State applies to EPA for a preemption waiver for those standards. However, Part One of the SAFE Rule, which became effective on November 26, 2019, revoked California's existing waiver to implement its own vehicle emission standard and established a standard to be adopted and enforced nationwide (84 FR 51310). At the time of preparation of this environmental document, the implications of the SAFE Rule on California's future emissions are uncertain. On February 8, 2021, the incoming administration issued a stay in regard to the legal challenges by California and other states to the revocation of California's waiver (JDSupra 2021a). As of April 22, 2021, there is currently a proposal to withdraw Part One of the SAFE Rule (JDSupra 2021b).

Federal Clean Air Act

The federal Clean Air Act (CAA) of 1970, amended in 1977 and 1990 (42 U.S. Code 7506[c]), was enacted for the purposes of protecting and enhancing the nation's air resources to benefit public health. In 1971, the CAA required EPA to set national ambient air quality standards that establish emission limits for certain pollutants. In 2009, EPA signed two findings related to GHGs. First, EPA found that current and projected concentrations of CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 would threaten public health and the welfare of current and future generations. Second, EPA found that mobile vehicles contribute to GHG pollution, which threatens public health and welfare (EPA 2009).

Global Change Research Act (1990)

In 1990, Congress passed, and the president signed Public Law 101-606, the Global Change Research Act. The purpose of the legislation was "to require the establishment of a United States Global Change Research Program aimed at understanding and responding to global change, including the cumulative effects of human activities and natural processes on the environment, to promote discussions towards international protocols in global change research, and for other purposes." To that end, the Global Change Research Information Office was established in 1991 to serve as a clearinghouse of information. The act requires a report to Congress every 4 years on the environmental, economic, health, and safety consequences of climate change; however, the first *National Assessment on Climate Change* (NCA1) was not published until 2000. Subsequent assessments were released in 2009 and 2014, with NCA4 released in separate volumes in 2017 and 2018. In February 2004, operational responsibility for the Global Change Research Information Office shifted to the U.S. Climate Change Science Program.

Energy Policy Act of 1992 and 2005

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. The EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. The EPAct requires certain federal, state, and local governments and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are also included in the EPAct. Federal tax deductions are allowed for businesses and individuals to cover the

incremental cost of AFVs. States are also required by the EPAct to consider a variety of incentive programs to help promote AFVs. The Energy Policy Act of 2005 provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 is designed to improve vehicle fuel economy and help reduce U.S. dependence on oil. It represents a major step forward in expanding the production of renewable fuels, reducing dependence on oil, and confronting global climate change. It also increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel by 2022, which represents a nearly fivefold increase over 2007 levels. It also reduces U.S. demand for oil by setting a national fuel economy standard of 35 miles per gallon by 2020—an increase in fuel economy standards of 40 percent.

STATE REGULATIONS

Assembly Bill 1493 (Chapter 200, Statutes of 2002)

Assembly Bill (AB) 1493 (Pavley) amended Health and Safety Code Sections 42823 and 43018.5 requiring the California Air Resources Board (CARB) to develop and adopt regulations that achieve maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles, light-duty trucks, and other vehicles used for noncommercial personal transportation in California. The regulations prescribed by AB 1493 took effect on January 1, 2006 and apply only to 2009 and later model year motor vehicles.

In September 2004, pursuant to AB 1493, CARB approved regulations to reduce GHG emissions from new motor vehicles. Under the new regulations, one manufacturer fleet average emission standard is established for passenger cars and the lightest trucks, and a separate manufacturer fleet average emission standard is established for heavier trucks. The regulations took effect on January 1, 2006, and set near-term emission standards, phased in from 2009 through 2012, and midterm emission standards, to be phased in from 2013 through 2016 (referred to as the Pavley Phase I rules). For model years 2017–2025, CARB has adopted the National Fuel Efficiency Policy standards as previously described. CARB established the Advanced Clean Cars program in 2012 to work with manufacturers to develop vehicle technologies, such as zero-emission vehicles (ZEVs), that would meet both the adopted GHG and criteria air pollutant standards (CARB 2021a).

Executive Order S-3-05 (Gov. Schwarzenegger, June 2005)

Executive Order (EO) S-3-05 was signed on June 1, 2005. The EO recognizes California's vulnerability to climate change, noting that increasing temperatures could potentially reduce snowpack in the Sierra Nevada, which is a primary source of the State's water supply. Additionally, according to this EO, climate change could influence human health, coastal habitats, microclimates, and agricultural yield. The EO set the GHG reduction targets for California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

The EO directs the secretary of the California Environmental Protection Agency to coordinate oversight of efforts made to achieve these targets with other State agencies and, like all EOs, it has no binding legal effect on regional agencies, such as MTC and ABAG, which are outside of the California Executive Branch. MTC and ABAG may voluntarily consider the emissions reduction targets and other provisions of the EO, but MTC and ABAG play no formal role in the EO's implementation.

Cleveland National Forest Foundation v. San Diego Association of Governments (November 24, 2014) (Cal.App.4th) further examined the EO and concluded it should be viewed as having the equivalent force of a legislative mandate for specific emissions reductions. The California Supreme Court reversed the judgement in 2017 The Supreme Court found San Diego Association of Governments did not abuse its discretion by declining to explicitly engage in a consistency analysis with the EO's 2050 goals but future analyses must be guided by available scientific and factual data (2017) (3 Cal. 5th 497).

California Global Warming Solutions Act of 2006 (AB 32 and SB 32)

AB 32, the California Global Warming Solutions Act (Health and Safety Code Section 38500 et seq.), was signed in September 2006. The act requires the reduction of Statewide GHG emissions to 1990 levels by the year 2020. This change, which is estimated to be a 25- to 35-percent reduction from current emission levels, will be accomplished through an enforceable Statewide cap on GHG emissions that will be phased in starting in 2012. The act also directs CARB to develop and implement regulations to reduce Statewide GHG emissions from stationary sources and address GHG emissions from vehicles. CARB has stated that the regulatory requirements for stationary sources will be first applied to electricity power generation and utilities, petrochemical refining, cement manufacturing, and industrial/commercial combustion. The second group of target industries will include oil and gas production/distribution, transportation, landfills, and other GHG-intensive industrial processes.

On December 11, 2008, CARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which functions as a roadmap of CARB's plans to achieve the GHG reductions in California required by AB 32 through subsequently enacted regulations. The Scoping Plan contains the main strategies California will implement to reduce CO_2e emissions by 174 MMT, or approximately 30 percent, from the State's projected 2020 emissions level of 596 $MMTCO_2e$ under a "business-as-usual" scenario. The Scoping Plan also breaks down the amount of GHG emissions reductions CARB recommends for each emissions sector of the State's GHG inventory. The Scoping Plan's recommended measures were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately affect low-income and minority communities. These measures also put the State on a path to meet the long-term goal of reducing California's GHG emissions to 80 percent below 1990 levels by 2050.

In May 2014, CARB released and has since adopted the First Update to the Climate Change Scoping Plan to identify the next steps in reaching AB 32 goals and evaluate the progress that has been made between 2000 and 2012 (CARB 2014a:4, 5). According to the update, California is on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 (CARB 2014a:ES-2). The update also reports the trends in GHG emissions from various emission sectors.

On September 8, 2016, Governor Brown approved Senate Bill (SB) 32 (Pavley, Chapter 249, Statutes of 2016), which added a 2030 target to the Global Warming Solutions Act of 2006. SB 32 requires that Statewide GHG emissions be reduced to 40 percent below 1990 levels by 2030. This bill was tied to passage of a companion bill, AB 197, described below.

On November 30, 2017, CARB released its 2017 Climate Change Scoping Plan (2017 Scoping Plan), which lays out the framework for achieving the 2030 reductions as established in EO B-30-15, SB 32, and AB 197. The 2017 Scoping Plan identifies the GHG reductions needed by emissions sector to achieve a Statewide emissions level that is 40 percent below 1990 levels before 2030. Many of the programs require Statewide action, promulgated through regulation, and are outside the ability of substate jurisdictions to implement on their own accord. This is important to recognize in terms of GHG emissions efficiency and attaining GHG targets. The ability to attain targets will rely not only on transportation strategies (e.g., the SCS) but also on land use strategies implemented by local cities and

counties (e.g., qualified GHG reduction plans) and controls and actions tied to economy-wide changes promulgated by the State.

Examples listed in the 2017 Scoping Plan include:

- relying on SB 350 targets of providing 50 percent of the State's electricity via renewable resources by 2030 (largely accomplished by actions of utilities),
- attaining an 18-percent reduction in carbon intensity of fuels (Low Carbon Fuel Standard [LCFS]),
- attaining a vehicle fleet mix that includes 4.2 million ZEVs by 2030 and making similar changes in urban buses and light- and heavy-duty trucks,
- implementing regulations that reduce the emission of short-lived GHGs,
- deploying 100,000 ZEV freight vehicles by 2030,
- reducing refinery GHG emissions by 20 percent,
- continuing (past 2020) the Cap-and-Trade Program, and
- reducing vehicle miles traveled (VMT) by implementation of SB 375 and other strategies intended to reduce VMT (CARB 2017:ES4, ES5).

In addition, and as mentioned above, the 2017 Scoping Plan states that local governments (e.g., cities and counties) play an important role in achieving the State's long-term GHG goals because they have broad influence, and sometimes exclusive authority, over activities that enable or thwart uptake of policies that contribute to significant direct and indirect GHG emissions. These actions include community-scale planning and permitting processes, discretionary actions, local codes and ordinances, outreach and education efforts, and municipal operations. CARB states that to achieve the 2030 target, local governments are essential partners and that their action is required to complement and support State-level actions. CARB also acknowledges that without land use decisions from local governments that allow more efficient use and management of land use, longer-term targets cannot be met. CARB recommends that local jurisdictions develop sufficiently detailed and adequately supported GHG reduction plans (including CAPs) that look holistically at GHG emissions and local strategies to support Statewide limits.

Senate Bill 375 (Chapter 728, Statutes of 2008)

SB 375, adopted September 30, 2008, helps meet the statewide goals of reducing emissions from cars and light-duty trucks. SB 375 requires regional planning agencies to include an SCS in their RTP that demonstrates how the region could achieve the GHG emissions reductions set by CARB through integrated land use and transportation planning. Local governments retain control of land use planning authority; however, SB 375 amended CEQA (PRC Section 21000 et seq.) to ease environmental review of specific types of developments that are anticipated to reduce emissions if consistent with the SCS.

The SCS must identify a transportation network that, when integrated with the forecasted development pattern for the Plan area, will reduce GHG emissions from automobiles and light trucks in accordance with reduction targets set by CARB. In 2018, CARB revised established per-capita GHG emission reduction targets for MPOs across the state. The Bay Area's revised targets were set as 10 percent per capita by 2020 and 19 percent per capita by 2035 (CARB 2018), as shown in **Table 3.6-6**.

SB 375 and CARB's emissions reduction targets are the primary mechanism to achieve GHG reduction goals for cars and light trucks under AB 32 targets, which were extended by SB 32 (see discussion above). However, CARB acknowledges that MPO's collective achievement of their revised per-capita GHG emissions reduction targets would not be enough to achieve the reduction need identified in the 2017 Climate Change Scoping Plan. CARB expects the GHG emission reduction gap (estimated at 7 percent) would be accounted for through "new State-initiated VMT Reduction strategies." For further discussion, please see Criterion GHG-3 (CARB 2018).

Table 3.6-6: SB 375 Regional Plan Climate Targets

MPO	Targets	
	2020	2035
MTC/ABAG	-10%	-19%
SACOG	-7%	-19%
SANDAG	-15%	-19%
SCAG	-8%	-19%
Fresno COG	-6%	-13%
Kern COG	-9%	-15%
Kings CAG	-5%	-13%
Madera CTC	-10%	-16%
Merced CAG	-10%	-14%
San Joaquin COG	-12%	-16%
Stanislaus COG	-12%	-16%
Tulare CAG	-13%	-16%
AMBAG	-3%	-6%
Butte CAG	-6%	-7%
San Luis Obispo COG	-3%	-11%
Santa Barbara CAG	-13%	-17%
Shasta RTA	-4%	-4%
Tahoe MPO	-8%	-5%

Note: Targets are expressed as a percent change in per capita passenger vehicle greenhouse gas emissions relative to 2005.
Source: Data compiled by MTC/ABAG bases on data from CARB 2021e

Assembly Bill 197

Governor Brown signed AB 197 (Garcia, Chapter 250, Statutes of 2016) on September 8, 2016. AB 197 creates a legislative committee to oversee CARB and requires CARB to take specific actions when adopting plans and regulations pursuant to SB 32 (described above) related to disadvantaged communities, identification of specific information regarding reduction measures, and information regarding existing GHGs at the local level.

Senate Bill 1368 (Chapter 598, Statutes of 2006)

SB 1368, signed in September 2006, required the California Public Utilities Commission (CPUC) to establish a GHG emissions performance standard for "baseload" generation from investor-owned utilities by February 1, 2007. CEC was required to establish a similar standard for local publicly owned utilities by June 30, 2007. The legislation further required that all electricity provided to California, including imported electricity, be generated from plants that meet or exceed the standards set by CPUC and CEC. In January 2007, CPUC adopted an interim performance standard for new long-term

commitments (1,100 pounds of CO_2 per megawatt-hour), and in May 2007, CEC approved regulations that match the CPUC standard.

Executive Order S-01-07 (Gov. Schwarzenegger, January 2007)

In January 2007, EO S-01-07 established an LCFS. The EO calls for a Statewide goal to be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 and requires that an LCFS for transportation fuels be established for California. Further, it directs CARB to determine if an LCFS can be adopted as a discrete early action measure pursuant to AB 32, and, if so, to consider the adoption of an LCFS on the list of early action measures required to be identified by June 30, 2007, pursuant to Health and Safety Code Section 38560.5. The LCFS applies to all refiners, blenders, producers, and importers ("Providers") of transportation fuels in California; will be measured on a full fuels cycle basis; and may be met through market-based methods by which Providers exceeding the performance required by an LCFS shall receive credits that may be applied to future obligations or traded to Providers not meeting the LCFS.

In June 2007, CARB approved the LCFS as a Discrete Early Action item under AB 32, and in April 2009, CARB approved the new rules and carbon intensity reference values with the new regulatory requirements taking effect in January 2011. The standards require Providers to report on the mix of fuels that they provide and demonstrate that it meets the LCFS intensity standards annually. This is accomplished by ensuring that the number of "credits" earned by providing fuels with a carbon intensity lower than the established baseline (or obtained from another party) is equal to or greater than the "deficits" earned from selling higher-intensity fuels.

In December 2011, the U.S. District Court for the Eastern District of California issued three rulings against the LCFS, including a requirement for CARB to abstain from enforcing the LCFS. In April 2012, the Ninth Circuit granted CARB's motion for a stay of the injunction while it continued to consider CARB's appeal of the lower court's decision. Consequently, CARB readopted the LCFS regulation in September 2015, and the changes went into effect on January 1, 2016. The program establishes a strong framework to promote the low-carbon fuel adoption necessary to achieve the governor's 2030 and 2050 GHG goals.

Senate Bill 97

SB 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in CEQA documents. Pursuant to SB 97, in March 2010, the California Resources Agency adopted amendments to the CEQA Guidelines for the feasible mitigation of the GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG and climate change impacts.

Executive Order B-16-2012

EO B-16-2012 directs State entities to support and facilitate the rapid commercialization of ZEVs. It outlines benchmarks for 2015, 2020, and 2025 related to establishing infrastructure to support and accommodate ZEVs, helping get ZEVs to market and on the road, and increasing their use for public transportation and public use, among others. It also establishes a goal of an 80-percent reduction of GHG emissions from the transportation sector in California as compared to 1990 levels by 2050. This EO also explicitly states that it "is not intended to, and does not create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person."

Senate Bill 743

SB 743 of 2013 required that the Governor's Office of Planning and Research (OPR) propose changes to the CEQA Guidelines to address transportation impacts in transit priority areas and other areas of the State. In response, Section 15064.3 was added to the CEQA Guidelines in December 2018, requiring that transportation impact analyses no longer consider congestion as an environmental impact but instead focus on the impacts of VMT. More detail about SB 743 is provided in the Section 3.15, "Transportation."

2016 Mobile Source Strategy

CARB released an updated Mobile Source Strategy on May 16, 2016 to demonstrate how the state could simultaneously meet air quality standards, meet greenhouse gas emission reduction targets, decrease health risk from emissions, and reduce petroleum consumption over the next fifteen years. The estimated benefits of the strategy include an 80 percent reduction in smog-forming emissions, and a 45 percent reduction in greenhouse gas emissions statewide. The Strategy informs goals for a series of related planning efforts, including the implementation of SB 375. At the time of preparing this environmental document, development of the 2020 Mobile Source Strategy was still underway (CARB 2021b)

Senate Bill 1383

SB 1383 of 2016 required that CARB approve and implement a Short-lived Climate Pollutant Strategy (SLCP) to reduce emissions of short-lived climate pollutants. The SLCP specifies a 40 percent reduction in methane and hydrofluorocarbons, and a 50 percent reduction in anthropogenic black carbon below 2013 levels by 2030. The bill also establishes targets for reducing organic waste in landfills and provides direction for managing methane emissions from dairy and livestock operations (CARB 2021c).

2018 Progress Report – California's Sustainable Communities and Climate Protection Act

On November 30, 2018, CARB released the *2018 Progress Report on California's Sustainable Communities and Climate Protection Act* (2018 Progress Report), which evaluates the performance of the SCSs prepared pursuant to the first set of reduction targets established by SB 375. The 2018 Progress Report found that MPOs are not on track to meet the GHG reductions expected under SB 375 for 2020 because of an overall increase in Statewide VMT per capita. While the State will meet its overall 2020 target because of reductions achieved in the energy sector, additional VMT reductions will be needed to meet longer-term State GHG reductions targets for 2030 and 2050.

Executive Order N-19-19

Governor Gavin Newsom issued N-19-19 on September 23, 2020, which outlines goals to combat climate change. The EO sets a series of emission goals, including for all new passenger cars and trucks, drayage trucks, and off-road vehicles and equipment to be zero-emission by 2035, and all medium- and heavy-duty vehicles to be zero emission by 2045 where feasible, giving CARB the authority to issue regulations for implementation. It also requires state agencies to accelerate the deployment of affordable fueling and charging options for ZEVs, and to develop a Zero-Emissions Vehicle Market Deployment Strategy by January 31, 2021. The EO also calls for the end of new hydraulic fracking permits by 2024, with state agencies expected to propose regulations to protect communities and workers by December 31, 2020.

Executive Order N-79-20

In September 2020, Governor Gavin Newsom signed Executive Order N-79-20, which sets a statewide goal that 100 percent of all new passenger car and truck sales in the state will be zero-emissions by 2035. It also establishes a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and that all new drayage trucks sold in California will be zero emissions by 2035. Additionally, the Executive Order targets 100 percent of new

off-road vehicle sales in the state to be zero emission by 2035. CARB is responsible for implementing the new vehicle sales regulation.

Senate Bill 288

SB 288 of 2020 amended PRC Section 21080.20 to provide additional statutory exemptions under CEQA. These exemptions include pedestrian and bicycle facilities projects; projects to improve customer information and wayfinding for transit riders, bicyclists, and/or pedestrians; transit prioritization projects; projects to designate peak hours or full-time bus-only lanes on highways; projects to institute or increase new bus rapid transit; transit agency projects to construct or maintain infrastructure to charge or refuel zero-emissions transit buses; maintenance, repair, relocation, replacement, or removal of any utility infrastructure associated with exempt projects; and city or county projects to reduce minimum parking requirements. At the time of writing this draft EIR, SB 288 sunsets in January 2030.

Caltrans Strategic Plan 2015-2020

The Strategic Management Plan of 2015-2020 named a strategic objective to reduce the environmental impacts from Caltrans transportation projects with an emphasis on supporting statewide emissions reduction goals. The targets included a 15 percent reduction from 2010 levels of greenhouse gases, and an 85 percent reduction from 2000 levels in diesel particulate matter emissions statewide by 2020. It also held a reduction target of 2010 levels for internal operational greenhouse gases of 15 percent by 2015 and 20 percent by 2020, as per EO B-18-12. The 2020-2024 Strategic Plan, adopted in December 2020, also names a goal to reduce greenhouse gas emissions, and lists a series of supporting strategies, including the development of a Caltrans Climate Action Plan, accelerating sustainable freight sector transformation, and establishing a VMT monitoring and reduction program.

Legislation Associated with Electricity Generation

The State has passed multiple pieces of legislation requiring the increasing use of renewable energy to produce electricity for consumers. California's Renewable Portfolio Standard Program was established in 2002 (SB 1078) with the initial requirement for utilities to generate 20 percent of their electricity from renewables by 2017, 33 percent by 2020 (SB X1-2 of 2011), 52 percent by 2027 (SB 100 of 2018), 60 percent by 2030 (also SB 100 of 2018), and 100 percent by 2045 (also SB 100 of 2018).

California's Energy Efficiency Standards for Residential and Nonresidential Buildings

The energy consumption of new residential and nonresidential buildings in California is regulated by CCR Title 24, Part 6, Building Energy Efficiency Standards (California Energy Code). Known by the shorthand name of "Title 24," this policy was established in 1978 in response to a legislative mandate to reduce California's energy consumption. CEC updates the California Energy Code every 3 years with more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions. The current California Energy Code will require builders to use more energy-efficient building technologies for compliance with increased restrictions on allowable energy use. CEC estimates that the combination of required energy-efficiency features and mandatory solar panels in the 2019 California Energy Code will result in new residential buildings that use 53 percent less energy than those designed to meet the 2016 California Energy Code. CEC also estimates that the 2019 California Energy Code will result in new commercial buildings that use 30 percent less energy than those designed to meet the 2016 standards, primarily through the transition to high-efficacy lighting (CEC 2018).

California Green Building Standards Code (2016), California Code of Regulations Title 24, Part 11

California's green building code, referred to as "CALGreen," was developed to provide a consistent approach to green building within the State. Taking effect in January 2016, the most recent version of the code lays out the minimum requirements for newly constructed residential and nonresidential buildings to reduce GHG emissions through improved efficiency and process improvements. It also includes voluntary tiers to further encourage building practices that improve public health, safety, and general welfare by promoting the use of building concepts that minimize buildings' impact on the environment and promote a more sustainable design. Local jurisdictions are required to adopt the CALGreen provisions. CALGreen is complementary with the California Energy Code, Title 24, Part 6, which continues to regulate energy efficiency in buildings.

Senate Bill 1 (Chapter 132, Statutes of 2006)

The "Million Solar Roofs" legislation sets a goal of installing 3,000 megawatts of new solar capacity by 2017 to move the State toward a cleaner energy future and help lower the cost of solar systems for consumers. The Million Solar Roofs program is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving the cost down over time. It provides up to $3.3 billion in financial incentives that decline over time.

Executive Order S-13-08

Governor Schwarzenegger signed EO S-13-08 on November 14, 2008, to address the potential impacts of global climate change, including sea level rise. The EO emphasizes the need for timely planning to mitigate and adapt to the potential effects of sea level rise on the State's resources. As a result, any State agency planning construction projects in areas vulnerable to future sea level rise must evaluate and reduce the potential risks and increase resiliency, to the extent feasible. Planning must consider a range of sea level rise scenarios for 2050 and 2100.

Cap-and-Trade Program

In 2011, CARB adopted the cap-and-trade regulation and created the Cap-and-Trade Program. The program covers GHG emissions sources that emit more than 25,000 metric tons of CO_2e per year, such as refineries, power plants, industrial facilities, and transportation fuels. The Cap-and-Trade Program includes an enforceable Statewide emissions cap that declines approximately 3 percent annually. CARB distributes allowances, which are tradable permits, equal to the emissions allowed under the cap. Sources that reduce emissions more than their limits can auction carbon allowances to other covered entities through the cap-and-trade market. Sources subject to the cap are required to surrender allowances and offsets equal to their emissions at the end of each compliance period. The Cap-and-Trade Program took effect in early 2012 with the enforceable compliance obligation beginning January 1, 2013. The program was initially slated to sunset in 2020, but the passage of SB 398 in 2017 extended the program through 2030.

Executive Order B-30-15

On April 20, 2015, Governor Brown signed EO B-30-15, which established a California GHG reduction target of 40 percent below 1990 levels by 2030. The governor's EO aligns California's GHG reduction targets with those of leading international governments, such as the 28-nation European Union, which adopted the same target in October 2014. California's new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the goal of reducing emissions 80 percent under 1990 levels by 2050. This is in line with the scientifically established levels needed in the United States to limit global warming below 2 degrees Celsius—the warming threshold at which there will likely be major climate disruptions such as super droughts and rising sea levels according to scientific consensus. SB 32, discussed previously, legislatively implements the targets in this EO.

Executive Order B-55-18

On September 10, 2018, Governor Jerry Brown signed EO B-55-18 to achieve carbon neutrality by 2045 and maintain net negative GHG emissions thereafter. It builds off of existing Statewide targets for reducing GHG emissions, including EO B-30-15, SB 32, and EO S-3-05, mentioned previously.

Executive Order B-48-18

EO B-48-18, signed into law in January 2018, requires all State entities to work with the private sector to have at least 5 million ZEVs on the road by 2030, as well as 200 hydrogen fueling stations and 250,000 electric vehicle–charging stations installed by 2025. It specifies that 10,000 of these charging stations must be direct-current fast chargers.

Senate Bill 100

On September 10, 2018, Governor Brown signed SB 100, a state policy that requires that eligible renewable energy and zero-carbon resources supply an increasing percent of all retail sales of electricity by 2045. The standards are set for 33 percent by 2020 (SB X1-2 of 2011), 52 percent by 2027 (California Renewables Portfolio Standard Program [SB 100 of 2018]), 60 percent by 2030 (also SB 100 of 2018), and 100 percent by 2045 (also SB 100 of 2018).

Warren-Alquist Act

The 1974 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission, or CEC. The creation of the act occurred as a response to the State legislature's review of studies projecting an increase in Statewide energy demand, which would potentially encourage the development of power plants in environmentally sensitive areas. The act introduced State policy for siting power plants to reduce potential environmental impacts, and additionally sought to reduce demand for these facilities by directing CEC to develop Statewide energy conservation measures to reduce the wasteful, inefficient, and unnecessary uses of energy. Conservation measures recommended establishing design standards for energy conservation in buildings that ultimately resulted in the creation of the California Energy Code, which has been updated regularly and remains in effect today. The act additionally directed CEC to cooperate with OPR, CNRA, and other interested parties in ensuring that a discussion of wasteful, inefficient, and unnecessary consumption of energy is included in all environmental impact reports required on local projects.

State of California Energy Plan

CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, and conservation; public health and safety; and the maintenance of a healthy economy. The State Energy Plan was updated in 2008, which called for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identified several strategies, including assisting public agencies and fleet operators in implementing incentive programs for zero-emission vehicles and addressing their infrastructure needs, as well as encouraging urban design that reduces VMT and accommodates pedestrian and bicycle access (CEC 2008).

The 2008 update has been supplemented by the *2019 California Energy Efficiency Action Plan*, which includes three goals to drive energy efficiency: doubling energy efficiency savings by 2030, removing and reducing barriers to energy efficiency in low-income and disadvantaged communities, and reducing GHG emissions from the buildings sector (CEC 2019b).

Assembly Bill 2076: Reducing Dependence on Petroleum

Pursuant to AB 2076 (Chapter 936, Statutes of 2000), CEC and CARB prepared and adopted in 2003 a joint agency report, *Reducing California's Petroleum Dependence*. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per-capita VMT (CARB and CEC 2003). Further, in response to the CEC's 2003 and 2005 *Integrated Energy Policy Reports*, the governor directed CEC to take the lead in developing a long-term plan to increase alternative fuel use.

A performance-based goal of AB 2076 was to reduce petroleum demand to 15 percent below 2003 demand.

Integrated Energy Policy Report

SB 1389 (Chapter 568, Statutes of 2002) required CEC to "conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The Energy Commission shall use these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the State's economy, and protect public health and safety" (PRC Section 25301[a]). This work culminated in the Integrated Energy Policy Report (IEPR).

CEC adopts an IEPR every 2 years and an update every other year. The 2020 IEPR is the most recent IEPR, which was adopted on April 14, 2021. The 2020 IEPR provides a summary of priority energy issues currently facing the State, outlining strategies and recommendations to further the State's goal of ensuring reliable, affordable, and environmentally responsible energy sources. Energy topics covered in the report include statewide transportation trends, including impacts from COVID-19; progress toward vehicle electrification, the role of microgrids contributing to a clean and reliable energy system; and an update on the state's energy demand outlook to reflect the global pandemic. The 2020 IEPR recommends that the public and private entities, as feasible, consider instituting telecommuting options to reduce VMT; engage and understand the local mobility and clean transportation needs of low-income and disadvantaged communities; develop policies to support the expansion of microgrids in underserved communities; and develop new fee structures that will address the impact of departing load charges on new microgrids (CEC 2021).

Senate Bill 350: Clean Energy and Pollution Reduction Act of 2015

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources to be increased to 50 percent by December 31, 2030. This act also requires doubling of the energy efficiency savings in electricity and natural gas for retail customers, through energy efficiency and conservation by December 31, 2030.

Assembly Bill 1007: State Alternative Fuels Plan

AB 1007 (Chapter 371, Statutes of 2005) required CEC to prepare a state plan to increase the use of alternative fuels in California. CEC prepared the State Alternative Fuels Plan (SAF Plan) in partnership with CARB and in consultation with other State, federal, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative nonpetroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-State production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-State production of biofuels without causing a significant degradation of public health and environmental quality.

Bioenergy Action Plan, Executive Order #S-06-06

Executive Order S-06-06, April 25, 2006, establishes targets for the use and production of biofuels and biopower and directs State agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The executive order establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. Executive Order S-06-06 also calls for the State to meet a target for use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the State can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 Plan and provides a more detailed action plan to achieve the following goals (CEC 2012):

- increase environmentally and economically sustainable energy production from organic waste;
- encourage development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications;
- create jobs and stimulate economic development, especially in rural regions of the State; and
- reduce fire danger, improve air and water quality, and reduce waste.

As of 2018, 2.35 percent of the total electricity system power in California was derived from biomass (CEC 2020a).

State of California Sea-Level Rise Guidance Document

EO S-13-08 directs the California Natural Resources Agency, in coordination with other State agencies and the National Academy of Sciences, to assess sea level rise for the Pacific Coast and create official sea level rise estimates for State agencies in California, Oregon, and Washington. The assessment and official estimates are provided within the State of California Sea-Level Rise Guidance document (OPC 2018). The State of California Sea-Level Rise Guidance: 2018 Update is also referred to above in Environmental Settings.

The State of California Sea-Level Rise Guidance 2018 update contains eight recommendations for incorporating sea level rise into planning:

- prioritize social equity, environmental justice, and the needs of vulnerable communities;
- prioritize protection of coastal habitats and public access;
- consider the unique characteristics, constraints, and values of existing water-dependent infrastructure, ports, and public trust uses;
- consider episodic increases in sea level rise caused by storms and other extreme events;
- coordinate and collaborate with local, State, and federal agencies when selecting sea level rise projections, and where feasible, use consistent sea level rise projections across multiagency planning and regulatory decisions;
- consider local conditions to inform decision making;
- include adaptive capacity in design and planning; and

- assessment of risk and adaptation planning should be conducted at the community and regional levels.

The guidance document is expected to be updated regularly, to keep pace with scientific advances associated with sea level rise.

California Climate Adaptation Strategy

In response to EO S-13-08, the California Natural Resources Agency released the California Climate Adaptation Strategy (CAS) in 2009. The strategy proposes a comprehensive set of recommendations designed to inform and guide State agencies in their decision-making processes as they begin to develop policies to protect the State, its residents, and its resources from a range of climate change impacts. The CAS presents recommendations for seven sectors, including Ocean and Coastal Resources and Transportation and Energy Infrastructure.

Within the Transportation and Energy Infrastructure sector, the CAS specifically directs the California Department of Transportation (Caltrans) to incorporate climate change vulnerability assessment planning tools, policies, and strategies into existing transportation and investment decisions. The strategy also instructs Caltrans to develop guidelines to establish buffer areas and setbacks to avoid risks to structures within projected "high" future sea level rise or flooding inundation zones.

Caltrans Guidance on Incorporating Sea Level Rise

Pursuant to EO S-13-08 and the California Sea-Level Rise Interim Guidance document, in May 2011 Caltrans released guidance on incorporating sea level rise into planning and decision making with respect to transportation projects. Caltrans's guidance recommends first determining if sea level should be incorporated into project planning, based on the project location and level of risk. A screening process with 10 criteria guides the assessment of whether to incorporate sea level rise: design life, redundancy/alternative route(s), anticipated travel delays, evacuations/emergencies, traveler safety, expenditure of public funds, scope of project, effect on non-State highways, and environmental constraints. If the screening determines that sea level rise should be incorporated into project planning, the next step is to estimate the degree of potential impact and assess alternatives for preventing, mitigating, and/or absorbing the impact. Caltrans uses the Statewide sea level rise estimates presented in the California Sea Level Rise Interim Guidance document for different years (2030–2100) to determine target sea level rise values, and it directs projects with a life that extends to 2030 or earlier not to assume impacts from sea level rise. Having identified target sea level rise values for a project, Caltrans then lays out steps for implementation, including conducting more technical studies of inundation and subsidence and determining any adverse effects on facility functions and operations (e.g., from erosion, exposure to salt water), necessary adaptation measures, and the costs of mitigation. Caltrans plans to release an updated guidance document late in 2021 (Caltrans 2020).

California Department of Public Health Guidance on Integrating Public Health into Climate Action Planning

In February of 2012, the California Department of Public Health released a guidance document, *Climate Action for Health: Integrating Public Health into Climate Action Planning*. This document introduces key health connections to climate change mitigation strategies, and suggestions for where these fit into a local CAP or general plan. The guidance document also provides several examples of strategies taken from actual CAPs that integrate public health objectives, with policy efforts to improve community health and reduce GHG emissions. The information provided is advisory and educational, and participation is voluntary. The document includes specific policy recommendations for transportation and land use planning, including incorporation of green space and tree canopy to mitigate urban heat islands, and healthy siting of housing, schools, and health care facilities to avoid major air quality impacts.

California Coastal Act

The California Coastal Act of 1976 directs CCC to protect and enhance the State's coastal resources.

CCC has planning, regulatory, and permitting authority over all development within the coastal zone, whose landward boundary varies with location. For the Bay Area, the Coastal Act covers the area along the Pacific Ocean, but the area along the margins of San Francisco Bay is covered by the Bay Conservation and Development Commission, under different legislation. This is addressed later in this section. The act governs coastal hazards for new development, mandating that it minimize risks to life and property in areas of high flood. New development must be located such that it will not be subject to erosion or stability hazard over the course of its design life, and construction of protective devices (e.g., seawalls, revetment) that substantially alter natural landforms along bluffs and cliffs are not permitted (Section 30253).

CCC's mandate extends to climate change, including sea level rise; however, the agency is currently assessing how best to address sea level rise and other challenges resulting from climate change. CCC partners with local governments to form Local Coastal Programs (LCPs), transferring the power to regulate development within the coastal zone to cities and counties. Within the Bay Area, San Mateo, San Francisco, Marin, and Sonoma Counties and the Cities of Daly City, Pacifica, and Half Moon Bay all have certified LCPs. Any changes in CCC's policies and/or regulations with respect to sea level rise may ultimately require revisions to LCPs.

REGIONAL AND LOCAL REGULATIONS

City and County General Plans

Many of the counties and cities in the Bay Area have general plan elements and policies that specifically address energy use and conservation. Those energy conservation measures contain goals, objectives, and policies aimed at reducing energy consumption. These include policies on energy retrofits to existing residential and commercial land uses, zoning and building ordinances for energy efficiency of new construction, and ways to reduce VMT through land use and transportation priorities.

Local Climate Action Plans

Consistent with CARB recommendations, several Bay Area jurisdictions have completed community emissions inventories (103), and 79 jurisdictions have finalized and adopted community CAPs, as shown in **Table 3.6-7**. There are also jurisdictions that have drafted or are in the process of drafting CAPS that are not included in **Table 3.6-7**.

Table 3.6-7: Bay Area Cities with Completed GHG Emissions Inventories or Climate Action Plans

Jurisdiction	Completed Community Emissions Inventory	Finalized and Adopted Community Climate Action Plan
Alameda County	X	X
Alameda	X	X
Albany	X	X
Berkeley	X	X
Dublin	X	X
Emeryville	X	X
Fremont	X	X
Hayward	X	X
Livermore	X	X
Newark	X	X

Jurisdiction	Completed Community Emissions Inventory	Finalized and Adopted Community Climate Action Plan
Oakland	X	X
Piedmont	X	X
Pleasanton	X	X
San Leandro	X	X
Union City	X	X
Contra Costa County	X	X
Antioch	X	X
Brentwood	—	—
Clayton	—	—
Concord	X	X
Danville	X	X
El Cerrito	X	X
Hercules	X	—
Lafayette	X	—
Martinez	X	X
Moraga	X	X
Oakley	X	—
Orinda	X	—
Pinole	X	—
Pittsburg	X	—
Pleasant Hill	—	—
Richmond	X	X
San Pablo	X	X
San Ramon	X	X
Walnut Creek	X	X
Marin County	X	X
Belvedere	X	X
Corte Madera	X	X
Fairfax	X	X
Larkspur	X	X
Mill Valley	X	X
Novato	X	X
Ross	X	X
San Anselmo	X	X
San Rafael	X	X
Sausalito	X	X
Tiburon	X	X
Napa County	X	X
American Canyon	X	X
Calistoga	X	X
Napa	X	—
St. Helena	X	X

Jurisdiction	Completed Community Emissions Inventory	Finalized and Adopted Community Climate Action Plan
Yountville	X	X
San Francisco	X	X
San Mateo County	X	X
Atherton	X	X
Belmont	X	X
Brisbane	X	X
Burlingame	X	X
Colma	X	X
Daly City	X	X
East Palo Alto	X	X
Foster City	X	X
Half Moon Bay	—	—
Hillsborough	X	X
Menlo Park	X	X
Millbrae	X	—
Pacifica	X	X
Portola Valley	X	—
Redwood City	X	X
San Bruno	X	X
San Carlos	X	X
San Mateo	X	X
South San Francisco	X	X
Woodside	X	X
Santa Clara County	X	X
Campbell	—	—
Cupertino	X	X
Gilroy	X	—
Los Altos	X	X
Los Altos Hills	X	X
Los Gatos	X	X
Milpitas	X	X
Monte Sereno	—	—
Morgan Hill	X	—
Mountain View	X	X
Palo Alto	X	X
San Jose	X	X
Santa Clara	X	X
Saratoga	X	—
Sunnyvale	X	X
Solano County	X	X
Benicia	X	X
Dixon	X	—

Jurisdiction	Completed Community Emissions Inventory	Finalized and Adopted Community Climate Action Plan
Fairfield	X	—
Rio Vista	X	—
Suisun City	X	—
Vacaville	X	X
Vallejo	X	X
Sonoma County	X	X
Cloverdale	X	—
Cotati	X	—
Healdsburg	X	—
Petaluma	X	—
Rohnert Park	X	—
Sebastopol	X	—
Santa Rosa	X	X
Sonoma (city)	X	—
Windsor	X	—
Regional Total	103	79

Source: CARB 2021d

The region's CAPs seek to help local jurisdictions achieve state emissions goals. They identify recommendations for meeting emissions goals, often in terms of different land uses or categories, including transportation, land use, energy, water, waste, and green infrastructure, and require monitoring of emissions over time. While not required above, a majority of jurisdictions in the region participate in the creation of both emissions inventories and CAPs.

Community Choice Aggregation Programs

Several Community Choice Aggregation (CCA) programs operate in the Bay Area. A CCA allows local governments to partner with local utilities to procure power on behalf of its residents, businesses, and municipal accounts. CCAs use the transmission and distribution services of a utility while supporting a municipality's choice to obtain energy from typically greener sources. CCAs in the Plan area include East Bay Community Energy, Peninsula Clean Energy, MCE, CleanPowerSF, San Jose Clean Energy, Silicon Valley Clean Energy, and Sonoma Clean Power, all of which have partnered with PG&E.

San Francisco Bay Plan

BCDC is charged with the protection, enhancement, and responsible use of the San Francisco Bay. The agency's jurisdiction includes the bay itself, all land within 100 feet of the bay shoreline, salt ponds, managed wetlands, and certain waterways named in BCDC's law. BCDC guides uses of the bay and its shoreline through policies set forth in the McAteer-Petris Act; the Suisun Marsh Preservation Act; the San Francisco Bay Plan, originally adopted in 1968; and the Suisun Marsh Protection Plan, originally adopted in 1977. The policies included in the Bay Plan address the uses of both the Bay and shoreline, water quality, and the approach to bay fill. Additionally, the Bay Plan has a number of proposals, including the development of ports, land preservation, development of parks and recreation, maintaining wildlife, and managing shipping channels. In 2019, BCDC amended its Bay Plan to allow for more substantial fill when addressing sea level rise with multi-benefit adaptation projects, as well as added an Environmental Justice and Social Equity Amendment establishing new equity-focused requirements for project sponsors (BCDC 2020).

County Sea Level Rise Programs

San Francisco Sea Level Rise Action Plan

In March 2016, the City and County of San Francisco released its *Sea Level Rise Action Plan* to identify actions that San Francisco can take now and in the near future to meet the challenge of sea level rise.

This plan addresses the immediate and long-term threats of sea level rise to the San Francisco shoreline through development of a comprehensive understanding of the threat of sea level rise and creation of a decisive plan of action. In general, the San Francisco Sea Level Rise Action Plan recommends one or a combination of three options to address sea level rise: accommodate (raise or waterproof assets in place), protect (create natural or engineered barriers, such as wetlands or levees), or retreat (relocate sensitive assets to low-risk areas and/or transition high-risk areas to lower-risk uses) (City of San Francisco 2016).

Resilient San Mateo Flood and Sea Level Rise Resiliency District

In 2018, the County of San Mateo and its 20 cities decided to modify the existing Flood Control District, operating since 1959, to expand its scope and restructure its governance. The modified agency, known as the Flood and Sea Level Rise Resiliency District, addresses sea level rise, flooding, coastal erosion, and regional stormwater infrastructure across the county, with an emphasis on multijurisdictional solutions. It coordinates with the county's Flood Resilience Program, created in 2016, which helps address cross-jurisdictional flood risks (San Mateo 2018a). The San Mateo County Sea Level Rise Vulnerability Assessment, which the agency completed in 2018, found that a midlevel 2100 sea level rise scenario could inundate property assessed at $34 billion. On the coastal side, $932 million in assessed property value could be at risk of erosion north of Half Moon Bay (San Mateo 2018b).

Marin Ocean Coast Sea Level Rise Adaptation Report

The Marin Ocean Coast Sea Level Rise Adaptation Report was released in February 2018. This plan for Marin County's ocean coast builds off of a 2015 vulnerability assessment, which measured the vulnerability of parcels and homes, transportation networks, utilities, working lands, natural resources, recreational activities, emergency services, and historic and archaeological resources. The report plans on 3 feet of sea level rise inundation by 2100, and presents actions for the coast to accommodate, protect, or retreat from sea level rise inundation and storms. The report highlights plans for each of the coastal communities, and suggests potential implementation for adaptation strategies for the area. Adaptation strategies are prioritized by timeline and suggest potential partners for development (County of Marin 2018).

Solano County Sea Level Rise Strategic Program

In June 2011, Solano County released its Sea Level Rise Strategic Program (SLRSP) to address climate change and associated sea level rise at the local level. As directed by the county's general plan, the SLRSP investigates the potential effects of sea level rise on Solano County, including the effects on specific properties and resources, and presents protection and adaptation strategies. The SLRSP considers two inundation scenarios: 16 inches by midcentury and 55 inches by the end of the century.

Major roads and highways, along with railways, in the county are considered to be highly sensitive and vulnerable to the effects of sea level rise, with low adaptive capacity. Residential, industrial, and commercial developments are also all highly sensitive and vulnerable to sea level rise, although the adaptive capacity of these uses is low to medium, given the ability for residents and businesses with resources to pursue alternative locations. For all new transportation infrastructure and development, the SLRSP recommends designing projects to tolerate periodic flooding and providing for new development that can be adapted or relocated. The SLRSP notes the difficulty in determining adaptive strategies for transportation infrastructure, as they will be developed based on future vulnerability and

risk analyses specific to each asset. However, it specifically recommends collaborating with MTC and Caltrans on adaptation planning for affected roadways (County of Solano 2011).

3.6.3 Impact Analysis

SIGNIFICANCE CRITERIA

The issue of global climate change is inherently a cumulative issue because the GHG emissions of individual projects cannot be shown to have any material effect on global climate. Thus, the proposed Plan's impact on climate change is addressed only as a cumulative impact.

The following significance criteria are based on Section 15064.4 of the CEQA Guidelines and relevant portions of Appendix G of the CEQA Guidelines, which recommend that a lead agency consider a project's consistency with relevant, adopted plans, and discuss any inconsistencies with applicable regional plans, including plans to reduce GHG emissions, and Appendix F of the CEQA Guidelines, which requires consideration of potentially significant energy implications of a project.

With respect to GHG emissions, the CEQA Guidelines Section 15064.4(a) states that lead agencies "shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions resulting from a project. The CEQA Guidelines note that an agency has the discretion to either quantify a project's GHG emissions or rely on a "qualitative analysis or performance-based standards" (Section 15064.4[a]). A lead agency may use a "model or methodology" to estimate GHG emissions and has the discretion to select the model or methodology it considers "most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change" (Section 15064.4[c]). The CEQA Guidelines provide that the lead agency should consider the following when determining the significance of impacts from GHG emissions on the environment (Section 15064.4[b]):

- The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

Based on Appendix F and Appendix G of the CEQA Guidelines, guidance provided by BAAQMD, and professional judgment, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- Result in a net increase in greenhouse gas emissions, either directly or indirectly, compared to 2015 conditions, that may have a significant impact on the environment (Criterion GHG-1);
- Conflict with the Bay Area region's achievement of the GHG emissions reduction target of 19 percent below 2005 emissions by 2035 established by CARB pursuant to SB 375 (Criterion GHG-2);
- Conflict with an applicable state plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases (Criterion GHG-3);
- Conflict with an applicable local plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases (Criterion GHG-4); or

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation (Criterion EN-1);
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (Criterion EN-2).

METHOD OF ANALYSIS

Greenhouse Gas Emissions

In general, the baseline for this analysis reflects 2015 conditions, as it is the most recent year for which comprehensive data on emissions, energy, demographics, and travel volume are available for the Bay Area region. However, a 2005 baseline is used for the analysis under GHG-2 to satisfy statutory requirements of Senate Bill 375 for benchmarking the year used for comparison to the proposed Plan's requisite greenhouse gas reduction targets. A 1990 baseline is used for GHG-3 for an assessment of the proposed Plan's consistency with SB 32, which calls for a statewide reduction of GHG emissions to 40 percent from 1990 levels by 2030.

Global Warming Potential Factors

To stay consistent with BAAQMD's 2015 GHG inventory for the Bay Area, 100-year timeframe GWP factors from the IPCC Fifth Assessment Report (FAR) were applied to calculate CO_2e. BAAQMD specifically chose FAR for their inventory to keep up with the latest science on climate, which differs from the Fourth Assessment Report assumptions utilized by CARB. Under FAR, CH_4, and N_2O are considered to have GWP factors of 34 and 298, respectively (IPCC 2014, BAAQMD 2017). Only CO_2, CH_4, and N_2O emissions were considered for analysis, reflecting BAAMQD's standard, as other GHGs were considered to be negligible.

Construction Emissions

GHG emissions from operation of construction equipment can vary depending on the level of activity, the specific operations taking place, the equipment being operated, and other factors. A qualitative analysis of potential GHG emissions from construction activity associated with projected land use development and proposed transportation projects was conducted. At the program level of analysis, it is not possible to accurately quantify the amount of emissions expected from implementation of the proposed Plan because of variability in the extent of construction based on site conditions throughout the Bay Area, and the fact that project details needed to conduct such an analysis are not and cannot be known at this level of analysis.

Operational Emissions

Land use emissions and motor vehicle emissions are modeled differently, and thus, are explained separately. Land use emissions are modeled using the California Emissions Estimator Model (CalEEMod). Motor vehicle emissions are modeled separately due to inconsistencies in CalEEMod's default trip assumptions with MTC's travel models. For further explanation, please see the sections below, with further details available in Appendix D.

Land Use Emissions

Emissions from the operation of forecasted development under the proposed Plan were based on the growth forecast of the Plan. The land use emissions associated with the Plan were calculated using default model assumptions in the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 as well as county- and region-specific emission factors (CAPCOA 2017). The energy intensity rates (e.g., therms per 1,000 square feet) for new land uses built between 2015 and 2050 were assumed to meet 2019 Title 24 standards, which became effective in 2020 (CEC 2021). While this approach may undercount emissions from new land uses built between 2015 and 2020, overall it will conservatively

capture energy efficiency of new land uses built between 2015 and 2050 because the majority of the Plan period is expected to be subject to increasingly stringent efficiency standards.

To compare operational GHG emissions from land use under existing conditions to those forecasted under the Plan buildout, the analysis assumes that the net change in emissions between existing conditions and buildout would be equivalent to emissions from the operation of:

- New land uses built between 2015 and 2050 using 2050 emission factors, minus
- Existing land uses that would be removed between 2015 and 2050 using 2015 emission factors.

Existing land uses that are removed are expected to be replaced by denser residential and commercial land use development. For further detail on land use emissions modeling, please see Appendix D.

The proposed Plan includes two environmental strategies that when implemented would result in lower emissions and energy use. Strategy EN02, "Provide Means-Based Financial Support to Retrofit Existing Residential Buildings" would result in building ordinances and building retrofits to meet higher energy standards, among other things. Similarly, Strategy EN03, "Fund Energy Upgrades to Enable Carbon Neutrality in All Existing Commercial and Public Buildings" would support the electrification and resilient power system upgrades leading to lower building emissions. The strategies only apply to existing structures, which cannot be readily incorporated into the modeling of new growth in the region. As a result, the emissions and/or energy use reductions of these two strategies, EN02 and EN03, were not quantified for the impact discussions below.

This analysis excludes emissions from high GWP gases, agriculture, and large industrial stationary sources (e.g., petroleum refineries). The proposed Plan does not include policies or provisions that would affect high GWP gases, large industrial stationary sources, nor regulate agricultural land uses.

Motor Vehicle Emissions

Motor vehicle, or mobile source, emissions were calculated using MTC's travel demand forecasting model, Travel Model 1.5, and mobile source emission factors developed by the California Air Resources Board (CARB). Vehicle activity projections are correlated to changes in demographic, housing, and socioeconomic factors. As shown in Table 2-11, between 2015 and 2050, the Bay Area is projected to add about 2.8 million people (a 37 percent increase) and 1.4 million jobs (a 40 percent increase). Based on expected future growth, the total vehicles miles traveled would increase by 18 percent, which means that VMT is projected to grow at a much slower rate than both population and jobs in the region. This can be attributed to the anticipated job growth in the region, consistent with recent trends. MTC also projects that much of the region's housing will grow along transit corridors and near job centers, further reducing VMT. For more information on the land use development pattern see Chapter 2, "Project Description."

Travel Model 1.5, released in 2020, produces forecasts of travel behavior and vehicle activity, and updates Travel Model One with the inclusion of ride-hailing, taxis, and autonomous vehicles. The Travel Model has been extensively reviewed by federal and State agencies and refined in connection with the application to air quality analyses of various kinds. Key model outputs for use in air quality analyses include total daily vehicle trips, VMT, and distribution of VMT by speed. This information was then used to determine total emissions from transportation activity in the Bay Area using motor vehicle emission factors from CARB's Emission Factor (EMFAC) model.

A detailed description of EMFAC 2021 is included in Section 3.4, "Air Quality," and a detailed description of the MTC travel demand forecasting model is included in Section 3.15, "Transportation."

Travel Model 1.5 is not sensitive to the full range of strategies in the proposed Plan. Marketing and education campaigns, as well as non-capacity-increasing transportation investments like bikeshare programs (i.e., Strategy EN09, "Expand Travel Demand Management Strategies"), are examples of strategies with the potential to change behavior in ways that result in reduced vehicle emissions. Travel Model 1.5 and EMFAC do not estimate reductions in emissions in response to these types of changes in traveler behavior. As such, an "off-model" approach was used to quantify the VMT and GHG reduction benefits of these important programs. Off-model analyses estimate GHG emission reductions from strategies based on evidence from empirical data and research and are standard elements of an SCS. CARB provides guidance on the off-model analyses in the Final Sustainable Communities Strategy Program and Evaluation Guidelines Appendix D (November 2019) and CARB reviews "the development, quantification, and effectiveness and potential adjustments of the MPO's off-model strategies" as part of their evaluation of MTC's SCS technical methodology (CARB 2019).

In evaluating Criterions GHG-1 and GHG-3, MTC used EMFAC 2021 to calculate the GHG emissions from motor vehicle sources. EMFAC 2014 is used only for the analysis of Criterion GHG-2, as described below. CARB officially released EMFAC 2021 (v1.0.0) to the public in January 2021. EMFAC 2021 is the latest emission inventory model that CARB uses to assess emissions from on-road motor vehicles in California and was used to model emissions for GHG-1 and GHG-3. It does not account for some of the recent and developing legislation on mobile source emissions, such as N-79-20. For Criterion GHG-1, the analysis incorporates operational land use and mobile source emissions. Unlike Criterion GHG-2, mobile source emissions are modeled solely using EMFAC 2021, which improves upon prior versions of EMFAC with updated emissions factor data, and the incorporation of various GHG reduction policies, including projections of zero-emission vehicle (ZEV) populations.

Impact GHG-2 addresses Criterion GHG-2 using a conservative approach where emissions exclude reductions in mobile source emissions because of the implementation of the Advanced Clean Cars (ACC) program/Pavley rule and LCFS, as required per SB 375 protocol.

Unlike EMFAC 2021, mobile source emissions from EMFAC 2014 are output only as CO_2 values, which is the largest contributor of GHG emissions for motor vehicle sources. Because the emissions model is based on travel demand forecast model outputs, it accounts for the projected land use development as well as transportation projects outlined in the proposed Plan. The emissions model also accounts for the effects of congestion (changes in average vehicle speeds) on CO_2 emissions. MTC then prepared an "off-model" calculation to account for CO_2 reduction estimates in strategy EN09. The EN09 strategy includes a car share program, the development of a regional electric vehicle charger network, and other strategies aimed at reducing GHG emissions. Detailed information on how the strategy reductions were calculated and details on the assumed implementation year for each policy are included in Plan Bay Area 2050's Forecasting and Modeling Report found at: planbayarea.org/reports.

For Criterion GHG-2, the analysis focuses on consistency with CARB's reduction targets pursuant to SB 375 pertaining to CO_2 emissions related to the operation of passenger vehicles and light duty trucks. Analysis for Criterion GHG-2 relies on EMFAC 2014 run in SB 375 mode, in accordance with CARB guidance.

Consistency with Greenhouse Gas Reduction Policies and Plans

The assessment for Criterion GHG-3 evaluates the proposed Plan's likelihood to impede implementation of state policies and plans, including statewide goals set by SB 32 and EO S-3-05 and the *2017 Scoping Plan*, by comparing emissions projected by the Plan with the state's long-term goals. SB 32 and EO S-3-05 call for a statewide reduction of GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 by 2050, respectively. The 2050 goals in the EO are also supported by a scientific consensus regarding GHG reduction needed to avoid dangerous climate change. Pursuant to these statewide targets, the 2017 Scoping Plan limits local plans from setting GHG targets

greater than 6 $MTCO_2e$ per capita by 2030 and 2 $MTCO_2e$ per capita by 2050, which were developed in accordance with the 2017 Scoping Plan guidelines by dividing the state's targeted mass emissions in 2030 and 2050 by the anticipated population growth.

The analysis in this Section focuses on transportation and non-agricultural land-related emissions generated by the proposed Plan, which accounts for electricity consumption, on-site building energy use (e.g., natural gas, propane), and waste management sectors. The emissions analysis excludes emissions from high-GWP gases, agriculture, and large industrial stationary sources, such as those from petroleum refineries. Based on these constraints, a custom weighted GHG reduction target was calculated using:

- the 2017 Scoping Plan's 2030 mass emissions targets for transportation and the relevant land use sectors (Residential and Commercial, Electric Power, Recycling and Waste) (CARB 2017: Table 3),
- the state's 2015 emissions from transportation and the relevant land use sectors (Residential and Commercial, Electric Power, Recycling and Waste) (CARB 2018),
- the Bay Area's 2015 emissions from transportation, modeled by MTC, and the relevant land use sectors from BAAQMD's 2017 Clean Air Plan (Electricity, Buildings, and Waste management) (BAAQMD 2017: Table 3-2).

Consequently, to be consistent with the statewide GHG reduction targets, land use and transportation emissions in the Bay Area under the proposed Plan should show a 41 percent reduction from 2015 levels by 2030 and an 83 percent reduction from 2015 levels by 2050 to be consistent with statewide goals. The resulting custom targets are slightly higher than the state's overall target primarily due to the greater burden the State has put on the energy and transportation sectors to reduce emissions compared to the sectors that were excluded from this analysis (e.g., agriculture, high GWP). Detailed quantification of this weighted target is shown in Appendix E.

Assessment for Criterion GHG-4 evaluates the plan in the context of local climate action plans and General Plans within the jurisdiction of MTC/ABAG. This analysis, in contrast to other Impacts within the chapter, is assessed qualitatively. For further information on the region's local plans, please see **Table 3.6 7** in Section 3.6.2. "Regulatory Setting," above.

Energy

The total levels of energy consumption by the proposed Plan residential and commercial sectors, measured in gigawatt-hours of electricity, BTU of natural gas, gallons of gasoline, and gallons of diesel fuel, were estimated for the baseline year (2015) and the Plan horizon year (2050). Lesser-used forms of energy were excluded from the analysis, including fuel and heating oils, which are typically used in more rural settings than the Plan jurisdiction, and propane, which is difficult to model due to its various forms. The year 2015 was used for the baseline due to the availability of data for this single calendar year from State and local sources. This includes data on energy consumption from CEC; emission inventories from CARB (which can be used as a surrogate for energy consumption); default values for the consumption of electricity and natural gas from CalEEMod); and land use and demographic estimates from ABAG. In addition, the lack of regional land use data for more recent years makes forecasting energy consumption difficult as estimates that are not based on accurate small-scale geographic land uses, like parcels, are less accurate. Strategy EN02, "Provide Means-Based Financial Support to Retrofit Existing Residential Buildings," and Strategy EN03, "Fund Energy Upgrades to Enable Carbon-Neutrality In All Existing Commercial and Public Buildings," also anticipate energy reduction through energy-focused building retrofits, but their benefits are not able to be modeled with CalEEMod, as the strategies focus on only existing buildings, and specific land use types. As a result, their impacts are measured qualitatively.

Table 3.6-8 summarizes the levels of energy consumption for each year by source estimated for the Plan area.

Table 3.6-8: Net Change in Energy Consumption[1]

Land Use/Energy Type	Net Change in Energy Consumption From 2015 to 2050[4]	Units
Single-Family Residential		
Electricity	1,345,000	MWh/year
Natural Gas[2]	3,539,000	MMBTU/year
Apartments High Rise		
Electricity	3,605,000	MWh/year
Natural Gas[2]	5,163,000	MMBTU/year
Apartments Mid Rise		
Electricity	754,000	MWh/year
Natural Gas[2]	1,238,000	MMBTU/year
Apartments Low Rise		
Electricity	216,200	MWh/year
Natural Gas[2]	474,300	MMBTU/year
Office		
Electricity	1,966,000	MWh/year
Natural Gas[2]	1,909,000	MMBtu/year
Retail		
Electricity	48,600	MWh/year
Natural Gas[2]	-105,400	MMBtu/year
Industrial		
Electricity	-187,600	MWh/year
Natural Gas[2]	-725,700	MMBtu/year
All Land Uses in Plan Area		
Electricity	7,809,000	MWh/year
Natural Gas[2]	12,432,000	MMBTU/year

Note: MWh = megawatt hour; MMBtu = one million British thermal units; MG = million gallons.

[1] Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding.

[2] Does not include natural gas from hearths (e.g., fireplaces).

[3] Emissions from hearths are based on natural gas hearths only.

[4] Energy consumption forecasts do not account for expected reductions from the implementation of strategies EN02 or EN03.

Source: Data compiled by Ascent Environmental 2021

The total levels of gasoline and diesel fuel consumption in the region were estimated based on the analysis of VMT in the region estimates of mobile-source GHGs in the region provided by MTC, fleet-average CO_2 emission rates for the region, and the carbon content of both fuel types. Fleet-average CO_2 emission rates for the region for both 2015 and 2050 were developed using CARB's emission factor model, EMFAC2021. Table 3.6-9: summarizes the levels of gasoline and diesel consumption for each year by vehicle category in the Plan area.

Table 3.6-9: Daily Levels of Gasoline and Diesel Consumption[1]

Vehicle Category	2015			2050			Net Change		
	Gasoline (thousands gal/day)[2]	Diesel (thousands gal/day)[2]	Natural Gas (thousands gal/day)[2]	Gasoline (thousands gal/day)[2]	Diesel (thousands gal/day[2]	Natural Gas (thousands gal/day)[2]	Gasoline (thousands gal/day)[2]	Diesel (thousands gal/day)[2]	Natural Gas (thousands gal/day)[2]
Passenger Vehicles	6,200	40	0	4,800	10	0	-1,300	-30	0
Trucks	400	1,100	20	190	950	40	-210	-150	20
Buses	40	80	2	10	30	1	-30	-40	-1
Other Vehicles	40	4	0	30	4	0	-10	1	0
All Vehicle Types	6,700	1,200	20	4,300	1,100	40	-2,400	-160	20

Notes: Gal/yea = gallons per year.

[1] Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding.

[2] Gasoline and diesel consumption forecasts do not account for expected reductions from the implementation of strategies EN08 or EN09.

Source: Data compiled by MTC/ABAG in 2021.

The proposed Plan's forecasted land use growth, sea level rise adaptation projects, and transportation projects would be expected to result in the consumption of energy in the form of gasoline and diesel fuel during construction activities. Because detailed construction information was not available, the energy analysis addresses these potential impacts at a program level.

IMPACTS AND MITIGATION MEASURES

Impact GHG-1: Result in a net increase in greenhouse gas emissions, either directly or indirectly, compared to 2015 conditions that may have a significant impact on the environment (PS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Construction Emissions

The level of GHG emissions from construction activity would depend on the type and scale of projects being constructed under the Plan. Generally, GHGs could be generated from a variety of activities and emission sources (e.g., exhaust emissions from off-road construction equipment, material delivery trips, and construction worker-commute trips). These emission types and associated levels fluctuate greatly depending on the particular type, number, and duration of usage for the varying equipment. The site preparation phase typically generates the most substantial emission levels because of the on-site equipment and ground-disturbing activities associated with grading, compacting, and excavation. Site preparation equipment and activities typically include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers).

Construction activity tends to be temporary in nature and would be expected to occur throughout the proposed Plan's implementation period through 2050 because of the various land use development, sea level rise adaptation infrastructure, and transportation projects that could be constructed. Where existing regulatory requirements or permitting requirements exist that are legally or otherwise binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts. However, because construction emissions may not be reduced to net zero in all cases, this impact would be potentially significant (PS).

Operational Emissions

As explained in Chapter 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.8 million residents and 1.4 million jobs, resulting in 1.4 million new households. The projected development would increase indirect and direct GHG emissions from building electricity and natural gas use, water use, wastewater treatment, waste generation, and landscaping equipment. However, the proposed Plan was designed to accommodate the people, households, and jobs identified in the regional growth forecast, and includes land use strategies that would allow for denser or more compact development in designated growth geographies. These strategies would allow greater densities for new commercial development in select PDAs and select transit-rich areas and provide incentives to employers to shift jobs to housing-rich areas well served by transit. The proposed growth pattern would thereby limit an increase in emissions. In addition, improved building energy efficiency standards and increased renewable energy sources for electricity would reduce future GHG emissions from new land use. An overview of GHG emissions related to land use projects is shown in **Table 3.6-10**, by land use type and source, and **Table 3.6-11**, by county. Strategy EN02 and Strategy EN03 propose additional building retrofits on existing residential and commercial properties that would further increase energy efficiency, though as described above, their effects are not quantified in the analysis.

Operational GHG emissions from projected development were determined based on existing and forecasted single family and multifamily occupied housing units and existing and forecasted jobs by sector. As shown in **Table 3.6-10**, GHG emissions from the net change in land uses would result in a net increase of 0.589 $MMTCO_2e$ in the Plan area.

The proposed Plan's sea level rise adaptation infrastructure is not anticipated to generate or emit greenhouse gas emissions during operation.

Table 3.6-10: Net Change in Annual Land Use GHG Emissions by GHG Source

County	County/GHG Source	Net Change in Activity	Activity Units	Net Change in $MTCO_2e$/year between 2015-2050
Single-Family Residential	Electricity	1,335,000	MWh/year	-8,800
	Natural Gas[1]	3,539,000	MMBTU/year	190,000
Multi-Family Residential (Low/Mid-Rise)	Electricity	970,000	MWh/year	-5,300
	Natural Gas[1]	1,713,000	MMBTU/year	92,000
Multi-Family Residential (High Rise)	Electricity	3,656,000	MWh/year	0[2]
	Natural Gas[1]	6,109,000	MMBTU/year	328,000
Residential Subtotal				596,000
Office	Electricity	1,966,000	MWh/year	-34,300
	Natural Gas[1]	1,909,000	MMBTU/year	102,500
Retail	Electricity	48,600	MWh/year	-98,200
	Natural Gas[1]	105,400	MMBTU/year	-5,700
Industrial	Electricity	9,700	MWh/year	-43,500
	Natural Gas[1]	536,200	MMBTU/year	-39,000
Non-Residential Subtotal				-118,139
All Land Uses in Plan Area	Electricity	7,809,000	MWh/year	-233,600
	Natural Gas[1]	12,432,000	MMBTU/year	667,500
	Water and Wastewater[3]	159,600	MG/year	102,900

County	County/GHG Source	Net Change in Activity	Activity Units	Net Change in $MTCO_2e$/year between 2015-2050
	Waste	831,500	Tons	35,300
	Hearths[4]	n/a[5]	n/a[5]	14,100
	Landscaping	n/a[5]	n/a[5]	3,300
Regional Total				589,400

Notes: Activity and emissions estimates modeled using CalEEMod v. 2016.3.2. NA = not available, MWh = megawatt hour, MMBtu = one million British thermal units, MG = million gallons, $MTCO_2e$ = metric tons of carbon dioxide equivalent. Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding. Net changes do not account for expected reductions from the implementation of strategies EN02 or EN03.

[1] Does not include natural gas from hearths.

[2] Value does not show decrease in emissions due to the assumption of increased high density development in the life of the Plan.

[3] Includes indoor and outdoor water use.

[4] Emissions from hearths are based on natural gas hearths only.

[5] CalEEMod Version 2016.3.2 does not output hearths and landscaping activity.

Source: Data compiled by MTC/ABAG in 2021

Table 3.6-11: Net Change in Annual Land Use GHG Emissions by County

County	County/GHG Source	Net Change in Activity	Activity Units	Net Change in $MTCO_2e$/year between 2015-2050
Alameda	Electricity	1,510,000	MWh/year	-42,300
	Natural Gas	2,795,000	MMBTU/year	150,000
	Other	-	-	219,400
	Alameda Total			327,200
Contra Costa	Electricity	950,100	MWh/year	-25,700
	Natural Gas	1,998,000	MMBTU/year	107,300
	Other	-	-	154,200
	Contra Costa Total			235,800
Marin	Electricity	24,100	MWh/year	-17,900
	Natural Gas	328,200	MMBTU/year	17.600
	Other	-	-	41,800
	Marin Total			41,400
Napa	Electricity	49,000	MWh/year	-2,900
	Natural Gas	127,000	MMBTU/year	6,800
	Other	-	-	11,200
	Napa Total			15,200
San Francisco	Electricity	41,900	MWh/year	-102,600
	Natural Gas	132,000	MMBTU/year	7,100
	Other	-	-	124,200
	San Francisco Total			28,600
San Mateo	Electricity	875,400	MWh/year	-10,600
	Natural Gas	1,385,000	MMBTU/year	74,400
	Other	-	-	59,400
	San Mateo Total			123,200

County	County/GHG Source	Net Change in Activity	Activity Units	Net Change in $MTCO_2e$/year between 2015-2050
Santa Clara	Electricity	3,604,000	MWh/year	-31,400
	Natural Gas	4,298,000	MMBTU/year	230,700
	Other	-	-	-362,900
	Santa Clara Total			-163,500
Solano	Electricity	477,600	MWh/year	-130
	Natural Gas	912,600	MMBTU/year	49,000
	Other	-	-	-62,100
	Solano Total			-13,300
Sonoma	Electricity	277,200	MWh/year	-140
	Natural Gas	457,300	MMBTU/year	24,600
	Other	-	-	29,600
	Sonoma Total			-5,200
Regional Total				589,400

Notes: Natural gas does not include natural gas from hearths; Other includes emissions from hearths, water use, wastewater treatment, solid waste generation, and landscaping equipment; Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding. Net changes do not account for expected reductions from the implementation of strategies EN02 or EN03.
Source: Data compiled by MTC/ABAG 2021

The proposed Plan would result in a number of strategies aimed at reducing GHG emissions from mobile sources through reducing commute trips, expanding clean vehicle initiatives, and expanding transportation demand programs. However, with the operation of new transportation projects, as well as the growing number of residents and jobs in the region, total on-road transportation GHG emissions would be expected to increase over time if no standards were put in place. This analysis incorporates implementation of Pavley regulations over the life of the proposed Plan. As shown in **Table 3.6-12**, when these standards are considered, overall on-road vehicle GHG emissions decline by 21 percent for passenger vehicles. Pavley standards only affect passenger vehicles, but emissions of other vehicles decline by 64 percent for buses, by 21 percent for trucks, and by 25 percent for "Other Vehicles" due to recently adopted regulations such as Advanced Clean Trucks (ACT) and Heavy Duty Omnibus regulations (CARB 2021f).

Table 3.6-12: Existing and Forecasted Daily Transportation GHG Emissions by Vehicle Source ($MTCO_2e$)

Emission Source	2015 Baseline	2050 Proposed Plan	Change from Baseline	Percent Change from Baseline
Passenger Vehicles	53,300	41,900	-11,400	-21%
Trucks	14,900	11,700	-3,200	-21%
Buses	1,100	400	-700	-64%
Other Vehicles	400	300	-100	-25%
Total	69,700	54,300	-15,400	-22%

Notes: Values include clean car standards. Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding. Estimates calculated using EMFAC 2021. MTC applied a ratio of 1:00:1:02 to all EMFAC2021 generated CO_2 estimates for conversion to CO_2e. Emissions were annualized by multiplying by 300 to take account for the fact that there is less traffic on weekends. Emission estimates do not account for expected reductions from the implementation of strategies EN08 or EN09.
Source: Data compiled by MTC 2021

Emissions are reported on a regional basis, with respect to mobile sources. Changes in land use and transportation activity under the proposed Plan would result in a net reduction of 4.0 $MMTCO_2e$, or 9 percent, from 2015 to 2050, as shown in **Table 3.6-13**. Therefore, there would be a less-than-significant (LS) impact.

Table 3.6-13: Annual GHG Emissions from Projected Land Use and Transportation Sources ($MTCO_2e$/year)

Sources	2015 Baseline	2030 Proposed Plan[1]	2050 Proposed Plan	Change from 2050 to Baseline	Percent Change from 2050 to Baseline
Land Use	23,810,000[2]	24,100,000	24,399,000[3]	+589,400	+2%
Transportation	20,910,000[4]	18,600,000	16,320,000[4]	-4,590,000	-22%
Regional Total	44,720,000	42,700,000	40,719,000	-4,001,000	-9%

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding. Emission estimates do not account for expected reductions from the implementation of strategies EN02, EN03, EN08, or EN09.

[1] Interpolated between 2015 and 2050.

[2] Based on emissions from electricity consumption, building energy usage (e.g. natural gas, propane), and waste management emissions from BAAQMD's 2015 Bay Area GHG Inventory (BAAQMD 2017: Table 3-2).

[3] Calculated by adding the calculated net change in to 2015 values. Calculations assume residential and nonresidential land uses built between 2015 and 2050 would be built to 2019 Title 24 building energy efficiency standards.

[4] Calculated by MTC using EMFAC2021.

Source: Data compiled by MTC 2021

Conclusion

Implementation of the proposed Plan is expected to result in a net reduction in GHG emissions in 2050 when compared to 2015 conditions. However, because construction emissions may not be reduced to net zero in all cases, this impact would be **potentially significant (PS)**. Mitigation Measure GHG-3 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure GHG-1 Consistent with the recommendations in the 2017 Scoping Plan, the applicable lead agency can and should implement, where necessary and feasible to address site-specific construction climate change impacts, the following measures to avoid or minimize impacts related to construction GHG emissions:

- Project proponents shall require its contractors to restrict the idling of on- and off-road diesel equipment to no more than 5 minutes while the equipment is on-site.
- Project proponents of new facilities shall implement waste, disposal, and recycling strategies (i.e., 10 percent recycled content for Tier 1 and 15 percent recycled content for Tier 2) in accordance with the voluntary measures for non-residential land uses contained in Section A5.405 of the 2016 CALGreen Code or in accordance with any update to these requirements in future iterations of the CALGreen Code in place at the time of project construction.
- Project proponents of new facilities shall achieve or exceed the enhanced Tier 2 target for nonresidential land uses of recycling or reusing 80 percent of the construction waste as described in Section A5.408 of the 2016 CALGreen Code or in accordance with any update to these requirements in future iterations of the CALGreen Code in place at the time of project construction.
- Project proponents shall require all diesel-powered, off-road construction equipment meet EPA's Tier 3 or Tier 4 emissions standards as defined in 40 CFR 1039 and comply with the exhaust emission test procedures and provisions of 40 CFR Parts 1065 and 1068. This measure can also be achieved by using battery-electric off-road equipment as it becomes available.

- Project proponents shall implement a program that incentivizes construction workers to carpool, and/or use public transit or electric vehicles to commute to and from the project site.

Significance after Mitigation

Implementation of Mitigation Measure GHG-1 would mitigate the GHGs emitted during the construction phase of the projected land use pattern and planned transportation projects under the proposed Plan. Projects taking advantage of CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as feasible, to address site-specific conditions. If these mitigation measures were adopted by the implementing agency, construction related impacts could be reduced, but not necessarily to a less-than-significant level, and this impact would be **significant and unavoidable** for purposes of this program-level review.

Impact GHG-2: Conflict with the Bay Area region's achievement of the GHG emissions reduction target of 19 percent below 2005 emissions by 2035 established by CARB pursuant to SB 375 (LTS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

The proposed Plan includes land use strategies that would allow for denser or more compact development in designated growth geographies. These strategies would allow greater densities for new commercial development in select growth geographies and provide incentives to employers to shift jobs to housing-rich areas well served by transit. As noted in Criterion GHG-1, the proposed growth pattern would thereby limit an increase in emissions.

The proposed Plan's sea level rise adaptation infrastructure is not expected to increase emissions. Instead, the adaptation infrastructure would alleviate risk from inundation of existing and forecasted development and transportation infrastructure and support the proposed Plan's core land use strategy to "focus growth" in existing communities along the existing transportation network.

The proposed Plan would also result in the implementation of transportation projects. However, several strategies in the proposed Plan would reduce emissions from cars and light duty trucks. As shown in **Table 3.6-14**, Strategy EN09, "Expand Transportation Demand Management Initiatives" includes strategies that are expected to reduce vehicle trips and, subsequently, on-road passenger vehicle emissions by nearly 6,300 $MTCO_2$ per day in 2035. As noted in the methodology, Travel Model 1.5 is not sensitive to the full range of strategies in the proposed Plan. As a result, the emissions reduction benefits of Strategy EN09 are calculated "off-model" consistent with guidance from CARB.

Table 3.6-14: Plan Bay Area 2050 Strategy EN09: Transportation Demand Management Initiatives $MTCO_2$ Reductions

Strategy	2035	
	Daily Reductions ($MTCO_2$)	Annual Reductions ($MTCO_2$)
Bike Share	10	4,100
Car Share	1,800	537,500
Targeted Transportation Alternatives	800	238,300
Vanpool Incentives	120	35,600
Regional EV Charger Network	670	201,600
Vehicle Buyback Program	2,900	864,000
Total	6,300	1,881,000

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding. Emissions are annualized by multiplying by 300 to take account for the fact that there is less traffic on weekends.

Source: Data compiled by MTC/ABAG 2021

Table 3.6-15 shows the change in daily and per-capita car and light duty truck CO_2 emissions between 2005 and future years. Emissions are expected to decline over time with and without the implementation of Strategy EN09. With Strategy EN09, the proposed Plan is expected to result in nearly a 22 percent decline in per capita CO_2 emissions from 2005 to 2035, exceeding the SB 375 target of 19 percent. This decline is attributable to numerous factors, most importantly the integrated land use and transportation strategies reflected in the proposed Plan that result in a land use development pattern that focuses growth into higher-density locations near transit services. This "focused growth" approach allows more efficient use of the existing transportation infrastructure. The integrated land use development pattern and transportation strategies are described in greater detail in Chapter 2, "Project Description."

Table 3.6-15: Analysis of Passenger Vehicle and Light Duty Truck CO_2 Emissions[1] Pursuant to SB 375

Year	Population	Modeled GHG Emissions ($MTCO_2$/ day)	Strategy EN09 Reductions relative to 2005 ($MTCO_2$/ day)	Emissions per Capita (kg CO_2)	Percent Reduction in Per Capita CO_2 Emissions Relative to 2005		
					Proposed Plan without Strategy EN09	Proposed Plan with Strategy EN09	Reduction Target Pursuant to SB 375 Target
2005	6,979,000	54,800	0	7.9	0	0	n/a
2035	9,167,000	62,600	-6,300	6.8	-13%	-22%	-19%

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding.

[1] Estimates calculated using EMFAC 2014, as per SB 375 protocol.

Source: Data compiled by MTC/ABAG 2021

As noted, per the requirements of SB 375, this analysis does not include emissions reductions associated with Pavley, LCFS standards, or any additional measures from the 2017 Scoping Plan, which are expected to further reduce CO_2 emissions and result in a decrease in total CO_2 emissions over time. Because the proposed Plan would reduce per capita passenger vehicle and light duty truck CO_2 emissions by over 19 percent by 2035 as compared to 2005 baseline, per the regional targets set by CARB pursuant to SB 375, there would be a less-than-significant impact (LTS).

Conclusion

Because implementation of the proposed Plan would reduce per capita passenger vehicle and light duty truck CO_2 emissions by over 19 percent by 2035 as compared to 2005 baseline, per the regional targets set by CARB pursuant to SB 375, there would be less-than-significant (LTS) impact. No mitigation measures are required.

Mitigation Measures

None required.

Impact GHG-3: Conflict with an applicable state plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases (PS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

As discussed under Impact GHG-1, implementation of the proposed Plan would result in a net reduction in GHG emissions from land use and transportation sources combined. As shown in Table 3.6-13, the net land use and transportation emissions under the Plan would be reduced by 9 percent from 2015 to 2030 and 9 percent from 2015 to 2050.

In order to determine whether the net land use and transportation emission reductions under the proposed Plan would conflict with implementation of state policies and plans, including statewide goals set by SB 32 and EO S-3-05 and the *2017 Scoping Plan*, the proposed Plan's reductions must be correlated to the statewide reduction of GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 by 2050, respectively. Based on the available data and assumptions described above under Method of Analysis, which include recommendations from CARB and BAAQMD for determining plan level significance of GHG emissions in relation to the State's goals, a reduction of 41 percent below 2015 levels by 2030 and 83 percent below 2015 levels would be needed for the proposed Plan to be consistent with the State's 2030 and 2050 target, respectively. See Appendix E for detailed quantification of this weighted target. As shown in **Table 3.6-13,** in 2015, land use and transportation accounted for nearly 48 $MMCO_2e$ in the Bay Area. Consequently, the proposed Plan would need to achieve a net reduction in land use and transportation emissions of 20 $MMTCO_2e$ from 2015 by 2030 and 40 $MMTCO_2e$ from 2015 by 2050 to be consistent with the State's 2030 and 2050 targets. As shown in **Table 3.6-15**, the proposed Plan would achieve an annual reduction of 2.0 $MMTCO_2e$ from 2015 land use and on-road transportation emissions by 2030 and 4.0 MMT CO_2e by 2050, which does not achieve the necessary reductions to be consistent with the State's targets. **Table 3.6-16**: below presents these calculations.

Table 3.6-16: Calculation of GHG Reduction and Targets from Land Use and Transportation relative to 1990 and 2015 levels

Year	Target Percent below 2015 Levels ($MTCO_2e$/year)	Historical and Targeted Bay Area Transportation and Land Use Emissions ($MTCO_2e$/year)	Reductions needed from 2015 ($MTCO_2e$/year)	Reductions from 2015 Proposed Plan ($MTCO_2e$/year)	Additional Reductions Needed ($MTCO_2e$/year)
2015	n/a	44,720,000[1]	n/a	n/a	n/a
2030	-41%[2]	26,385,000	-18,335,000	-2,020,000	-16,315,000
2050	-83%[3]	7,602,000	-37,118,000	-4,001,000	-33,117,000

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding. Emission estimates do not account for expected reductions from the implementation of strategies EN02, EN03, EN08, or EN09.

[1] Based on land use emissions from BAAQMD's 2017 Clean Air Plan (electricity consumption, building energy usage (e.g. natural gas, propane), and waste management emissions) and transportation estimates from MTC.

[2] Based on Reflects the SB 32 Target. See Appendix E for calculations of Plan-adjusted target.

[3] Reflects B-30-15 Target. See Appendix E for calculations of Plan-adjusted target.

Source: Data compiled by MTC/ABAG 2021

As discussed under GHG-2, the proposed Plan's 35 integrated strategies across the 4 elements—housing, the economy, transportation, and the environment— will enable the Bay Area to reduce forecasted per-capita GHG emissions from cars and light duty trucks as required under SB 375. However, since the inception of the 2017 Scoping Plan, CARB has acknowledged MPOs' meeting the 2018 revised GHG emissions reduction targets alone will not meet the emissions reductions necessary to meet state climate goals (CARB 2019). These goals are expected to be achieved, in large part, with additional State legislation and regulation. A 2018 CARB Progress Report noted that California has not yet been able to identify sufficient "system and structural changes to how we build and invest in communities that are needed to meet state climate goals." (CARB 2018). Importantly, this is not unique to the Bay Area; all MPOs in California are faced with the same challenge. Thus, without sufficient State legislation and regulation, attainment of state goals is extremely difficult. This would be a potentially significant (PS) impact.

Conclusion

The anticipated land use and transportation emissions under the Plan relative to the region's 2015 emissions may conflict with the State's GHG reduction plans under SB 32 and EO-S-3-05, as shown in Table 3.6-16. While MTC and ABAG have developed a set of land use and transportation strategies that exceed SB 375 goals for reducing emissions from cars and light duty trucks and place the Bay Area on a downward trajectory in net GHG emissions, CARB has identified that meeting SB 375 goals alone will not meet statewide goals under the Scoping Plan. Because the proposed Plan will not meet the target reductions of 41 percent below 2015 levels by 2030 and 83 percent below 2015 levels by 2050, it may conflict with an applicable plan, policy, or regulation adopted to reduce emissions of GHGs. This impact is considered **potentially significant (PS).** Mitigation Measure GHG-3 addresses this impact and is described below.

Mitigation Measures

- Implement Mitigation Measures TRA-2a and TRA-2b

Mitigation Measure GHG-3 Consistent with the recommendations in the 2017 Scoping Plan, implementing agencies and/or project sponsors shall implement the following, where feasible and necessary based on project- and site-specific considerations:

- CAP support programs: MTC and ABAG, in partnership with the BAAQMD, shall provide technical assistance to the counties and cities in the Bay Area to adopt qualified GHG reduction plans (e.g., CAPs). The CAPs can be regional or adopted by individual jurisdictions, so long as they meet the standards of a GHG reduction program as described in CEQA Guidelines Section 15183.5. At the regional level, the cumulative emissions reduction of individual CAPs within the region or a regional CAP should demonstrate an additional Bay Area-wide reduction of 33 $MMTCO_2e$ from land uses and on-road transportation compared with projected 2050 emissions levels already expected to be achieved by the Plan. (This is based on the 2015 Bay Area land use and on-road transportation emissions of 37 $MMTCO_2e$, the statewide GHG reduction target of 80 percent below 1990 levels by 2050, and a two percent increase in statewide emissions between 1990 and 2015). However, MTC and ABAG do not have jurisdiction over the adoption of CAPs by individual jurisdictions.

- Energy reduction incentive programs: These reductions can be achieved through a combination of programs supported by BayREN, which focus on energy reduction by homeowners, multifamily property owners, and businesses through energy retrofits of existing buildings. BayREN also supports other programs that help local jurisdictions reduce building energy use through improved design and construction standards, such as updated Title 24 energy standards, and including ZNE in new construction. These programs and other measures supported by MTC and ABAG may be included so long as the additional l 33 $MMTCO_2e$ reduction (by 2050) can be demonstrated. However, MTC and ABAG cannot require engagement in these programs. This target can be adjusted depending on the progress of statewide legislation or regulations in reducing statewide GHG emissions, so long as a trajectory to achieve this target in the Bay Area is maintained.

While many local jurisdictions in the region have released CAPs, the additional implementation of CAPs in the region would continue to help to reduce GHG emissions from the land use projects that would be constructed under the Plan, as well as reducing GHG emissions from existing uses. Energy reduction incentive programs, such as those supported by BayRen, would help with reduce GHG emissions from energy usage in existing and new structures in the region.

Significance after Mitigation

Implementation of CAPs or other supporting programs, including energy reduction incentive programs, would reduce GHG emissions. Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions.

However, there is no assurance that this level of mitigation would achieve the regional reductions needed to attain the statewide 2030 and 2050 targets. Additional regulatory action that results in substantial GHG reductions throughout all sectors of the State economy and based on State-adopted regulations would likely be needed to attain such goals, and they are beyond the feasible reach of MTC and ABAG and local jurisdictions. Moreover, MTC and ABAG cannot require local implementing agencies to adopt the above mitigation measure, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Even with full implementation of the mitigation measure, forecasted emissions would not be reduced to target levels under SB 32 and EO-S-3-05. Therefore, this impact would be **significant and unavoidable (SU)**.

Impact GHG-4: Conflict with an applicable local plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases (LTS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

The proposed Plan's forecasted growth pattern is not expected to conflict with any climate action plans and General Plans of cities and counties located in the proposed Plan area, or with any local regulations adopted with the intent to reduce GHG emissions. The Regulatory Setting, above, describes the plans, policies, and regulations relevant to the proposed Plan that are related to the reduction of GHG emissions.

Local CAPs or GHG reduction plans are adopted by local jurisdictions to comply with the goals set for local governments in CARB's Scoping Plan and are therefore designed to support the same State-mandated goals and targets for GHG reduction outlined above. It is ultimately local jurisdictions that determine whether land use development projects are consistent with local plans and policies. MTC and ABAG do not have jurisdiction over land use development projects approval within the region.

The proposed Plan does not address all the potential reduction measures, goals, and GHG targets that are identified in local CAPs, general plans, and other plans that address climate change; local jurisdictions set targets based on state, regional, or local conditions. Further, not all plans will have the same reduction goals and implementation measures because they account for various local factors and considerations (see **Table 3.6-6** in the Regulatory Setting for a list of local jurisdictions with GHG inventories and adopted CAPs). The proposed Plan identifies land use strategies that lead to a focused growth land use development pattern and transportation strategies that will make the regional system more efficient, resulting in reductions to per capita and overall GHG emissions. However, some variations may exist on the local level. For instance, the proposed Plan's focused growth pattern may not support an individual jurisdiction's efforts to meet its GHG target because the proposed Plan's growth patterns may not constrain growth in that particular jurisdiction. While some variations may exist between the proposed Plan and specific local CAPs, these variations would need to be assessed at the local level. In addition, the proposed Plan is not binding; it does not constrain a local jurisdiction from exercising Its discretion to make different land use decisions. In general, it is expected that local CAPs and the proposed Plan would be complementary efforts towards the reduction of GHG emissions in line with State goals and mandates.

Conclusion

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the proposed Plan is not expected to conflict with local climate action or GHG reduction plans, and the impact is considered to be **less than significant (LTS)**. No mitigation is required.

Mitigation Measures

None required.

Impact EN-1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation (LTS)

Land Use Impacts

As explained in Section 2, "Project Description," the proposed Plan integrates 35 strategies to accommodate projected household and employment growth in the nine-county Plan area. As shown in **Table 2-3**, the proposed Plan's 35 integrated strategies would result in 88 percent of forecasted new housing units (2015 to 2050) to be built as multi-family units compared to single-family homes. This distinction is important because the levels of energy consumption associated with both the construction and operation of multi-family units is generally less than for single-family homes. The average multi-family unit has a lower floor-to-area ratio resulting in less ground disturbance during construction and is designed to house more inhabitants per unit of floor area. With fewer exterior walls and more interior walls shared by multiple units, the space heating and cooling of multi-family units is generally more energy efficient than single-family homes.

The proposed Plan serves as a comprehensive set of strategies to accommodate forecasted regional growth. The strategies would result in an increase in the building of multi-family units compared to single-family residential dwelling units, as described above. Therefore, as compared to existing conditions, wherein current land use trends remain consistent with existing general plans, per capita energy consumption associated with the proposed Plan would be lower due to the increased energy efficiency on a per capita basis of multi-family housing. While total energy consumption is projected to increase for both multi-family and single-family housing types, this projected increase is the result of accommodating the region's forecasted 1.4 million new household and 1.4 million new jobs through 2050 as shown in **Table 2-1** in Chapter 2, "Project Description." As summarized in Table 2-4 in Chapter 2, "Project Description," the region is projected to accommodate this level of new households with a regional trend towards multi-family housing. Therefore, although overall energy consumption in the region is forecasted to increase, per capita energy consumption is expected to decrease due to the proposed Plan's strategies which result in a more compact land use development pattern. For further information, of reduced emissions from land use strategies in the proposed Plan, see **Table 3.6-11**.

Additionally, Strategy EN02, "Provide Means-Based Financial Support to Retrofit Existing Residential Buildings" would result in building ordinances and building retrofits to meet higher energy standards, among other things. Similarly, Strategy EN03, "Fund Energy Upgrades to Enable Carbon Neutrality in All Existing Commercial and Public Buildings" would support the electrification and resilient power system upgrades leading to lower building emissions. EN02 and EN03 would result in decreased energy demand region-wide but, as stated previously, were not estimated in the energy demand presented in Table 3.6-8. Therefore, it is foreseeable that implementation of EN02 and EN03 would result in less energy consumption than what has been estimated for this analysis, and would further increase the energy efficiency of the proposed Plan.

In addition, as described in Section 3.6.2, "Regulatory Setting," it is assumed that future construction and operation of residential and non-residential buildings would be more energy efficient than the current 2019 California Energy Code as the standards are periodically updated on an approximate

three-year cycle to accommodate technological improvements in efficiency. To assist the state in meeting the renewable resource targets mandated by SB 100, future versions of the California Building Code are anticipated to become not only more energy efficient, but allow less on-site natural gas usage, also known as decarbonization pursuant to the findings of the 2018 IEPR and CPUC's Rule Making 19-01-011, which entails implementing SB 1477 (summarized in Section 3.6.2, "Regulatory Setting,") and establishing a building decarbonization policy framework.

Implement of the proposed Plan's land use development pattern would also require the consumption of gasoline and diesel fuel associated with worker commute, material movement, and excavation trips and operation of heavy-duty equipment. The total amount of gasoline and diesel fuel that would be required to complete construction of the land use development projects is unknown at this time due the uncertainty surrounding the magnitude, timing, distance of haul route and worker commute trips, type of heavy-duty equipment used, and level of project-level mitigation that could be applied. While construction of the land use types under the proposed Plan would result in gasoline and diesel fuel consumption, this level would be considered necessary to provide adequate housing and commercial, retail, and industrial land use to accommodate the projected increasing in population, housing, and employment that the Plan area would realize by 2050. Thus, this use of energy would not be considered inefficient, unnecessary, or wasteful. For these reasons, this would be a less-than-significant (LTS) impact.

Sea-Level Rise Adaptation Impacts

Energy would be consumed during the construction of sea-level rise adaptation infrastructure. Gasoline would be consumed from worker commute trips, and diesel fuel would be consumed from the movement of haul trucks to and from project sites and use of heavy-duty construction equipment. The exact amount of gasoline and diesel fuel use is unknown at this time to the magnitude, timing, and the type of heavy-duty construction equipment used. This consumption would be inherently short-term and would facilitate the construction of adaptation infrastructure that would improve the resiliency of the Plan area to rising sea levels. Moreover, energy-related infrastructure could be located in areas that are vulnerable to sea-level rise; therefore, the adaptation infrastructure would improve the resiliency of electrical and natural gas infrastructure (see Impact PUF-1 in Section 3.14, "Public Utilities and Facilities").

Sea level rise has been identified as a major secondary climate change impact that will greatly affect the San Francisco Bay Area. Sea level has risen approximately 20 centimeters over the last 100 years, and depending on future GHG emissions scenarios, sea level along the California coast would rise by 0.74 to 1.37 meters by 2100 (OPR et al. 2018). Thus, while energy would be consumed in the form of gasoline and diesel fuel for construction of sea-level rise and resiliency projects, this consumption would be necessary to bolster the resiliency of the Plan area to future inundation by rising rides. Thus, because this energy consumption would not be considered unnecessary, the energy associated with sea-level rise and resiliency projects would be less than significant (LTS).

Transportation System Impacts

The proposed Plan is designed to increase the efficiency of transportation in the region by reducing per capita VMT in passenger vehicles and light-duty trucks. Thus, the proposed Plan inherently increases the energy efficiency of mobility in the region. As shown in **Table 3.6-9**, implementation of the proposed Plan would result in a decrease in gasoline consumption and an increase in diesel consumption per year. The decrease in gasoline consumption is also attributable to increasing fuel efficiency standards on passenger vehicles and light-duty trucks. The projected increase in diesel consumption is attributable to a projected increase in the level of VMT by diesel-powered heavy trucks in the region. Accounting for the fact that the energy-content of diesel is approximately 15 percent greater than gasoline, implementation of the proposed Plan would result in reduced consumption of automotive fuel by 272.8 trillion BTU. Much of this decrease in gasoline and diesel

consumption would be due to the improved energy efficiency of passenger vehicles from more stringent emission and fuel efficiency standards established by CARB. As described in the methodology, recent state legislation that could not be accounted for in modeling is expected to provide additional reductions to these values.

Notably, Table 3.6-9 does not account for implementation of strategies EN08 or EN09, which would result in an additional reduction in the consumption of gasoline and diesel fuel from passenger cars. It is foreseeable, then, that the reductions identified in Table 3.6-9 underrepresent the actual fuel reductions that would be achieved in 2050 through implementation of the Proposed Plan and its associated strategies. Therefore, this is a less-than-significant (LTS) impact.

Conclusion

Construction and operation of the proposed Plan's land use development pattern, sea-level rise adaptation infrastructure, and transportation projects would not result in the wasteful, unnecessary, or inefficient use of energy because the energy associated with these projects would be serving necessary regional needs, would be subject to Plan strategies that result in increased efficiency, and would comply with applicable regulations and standards (e.g., RPS, California Energy Code). Therefore, energy impacts would be **less-than-significant (LTS).** No mitigation is required.

Mitigation Measures

None required.

Impact EN-2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (LTS)

Land Use Impacts

Implementation of the proposed Plan's forecasted development pattern would not conflict with or obstruct a state or local plan for increasing renewable energy or energy efficiency. The proposed Plan would result in development or redevelopment to accommodate the regional growth forecast of households and jobs, thereby increasing the demand for electricity and natural gas; however, as discussed in Chapter 2, "Project Description," the proposed Plan's land use strategies are directed at reducing automobile use through construction of compact and mixed-use development in areas that offer transportation choices such as walking, biking, and transit. Implementation of the proposed land uses pattern developed for the proposed Plan would also be subject to the GHG reduction policies of a CAP, where applicable. At the time of writing this Draft EIR, many cities and counties in the region have CAPs, GHG Reduction Plans, or Sustainability Plans that include policies to increase the use of renewable energy throughout the region. The proposed Plan's forecasted land use development pattern would not conflict with the applicability of the policies of a local or regional CAP or any other plan that serves to reduce GHG emissions or energy consumption to future development within the Plan area. The projected land uses would also be subject to the most recent iteration of the California Energy Code, which requires that single-family residential development include solar photovoltaics. Land use development projects would also be required to adhere to future iterations of the California Energy Code which is updated on a triennial basis (once every three years) and is expected to become increasingly more stringent over time to further the State's renewable energy and GHG reduction goals as stated in the 2018 IEPR (discussed above under Impact EN-1), which is a state plan that focused on improving the energy efficiency of the state. Therefore, this would be a less-than-significant (LTS) impact.

Sea Level Rise Adaptation Impacts

Sea level rise adaptation infrastructure would require the use of energy during construction phasing, as discussed in greater detail above under Impact EN-1. State and local plans that target increasing energy sourced from renewables and/or improving energy efficiency target operational energy

consumption. Operation of sea-level rise adaptation infrastructure would not have a large operational energy budget, if any. Thus, the need for renewable energy would not be required. This would be a less-than-significant (LTS) impact.

Transportation System Impacts

The proposed Plan would reduce dependence on petroleum products and increase reliance on renewable energy. For example, the proposed Plan's strategies would result in the automobile mode share to decrease as a share of all trips, and instead shifting to more sustainable active transportation modes. Strategy EN08, "Expand Clean Vehicle Initiatives" would expand investments in clean vehicles and relocate energy derived from petroleum combustion to the electricity grid, which, as discussed in 3.6.1, "Regulatory Setting," would be sourced by a greater portion of renewable energy as a result of SB 100 and the RPS. While VMT would ultimately go up by 2050, statewide regulatory mechanisms, such as the ZEV Action Plan, SB 100, and RPS would minimize the amount of fuel consumed from passenger vehicles as the transportation system is electrified and the energy sector becomes increasingly more renewable. Transportation projects developed for the proposed Plan would not conflict with the implementation of the aforementioned regulations and statewide plans.

City and county policies derived from general plans, CAPs, or any other a plan that seeks to reduce GHG emissions would apply to transportation infrastructure in the Plan area. It is common practice for CAPs to develop local measures to reduce gasoline and diesel fuel consumption which directly results in decreased emissions of GHGs. Implementation of the proposed transportation system improvements would not interfere or conflict with any local or regional plan that serves to reduce gasoline and diesel consumption. For example, CAP policies that seek to improve the region's EV infrastructure would continue to apply with implementation of the proposed Plan. Therefore, this would be a less-than-significant (LTS) impact.

Conclusion

Implementation of the proposed Plan itself would result in the densification of land use, increased energy efficiency from residential uses, and a net reduction in the consumption of automotive fuel and would increase reliance on renewable energy sources. Therefore, this impact would be **less than significant (LTS)**. No mitigation is required.

Mitigation Measures

None required.

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3.7 CULTURAL RESOURCES AND TRIBAL CULTURAL RESOURCES

This section evaluates the potential cultural resource impacts resulting from the implementation of the proposed Plan. Cultural resources generally are the material remains of human activity identified with either the prehistoric inhabitants of the area (any time before the arrival of the Spanish in the latter half of the 18th century) or with the historic inhabitants. The historic period begins with the arrival of the Spanish.

Cultural resources in the Bay Area reflect centuries of human settlement in the region and document the changing character of economic, social, and spiritual activities. They include prehistoric resources, historic-period resources, and tribal cultural resources (the latter as defined by Assembly Bill (AB) 52, Statutes of 2014, in PRC Section 21074), as well as sensitive locations where resources are likely to be identified in the future based on our existing knowledge of historic and prehistoric settlement patterns. Archaeological resources are locations where human activity has measurably altered the earth or left deposits of prehistoric or historic-era physical remains (e.g., stone tools, bottles, former roads, house foundations). Historical (or built-environment) resources include standing buildings (e.g., houses, barns, outbuildings, cabins) and intact structures (e.g., dams, bridges, roads, districts), or landscapes. Tribal cultural resources generally are sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a tribe.

Comments received in response to the Notice of Preparation included regulation information related to the CFR 23 CFR Section 450.316 (which do not apply because there is no federal involvement with the proposed Plan to trigger those requirements), preservation of cultural features (however, the comment was related to the arts, drama, theater, movies, and restaurants, which are not cultural resources under CEQA), and tribal consultation and the requirements of AB 52. Tribal consultation under AB 52 is described below.

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important" (CEQA Guidelines Section 15083). Neither the CEQA Guidelines nor Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.7.1 Environmental Setting

This section summarizes both historic and prehistoric resources and identifies the types of geographic areas within the Plan area that may contain cultural resources.

PREHISTORIC RESOURCES AND ETHNOGRAPHY

Prehistoric cultural resources are composed of Native American structures or sites of historical or archaeological interest. These may include districts, objects, landscape elements, sites, or features that reflect human occupations of the region, such as villages and burial grounds.

The moderate climate, combined with the abundant natural resources found throughout the nine-county region, has supported human habitation for several thousand years Before Present (BP). Some theories suggest that the prehistoric bay and river margins were inhabited as early as 10,000 years ago. Rising sea levels, the formation of the San Francisco Bay, and the resulting filling of inland valleys have covered these early sites, which were most likely located along the then existing bay shore and waterways. Existing evidence indicates the presence of many village sites from at least 5,000 years BP in the region. The arrival of Native Americans into the Bay Area is associated with documented cultural resources from circa 5,500 BP (U.S. Department of the Interior 1990).

Six different groups of Native population, identified by their language, lived within the Bay Area: Ohlone (Alameda, Contra Costa, San Francisco, San Mateo, Santa Clara, and Solano Counties), Bay Miwok (Contra Costa County), Patwin (Napa and Solano Counties), Coast Miwok (Marin and Sonoma Counties), Pomo (Sonoma County), and Wappo (Napa County). These native populations periodically increased between 5,000 BP and the arrival of the Spanish in the late 18th century. Native villages and campsites were inhabited on a temporary basis and are found in several ecological niches because of the seasonal nature of their subsistence base.

By 1,000 BP, population densities had grown to the point where less favorable environmental settings were being used for habitation. Traditional tribal territorial boundaries thus usually overlap; this is particularly the case in the South Bay. Groups competed for hunting grounds, seed and acorn gathering areas, and other areas necessary to a hunting-and-gathering culture. Remains of these early peoples indicate that main villages, seldom more than 1,000 residents, were usually established along water courses and drainages. Remains of satellite villages have been found in areas used for the procurement of food or other resources. By the late 1760s, about 300,000 Native Americans lived in California (San Francisco Estuary Partnership 2016).

Ohlone

The Ohlone languages belong to the Utian family of the Penutian language stock and were spoken in a large area extending from the San Francisco Bay Area southward along the coast to Point Sur and inland to the Diablo Range and portions of the northern San Joaquin Valley. The basic Ohlone political unit was the “tribelet,” an autonomous, self-governing, territorially defined unit over which recognized authority was given to one person, in most instances the leader or chief. Each tribelet was composed of one or more villages and a number of camps within its recognized and protected resource exploitation zone. Because of geographic barriers and distance between Ohlone tribelets, however, the integration of smaller political units into larger ones was the exception rather than the rule among the Ohlone (Pacific Legacy 2016).

The Ohlone were hunter-gatherers who occupied semipermanent camps and villages from which they could take advantage of seasonal changes in resource availability. Dwellings at these habitation sites were dome-shaped, with pole frameworks and thatch for roof and walls. Other structures that could be found in an Ohlone village included acorn granaries; sweat houses for the men, often located along streambanks; menstrual houses for women; and dance houses and assembly houses, generally located in the center of a village. The Ohlone people had a diverse diet. The single most important food item among the Ohlone was the acorn, at least four species of which were collected and processed into meal or flour. Birds and small mammals were hunted, clubbed, trapped, and snared. Fish were also hooked or caught by hand. Shellfish provided an important seasonal food resource (Pacific Legacy 2016).

Regional interaction among the Ohlone, and with neighboring cultures, such as the Salinan and Yokuts, took place through trade, ceremonies, warfare, and intermarriage. Shell beads were widely used by the

Ohlone as a form of currency in exchanges. Olivella shells, mussels, abalone shells, salt, dried abalone, woven baskets, and other items were traded for prized goods with nearby villages and with more distant villages located in dissimilar environmental zones. Among the items received by the Ohlone in such transactions were stores of the prized piñon nut and obsidian for tool-making (Pacific Legacy 2016).

The Spanish colonization of the region was accomplished through the introduction of the Hispanic mission system. Starting with Mission San Carlos and the Presidio of Monterey in 1770, several other missions were established over the next 30 years, each exerting their influence over the native people of the Plan area. The subjugation of the native people resulted in dramatic environmental changes after they could no longer influence the native landscape, while poor nutrition and repeated exposure to introduced European diseases and violence served to decimate the Ohlone. Ultimately, the people affiliated with the Plan area were dispersed among other tribesmen at Missions Santa Clara, San Juan Bautista, and Santa Cruz. Nonetheless, many survived, and their descendants continue to live in the region (Midpeninsula Regional Open Space District 2014).

Bay Miwok

The Bay Miwok are known to have occupied the interior valleys of the East Bay, perhaps extending as far as the shoreline in the vicinity of present–day East Oakland, at least since 300 A.D., though their presence may date back as far as 2500 B.C. Although mutually unintelligible, the Ohlone, Bay Miwok, and Coast Miwok languages all derive from Utian stock. Like other west–central California Native American groups, the Bay Miwok were organized into autonomous territorial political groups. Each territorial group was a community of interrelated families; the size of most tribelet populations ranged between 200 and 400 people. The small villages were generally located near sources of fresh water, such as creeks and springs, though they were also found on alluvial flats and along the first set of ridges between valleys and mountain ranges.

The Bay Miwok subsisted on the bountiful natural food resources that characterized the Bay Area. Staples of their diet included fish (principally salmon), shellfish, waterfowl, tule elk, and acorns. Acorns were pounded by mortar and pestle to form a mush that was often flavored with berries. Men contributed to the food supply by fishing and hunting for game. Larger animals were hunted with bows and obsidian-tipped arrows, and traps and snares were set for smaller mammals, such as rabbits. The Bay Miwok fished from creeks using nets and/or basket traps deployed from small rafts constructed of tule rushes, propelled by double–bladed paddles.

The Bay Miwok utilized local rock and mineral sources to manufacture cutting, scraping and other tools and local sandstone for grinding and pounding tools. Cinnabar and hematite could be used to barter with noncoastal groups for more exotic materials, such as obsidian. Animal remains were also particularly useful. In addition to the use of pelts and feathers for clothing and bedding, sinew was used for bow strings, and teeth, bones, claws, and beaks were employed as tools, including awls, pins, daggers, scrapers, and knives. Feathers, bones, and shells were used in a wide variety of personal ornamentation.

Infiltration of Europeans into the Bay Area rapidly led to the decimation of the Bay Miwok people. They were forced into servitude on the Spanish missions and large “rancherias” in northern Alameda and Contra Costa Counties. Disease and overwork, as well as conflicts with other tribal groups, led to their decline. By the beginning of the American historical period (1848), the Bay Miwok had ceased to exist as an ethnic or linguistic entity (Contra Costa County 2009:4.D-3).

Patwin

The Patwin are Wintuan speakers. The Wintuan language is part of the larger Penutian language family, which also includes Miwok, Maidu, Ohlone, and Yokuts. The Patwin were organized into tribelets consisting of a primary village and several smaller associated villages. Numerous ethnographic village locations were reported for the Patwin; villages were located along the Sacramento River and all major drainages that drain the eastern and southern slopes of the Coast Ranges, including Putah, Ulatis, and Suisun Creeks. Permanent houses, typically of the semisubterranean type, usually sheltered more than one household, each occupying different sides of the dwelling. Temporary shelters were often seasonally occupied when families were away from the permanent winter village. These temporary shelters, primarily used for protection against the summer sun and infrequent rains, consisted of a brush-covered shed, four corner posts, and a flat roof.

A variety of animals were taken by the Patwin, including deer, pronghorn, elk, rabbit, and various species of fish and birds. Deer, ducks, geese, quail, and mud hen were caught in various nets. Fish species taken included chub, salmon, sturgeon, hardhead, and trout. Steelhead were also taken with nets. Decoys were used to hunt ducks and deer; deer head decoys were worn by hunters to approach or attract their prey. Other animals, including most raptors and carnivores, were hunted for their feathers or pelts, which were used for ceremonial or utilitarian purposes. Seasonal vernal pools, a common feature in the southern half of Solano County, were likely part of an early spring subsistence strategy when other food sources were scarce. Lithic debitage, manos, millingstones, pestles used with wooden mortars, hammerstones, and mortars that have been identified at prehistoric sites near vernal pools suggest Patwin resource exploitation.

In the late 18th and early 19th centuries, Spanish missionaries, and European and American trappers and explorers, entered northern California. Spanish emissaries from Missions San Francisco de Asis, San Francisco Solano, and San Jose actively proselytized the Patwin people. The earliest historic records, beginning around 1800, consist of Spanish mission registers of baptisms, marriages, and deaths of Indian neophytes. During the 1830s and 1840s, the Patwin territory was taken over by Mexicans and Americans. By the 1860s, the few Patwin who had survived almost 100 years of epidemics and conflict with the Spanish, Mexican, and Euro-Americans either worked as laborers for ranches or were placed on small reservations established by the United States government.

Mission records provided tribelet names and locations. The Malacas lived east of today's Fairfield, on the plains of the north side of Suisun Bay. They had close ties with the Suisuns, who also resided in the vicinity of Fairfield. The Malacas moved to Mission Dolores from 1810 until 1816, at the same time as the Suisuns, and the Malacas may have been assumed to be Suisuns. The Tolenas, who lived in Green Valley north of the Suisun Plain, moved to Mission Dolores from 1815 until 1820. Nineteen Tolenas also moved to Mission San Jose. The Ululato, who lived in the vicinity of today's Vacaville, moved to Mission Dolores from 1815 until 1822, then to Mission San Francisco Solano from 1824 to 1833 (Solano County 2008:4.10-4 through 4.10-6).

Coast Miwok

Before the arrival of Europeans to the San Francisco Bay Area, Coast Miwok territory included the entire Marin Peninsula and stretched as far north as Duncan's Point and as far east as Sonoma. Linguistically, Miwok is one of the Penutian languages. Precontact population estimates for the Coast Miwok suggest that population density was low, with perhaps as few as 2,000 people living in the entire area. The settlement patterns of the Coast Miwok, similar to other native groups in the region, were largely dictated by the seasonal availability of important food resources. During the warmer summer months, villages were occupied along rivers, estuaries, and the coast. Winter villages were often located further inland and contained semi-permanent structures and food storage facilities.

The Coast Miwok created a diverse array of material culture. Because pottery was not used by most native Californians, basketry was of particular importance and served a number of purposes, including cooking, serving, parching, carrying, and storage. Although baskets were primarily utilitarian in nature, some were multicolored and sported feather and shell ornaments. Lupine roots were used to make cordage for nets, and wooden objects included foot drums and paddles for use with the tule balsa, an important watercraft. Weaponry consisted of the bow and arrow, as well as the sling and a bola for hunting waterfowl. Arrow points were typically made from obsidian, although chert was used to make different types of flaked stone tools. Other types of stone were used as mortars and pestles. Shell was another important material, particularly abalone, commonly used for ornamentation.

The first contact between Coast Miwok and Europeans occurred over 400 years ago, presumably in 1579 when Sir Francis Drake made landfall somewhere in Coast Miwok territory. Drake remained in the area for 6 weeks marked by a number of amicable interactions with the local people. Sixteen years later, Sebastian Cermeño landed in what is today known as Drakes Bay. His galleon, the *San Agustin*, was wrecked by a storm, forcing Cermeño and his men to make the return trip to Acapulco by launch. Even before they left, however, the Coast Miwok began salvaging items from the larger vessel, and the Chinese porcelains and metal objects they recovered have been noted in archaeological assemblages from throughout the area (Marin County 2011:218).

Pomo

Groups speaking two closely related Pomoan languages, Southwestern Pomo and Southern Pomo, held most of the area that was to become Sonoma County. The Southwestern Pomo (Kashia/Kashaya) occupied about 30 miles of the northwestern Sonoma County coast, extending inland up to 13 miles. This territory consisted primarily of rocky coastline and unbroken redwood forest. Shellfish, sea mammals, and salmon were major resources. Village sites were situated along the coast and on inland ridges. The principle village was located near Fort Ross, where the main residences of the headmen and women were located. Other large principle villages and smaller subsidiary villages supported an estimated 1,500 people. During the summer, the communities moved to the coast, where they gathered abalone, mussels, fish, and marine mammals, as well as sea plants and sea salt. In the late fall, they journeyed back inland to sheltered village locations. Kashia basketry is a ritual art and incorporates stone, bone, shell, horn, fibers, and feathers in unique designs.

The history of the Kashia differs from that of other Pomo-speaking tribes in that their first direct contact with nonnative peoples was not with Spaniards, Mexicans, or Euro-Americans but rather with Russians. The Russian colony at Fort Ross operated from 1812 to 1842, and as a result many Kashia Pomo escaped missionization. When the Russians left, Mexican and Euro-Americans began to settle the coast and forced changes to the Kashia's traditional way of life. Beginning in the 1870s, they lived in three villages, two of which were located on property owned by Charles Haupt, who was married to a Kashia woman. In 1914, Haupt petitioned the U.S. government on behalf of the Kashia for a 40-acre parcel near Stewarts Point.

The Southern Pomo territory spanned an area from the coastal town of Gualala, east to Cloverdale, and south toward Healdsburg, Santa Rosa, and Sebastopol. Three tribal units of the Southern Pomo occupied the region: the Kataictemi, the Konhomtara, and the Bitakomtara. The Southern Pomo were hunter-gatherers who lived in rich environments that allowed for dense populations with complex social structures. They settled in large, permanent villages about which were distributed seasonal camps and task-specific sites. Primary village sites were occupied continually throughout the year, and other sites were visited to procure particular resources that were especially abundant or available only during certain seasons. Sites often were near freshwater sources and in ecotones where plant life and animal life were diverse and abundant (Sonoma County 2006:4.10-2; 2008:3.6-2; 2010:4.8-3).

Wappo

Wappo is a dialect of the Yukian language, which also includes Yuki, Coast Yuki, and Huchnom. Wappo is the name given to Wappo-speaking people by the Spanish. Wappo is derived from the Spanish word "guapo," which may be translated as brave or handsome. The Spanish considered Wappo to be brave because of their resistance to Euro-American incursion in Napa Valley during the 18th and 19th centuries. Wappo dialects were spoken in a territory that consisted of two divisions. The smaller division existed in a 5-square-mile territory south of Clear Lake. The larger division extended from just north of Napa and Sonoma in the south to Cloverdale and Middletown in the north.

Mission records reveal that Wappo unsuccessfully battled the Spanish; Wappo from villages at Canijolmano, Caymus, Chemoco, Huiluc, Locnoma, Mayacama, and Napa were brought to the mission at Sonoma between 1823 and 1834 to be used for labor. In 1854, the Wappo of the Russian River Valley, whose population likely included Wappo from territories within Napa County, were moved to a reservation in Mendocino. The population of Wappo in Napa Valley in 1855 is estimated to be 500. By 1856, nearly half the Wappo moved to Mendocino had died. The reservation was closed in 1867.

The acorn was the primary plant food, along with a variety of roots, bulbs, grasses, and other plant resources. Deer, elk, and antelope were the primary animal resources, but smaller mammals, such as rabbits, squirrels, and birds, were also important. Fish supplemented the diet but may not have been as important as terrestrial animals, which were abundant in the grassy valleys. Wappo used stone in almost every aspect of their lives. Napa Glass Mountain, a regionally important obsidian site and quarry, and other local obsidian sources are located within Wappo territory. Other major obsidian sources are near Wappo territory (i.e., Borax Lake, Mount Konocti, and Annadel). Obsidian was used for projectile points, knives, scrapers, drills, and many other tool types. It was a valuable commodity in regional trade networks and provided Wappo with a resource that could be traded for a variety of resources. Chert, found naturally throughout the north Coast Ranges, was also used for a wide range of tools, including projectile points, knives, scrapers, and cobble tools. Basalt was also used for tool manufacture, but it was not the preferred material. Bone tools were also used for awls, needles, whistles, and perforators. Wappo traded with their neighbors for a variety of goods, such as marine shells, fish, and salt (Napa County 2007:4.12-4).

HISTORICAL RESOURCES

Historical resources are standing structures of historic or aesthetic significance. Architectural sites dating from the Spanish Period (1529–1822) through the late 1960s are generally considered for protection if they are determined to be historically or architecturally significant. These may include missions, historic ranch lands, and structures from the Gold Rush and the region's early industrial era. More recent architectural sites may also be considered for protection if they could gain historic significance in the future.

The arrival of the Spanish and the development of the mission system in the latter half of the 18th century permanently disrupted the indigenous societies flourishing in the area. Native American settlements were abandoned and replaced with agricultural land, housing, and military support for the missions. The San Francisco Mission (Mission San Francisco de Asisi or Mission Dolores) and the Presidio (Yerba Buena) were founded in 1776. Both the Mission Santa Clara and the Pueblo de San José de Guadalupe were founded in 1777 in Santa Clara County.

After the Mexican revolt against Spain in 1822, California lands came under Mexican rule, and large tracts of land, including the former missions, were granted to individual owners. It was during the

Mexican era that most of the historic ranchlands and associated living quarters and operational structures originate.

Mexico ceded control of California to the United States at the end of the Mexican-American War (1846–1848), and the discovery of gold in the late 1840s brought thousands of prospectors and settlers into California. The Bay Area became the gateway to the gold of the Sierra Nevada, with rapid growth occurring in several of the region's fledgling cities, focusing in San Francisco as a shipping and financial center. Today, the structures and sites from this Gold Rush period are often considered to be of historic significance.

An era of increased agricultural production followed the Gold Rush, with much of the region's inland valley natural grasslands plowed for wheat, orchard, and vegetable cultivation. Construction of levees in the Sacramento–San Joaquin Delta reclaimed wetland areas for field crops and orchards, and lumbering, begun during the Gold Rush to supply mining operations, continued to supply a growing population. The expansion of the Transcontinental Railroad in San Francisco in 1888 assured the Bay Area's continued prominence as an economic and population center for the West in general and for California.

In the early 1900s, the Bay Area's economic base continued to grow and diversify, with a maritime industry developing around the bay and manufacturing, trade, and the lumber industry aiding in the growth and development of the region. Urban areas continued to grow in accordance with transportation corridors. The rail lines of the early 1900s supported new development along their routes, with residential and commercial centers at their stops. The arrival of the automobile and roadway construction allowed population and economic centers to develop in more dispersed patterns throughout the region. Cultural resources from this manufacturing era include sites and structures associated with industrial development (i.e., railroad and maritime industries) and with prominent citizens of the time.

Alameda County

Spanish settlement occurred in the 18th century when Juan Bautista de Anza led an expedition of the area. Spanish settlers later constructed Mission San Jose, which is located in present-day Fremont. Mexico gained control of the area after it achieved independence from Spain. As a result of the Mexican-American War, the area became a part of the United States in 1848, and in 1853 the boundaries of Alameda County were formed. The Gold Rush and the various economic opportunities that resulted from it brought Dutch, Anglo, and Portuguese immigrants in the mid-19th century. The unincorporated areas of Alameda County remained largely rural until the post-World War II period, when the communities of Ashland, Castro Valley, Cherryland, Fairview, Hillcrest Knolls, and San Lorenzo were transformed into suburban bedroom communities to accommodate population growth arising from the "baby boom" and influx of people to the area seeking work (Alameda County 2016).

Contra Costa County

Settlement by nonnative Americans did not begin until after the Mexican government began awarding land grants to prominent Mexican citizens in the late 1820s. Contra Costa County was one of the original 27 California counties when California became a state in 1850. Its boundaries included what is now Alameda County until 1852.

Until the 1960s, Contra Costa County's population was greatest along the shorelines of San Francisco and Suisun Bays, with shipping ports and rail lines creating jobs and the need for housing. In the valleys of central Contra Costa County, farming and ranching dominated the landscape and economy.

After World War II, residential commuter suburbs began to expand. In the past 45 years, Walnut Creek, Concord, and San Ramon have become major business and retail centers called "edge cities." The population of central and east Contra Costa County has nearly doubled since 1970 (Cerny 2007:339).

Marin County

Marin was not settled by the Spanish until 1817, when Mission San Francisco de Asis built Mission San Rafael Archangel, a hospital mission and refuge. With the exception of the areas along the coast, which were reserved for the military, today's Marin County belonged to Mission San Rafael. Beginning in 1834, the mission lands were subdivided into 21 Mexican ranchos.

When California became a state in 1850, Marin was divided into the townships of Sausalito, Bolinas, Novato, and San Rafael. Ranching and lumber were the foundations of Marin's early economy. John Reed built a sawmill in Mill Valley by 1834 and James Ross logged the area until his death in 1862. Logging on the west side of Mount Tamalpais began in 1851, and the Bolinas Wharf was established to provide berthing for the sloops that would carry the lumber to San Francisco.

The first railroad to operate in Marin County was the San Rafael & San Quentin Railroad in 1870; the second was the North Pacific Coast Railroad, which began operation in 1875 and ran from Sausalito to Tomales. The North Pacific Coast Railroad eventually expanded up to Duncan Mills on the Russian River, over to San Anselmo, and down to San Francisco. The railroad eventually became the Northwestern Pacific.

The Golden Gate Bridge was opened in 1937; however, the commuter suburbs did not grow until after World War II. After the filling and draining of the creeks and marshes on either side of U.S. Highway 101, the commercial developments began to appear along the highway in the 1950s, replacing the dairy ranching in the area (Cerny 2007:459–461).

Napa County

The first non-Spanish settler in the Napa Valley area was George Calvert Yount. A North Carolina native, Yount was hired in 1833 to repair the buildings at the San Rafael and Sonoma missions and to complete carpentry work for Mexican General Mariano Vallejo. Yount became a Mexican citizen and was subsequently awarded Rancho Caymus in 1836 and Rancho La Jota on Howell Mountain in 1843, comprising 11,814 and 4,454 acres, respectively, where his business enterprises included a flour mill and sawmills.

Rancho Caymus, located in central Napa Valley in Wappo territory, included the northern fringe of the town of Yountville, which was named after Yount. The 8,865-acre Mexican land grant was awarded in 1841 by Governor pro-tem Manual Jimeno to Cayetano Juárez. Juárez was a California native and had served in the military under General Mariano Vallejo between 1828 and 1836. He was appointed mayordomo at Sonoma in 1836 and was elected alcalde of Sonoma in 1845. An adobe house built by Juárez circa 1847, now operated as a restaurant, stands today at the junction of Soscol Avenue and Silverado Trail.

Many emigrant American families settled in the Napa Valley region between 1840 and 1845. In 1847, the grid for Napa City was laid out by John Grigsby and Nathan Coombs on property they had acquired from Nicholas Higuera's Rancho Entre Napa. Originally comprising the land between Brown Street and the Napa River and extending 600 yards from Napa Creek to the steamboat landing at Third Street, the land from several ranchos was combined to form the present-day city of Napa. In 1850, the first steamboat navigated the Napa River from San Francisco.

Napa County was established in February 1850 and is one of California's original 27 counties. The City of Napa was incorporated in 1874 and has always been the county seat. The county and the city prospered in the wake of the Gold Rush as ranching, farming, and local businesses flourished. The Napa Valley Railroad was completed in 1865 and was extended to Napa Junction (now American Canyon) in 1869. After 1905, interurban rail service linked the city to Vallejo, San Francisco, and the Bay Area.

Napa Valley's world-renowned viticulture industry began with the Spanish padres, who established the final and northernmost Spanish mission (San Francisco Solano de Sonoma) in 1823 at what is now the town of Sonoma. The industry became well established when Charles Krug started making large quantities of wine in the late 1850s and early 1860s. The Charles Krug facility remains the valley's oldest operating winery. Also located in St. Helena, the Christian Brothers vintners built one of the world's largest stone wineries in 1889. By the end of the 19th century, there were more than 140 wineries in the valley (Natural Investigations Company 2016:14–15).

San Francisco County

Nonnative explorers, settlers, and colonists began to arrive on the San Francisco Peninsula in the late 18th century. The government of Spain established a military outpost, or *presidio*, at the northern tip of the peninsula near the mouth of San Francisco Bay in 1776. Concurrently, Catholic missionaries of the Franciscan order established the sixth *misión* in a chain that would eventually number 21 along the California coast. The permanent chapel of the Mission San Francisco de Asis (Mission Dolores) was completed in 1791 near present-day 16th and Dolores Streets. When Mexico won independence from Spain in 1821, Mexico secularized the missions and conferred vast, private rancho tracts across the entire San Francisco Peninsula and beyond. By 1835, a small civilian commercial port settlement, the Pueblo of Yerba Buena, was established in the area of California and Montgomery Streets, initially supported by the export of California hides and tallow and the import of goods from the eastern United States and Europe.

In 1839, the pueblo's first survey platted the area and established a rectangular grid of blocks aligned to the cardinal directions. In 1847, Market Street was laid out on a diagonal to the earlier street grid, with much of its route along an old path to the mission. Soon thereafter, a survey platted the area south of Market Street on a street grid aligned diagonally with Market, and with quadruple-sized lots, conflicting with the grid to the north. This unconventional mismatch of surveys, platted at the birth of the city, is apparent today in the enduring street-and-block patterns north and south of Market Street.

In 1847, during the Mexican-American War, the United States changed the name of the settlement from Yerba Buena to San Francisco. The settlement changed dramatically with the discovery of gold in the Sierra Nevada foothills. San Francisco was the harbor closest to the strike, and by 1849 the city was growing exponentially. The population grew from 400 in 1848 to approximately 35,000 in 1852. The City boundary line was sequentially expanded southward and westward, ultimately reaching its current location (and merger with the county line) in 1856.

On April 18, 1906, a massive earthquake struck San Francisco. Although the quake itself did relatively little damage, the many ruptured gas lines, overturned furnaces, and toppled brick chimneys soon produced scores of fires that quickly spread unchecked throughout the city, while damaged water mains made firefighting extraordinarily difficult. The physical rebuilding of the city began within months, and even days, of the 1906 disaster. The city's reconstruction, despite occurring without central planning or leadership, resulted in modernization of the financial and industrial bases,

densification and expansion of residential neighborhoods, wholesale social and economic reorganization of the city, and ultimately a new San Francisco.

A nationwide economic surge during the 1920s correlated with another building boom in San Francisco, as well as the enacting of the city's first planning code in 1921, mandating the geographic separation of land uses. The opening of streetcar tunnels in 1918 and 1928, and the adoption of mass automobile use beginning in the 1920s, spurred residential development in outlying areas of the city. During the 1930s and the economic downturn of the Great Depression, the city was provided with some of its finest public works projects. Major structures, such as the San Francisco–Oakland Bay Bridge, the Golden Gate Bridge, Coit Tower, Rincon Annex, Aquatic Park, and numerous firehouses, libraries, police stations, and schools, were constructed with the aid of New Deal federal funds.

After World War II, many military personnel and wartime workers stayed in San Francisco, swelling the population and prompting more residential construction in outlying areas where land was still available. The 1950s and 1960s brought federally funded, locally implemented urban renewal to San Francisco. Urban renewal projects cleared large sites in the city's core and redeveloped them with highly programmed landscapes. The downtown area experienced dramatic growth in the 1970s and 1980s, driven by booming markets for office and commercial space. Mass transit was improved by completion of the Bay Area Rapid Transit regional rail system under Market and Mission Streets, and by a parallel Market Street subway for the city's local streetcar lines.

As the 20th century drew to a close, San Francisco's vast postindustrial districts located south of the downtown core, long underutilized and subject to deterioration, became the focus of physical redevelopment. New demands for housing, commercial, and institutional space initiated transformations of former warehouses and factories, railyards, and shipping facilities into high-density urban neighborhoods replete with public services and amenities (San Francisco Planning Department 2009).

San Mateo County

After the mission lands were secularized in 1835, 17 land grants were carved out of what would become San Mateo County. The southern hill country between Woodside and Redwood City became a significant area for logging operations after gold was discovered in 1848, and early San Mateo industries focused on providing San Francisco with resources: agriculture, lumbering, oyster cultivation, shrimp fishing, whaling, and waterworks. After the completion of the San Francisco/San Jose Railroad in 1864, San Mateo County became the first railroad suburb west of the Mississippi where the elite of San Francisco's industrial and commercial circles established country estates. Large suburban estates, not subdivided until the first third of the 20th century, retarded growth and gave San Mateo County a distinctive character.

The 20th century brought considerable growth to San Mateo County. After the 1906 earthquake, there was a large migration to the peninsula. A newly constructed streetcar system from San Francisco all the way to San Mateo allowed the hamlets along the line to become home to a new middle-class suburbanite. The affordability and popularity of the automobile through the 1920s added to this growth. However, it was World War II that had the greatest impact on the built environment. San Francisco International Airport, termed a "mud hole" before the war, was improved to such an extent by the U.S. Army that it was handling one-tenth of all air traffic in the United States by 1946. Supporting businesses sprang up nearby. Partially because of the growth of the airport, a wartime electronics industry exploded onto the scene (Cerny 2007:117–119).

Santa Clara County

For 75 years, the mission, pueblo, and an evolving rancho system developed under Spanish and then Mexican rule, transforming the fertile Santa Clara Valley into a frontier agricultural region that exported beef and hides to world markets. After California's admission to the United States, Santa Clara County gained a worldwide reputation as an important agricultural region known as the "Valley of Heart's Delight." During the Gold Rush, the city of San Jose served as one of the supply centers for hopeful miners. Sawmills established in the Santa Cruz Mountains utilized an abundance of old-growth redwood that fueled construction in the valley until the beginning of the 20th century.

A railroad was completed from San Francisco to San Jose in 1864, and distribution of Santa Clara County's agricultural products was further facilitated with a regional connection to the Transcontinental Railroad in 1869. By the late 1880s, fruit orchards supplanted grain as land was subdivided into smaller parcels. During the early 20th century, large canneries and packing plants were built to process the abundant production of fruit.

World War II also had a major effect on Santa Clara County. The large naval air station at Moffett Field became a gateway to military activity in the Pacific, with thousands of personnel brought to the area for training and processing. Soon after the war, the local business community launched an active campaign to attract new nonagricultural-related industries. Cold War industries began to locate near Moffett Field in the Sunnyvale and Mountain View areas. When IBM settled in downtown San Jose in the early 1940s, the invention of the Winchester Disk Drive set the stage for the eventual creation of the place now known as Silicon Valley.

Between 1945 and 1964, orchards were subdivided further into residential tracts, industrial parks, shopping centers, and schools at an average rate of 17,000 acres per year. Within cities and their environs that constitute the urban topology of the county, some of the rural character that was once the "Valley of Heart's Delight" continues to exist, side by side with the modern constructions that house high-tech factories and think tanks (Cerny 2007:165–167).

Solano County

Solano County contained five confirmed Mexican land grants. The first of the land grants was Rancho Suisun. Rancho Tolenas, adjacent to Rancho Suisun, included part of Fairfield and extended north into Napa County. The patent was issued in 1840 to Jose Francisco and Antonio Armijo. Juan Felipe Peña and Juan Manuel Vaca were granted Rancho de los Putos in the 1840s. Rancho de los Putos comprised almost 18,000 acres, including Lagoon Valley, Vaca Valley, and Vacaville. Rancho Rio de Los Putos, adjacent to Puta Creek in the northwestern portion of the county, was granted to William Wolfskill in 1842. Also called the Wolfskill Grant, Rancho Rio de los Putos was developed by four Wolfskill brothers, who planted extensive orchards, including a stand of olive trees that still remains today. Rancho Los Ulpinos was granted to John Bidwell in 1844. Bidwell's rancho was adjacent to the Sacramento River. Also in 1844, General Mariano Vallejo established a settlement named Eureka in a portion of his unconfirmed Rancho Suscol; later, this settlement was renamed Vallejo in his honor. Benicia and Cordelia were also within Rancho Suscol. Rancho Sobrante, another unconfirmed rancho, included today's towns of Montezuma, Birds Landing, Collinsville, and Denverton.

The primary economy during the Rancho Period was the hide and tallow trade. Large herds of cattle were raised and slaughtered for their hides, which were traded for goods and services. Each hide was worth $1 in trade and referred to as a "California dollar." The hides were shipped to New England and used in the shoe and boot industry. Tallow was derived from the fat and used to make candles and soap. There was little value to the meat, so dead carcasses littered fields and ports.

In the late 1840s and 1850s, former gold seekers and pioneers began settling in Solano County, where they raised livestock and cultivated fruit orchards, vineyards, wheat, barley, and oats. Produce and livestock were transported overland by wagons to the many sloughs throughout the county and then shipped by water to waiting markets. Twelve townships were established in Solano County between 1850 and 1871. Although the largest towns were adjacent to San Pablo and Suisun Bays, the majority of towns were situated at the ends of sloughs or channels that primarily ran through the eastern portion of the county. In 1868, the completion of the California Pacific Railroad through Solano County allowed the shipment of goods to East Coast markets, significantly bolstering economic development, agricultural production, and population growth. In 1913, the Oakland, Antioch, and Eastern Railway opened its 93-mile route from San Francisco to Sacramento, through largely unpopulated parts of Solano County. In 1928, the Sacramento Northern Railway purchased the railway, but the Depression and the popularity of the automobile contributed to the end of passenger service in 1940; by 1987 the railway had been abandoned (Solano County 2008:4.10-7).

Sonoma County

European settlement of Sonoma County began on the coast at Fort Ross (1812–1841). With concern over the Russian presence, the Sonoma Mission was founded in 1823. After secularization, General Mariano Guadalupe Vallejo established the Pueblo de Sonoma in 1835, the first town in the county. For his services, Vallejo received a land grant that extended from Petaluma to Solano County.

The San Francisco & North Pacific Railroad, the first Sonoma County railroad began operating in 1870, meeting ferries from San Francisco, just south of Petaluma. In 1875, the North Pacific Coast Railroad linked Sausalito to the coastal communities along Tomales Bay. Further east, the Sonoma Valley Railroad began operation in 1879. These lines merged in 1914 to form the Northwestern Pacific Railroad, which operated from Sausalito to Eureka, until the 1990s.

After statehood, logging along the coastal hills, cattle and dairy ranching, and potato farming supported the county. During the first half of the 20th century, the poultry industry, fruit and fruit processing, and hops production were briefly profitable. Today, wineries have replaced many of the ranches, most of which relocated to California's Central Valley (Cerny 2007:415–417).

RECORDED REGIONAL RESOURCES

Historical and Archeological Resources

The interpretations and designations of historical and archaeological resources in the Bay Area are documented at the Northwest Information Center (NWIC) at Sonoma State University.

As shown in **Table 3.7-1**, previous records searches in the Bay Area showed that as of 2013, approximately 8,118 prehistoric and historic period sites were recorded in the Bay Area and are listed with the California Historical Resources Information System, maintained at the NWIC. If one counts all historic period and prehistoric recorded sites, buildings, and structures, there are over 33,000 such features in the Bay Area.

Of the 8,118 sites previously recorded in the nine-county Bay Area, as of 2013, 1,006 cultural resources were listed in the California Register of Historic Resources (CRHR), meaning that they are significant at the local, State, or national level as specified under a set of established criteria (see details in the "Regulatory Setting" section, below); of those, 744 are also listed in the National Register of Historic Places (NRHP). From this list, 249 resources are listed as California Historic Landmarks. The greatest concentration of resources listed on both the NRHP and the CRHR in the Bay Area occurs in San

Francisco, with 181 resources. Alameda County has the second highest number of NRHP- and CRHR-listed resources, with 147.

Table 3.7-1: Recorded Archaeological and Historical Sites in the Bay Area

Source of Record	Alameda County	Contra Costa County	Marin County	Napa County	San Francisco County	San Mateo County	Santa Clara County	Solano County	Sonoma County
Total Recorded Resources (including buildings)[1]	11,242	3,060	2,775	1,517	4,873	2,252	2,599	747	4,304
Individually Listed Resources on both the NRHP and the CRHR[2]	147 BSO	39 BSO	41 BSO	78 BSO	181 BSO	51 BSO	104 BSO	22 BSO	64 BSO
	0 AS	0 AS	5 AS	0 AS	5 AS	1 AS	2 AS	0 AS	4 AS
Individually Listed Resources Only on the CRHR	302 BSO	18 BSO	25 BSO	18 BSO	242 BSO	32 BSO	121 BSO	66 BSO	59 BSO
	12 AS	41 AS	4 AS	11 AS	2 AS	0 AS	31 AS	5 AS	17 AS
California Historical Landmarks[3]	37	15	14	17	48	34	43	14	27
Historic Bridges Listed on the Caltrans Local Bridge Survey[4]	175	187	123	93	78	120	239	115	223

Notes: BSO = Building, Site, or Object; AS = Archaeological Site; CRHR = California Register of Historical Resources; NRHP = National Register of Historic Places; Caltrans = California Department of Transportation.

[1] Number of all recorded sites, including prehistoric and historic archaeological sites with and without trinomials, as well as recorded historic-period buildings and structures.

[2] Not included here are resources that have been listed as *contributors to* an Archaeological or Historic District, or resources that have been determined to be *eligible* for listing (but not listed) on the NRHP or the CRHR.

[3] State Office of Historic Preservation's California Landmarks By County, July 5, 2016, http://ohp.parks.ca.gov/?page_id=21387. BSO and AS are reported together.

[4] California Department of Transportation Local Bridge Survey, Update 2005, computer database, query only pre-1960 bridges. Please note, a previous "Category 3" used to compile prior RTP EIR listings no longer exists in this survey, with the result that this update may show lower totals compared to previous surveys reported in other EIRs.

Source: MTC and ABAG 2013

Tribal Cultural Resources and Native American Coordination

On August 28, 2020 MTC sent project-notification letters to tribes that have requested notification, and those that have been identified by the Native American Heritage Commission (NAHC), to learn about any tribal cultural resources in the Plan area (tribal cultural resources, as defined in PRC Section 21074, are described under "Tribal Cultural Resources," below). Correspondence in compliance with AB 52 is summarized in **Table 3.7-2,** below.

Table 3.7-2: Summary of AB 52 Consultation

Native American Contact Name	Native American Contact Group	Date of Initial Letter	Date(s) Reply Received	Comment
Ms. Pamela Baumgartner	Ione Band of Miwok Indians	August 28, 2020	No reply received	
The Honorable Darin Beltran	Koi Nation of Northern California	August 28, 2020	No reply received	
Mr. Dino Beltran	Koi Nation of Northern California	August 28, 2020	No reply received	
Ms. Thelma Brafford	Cortina Rancheria	August 28, 2020	No reply received	
The Honorable Rosemary Cambra	Muwekma Ohlone Indian Tribe of the SF Bay Area	August 28, 2020	No reply received	

Native American Contact Name	Native American Contact Group	Date of Initial Letter	Date(s) Reply Received	Comment
Ms. Mary Camp	Redwood Valley Rancheria	August 28, 2020	No reply received	
Ms. Nina Campbell	Scotts Valley Band of Pomo Indians	August 28, 2020	No reply received	
The Honorable Tony Cerda	Coastanoan Rumsen Carmel Tribe	August 28, 2020	No reply received	
Louie Cerda	Coastanoan Rumsen Carmel Tribe	August 28, 2020	No reply received	
The Honorable E.J. Crandell	Robinson Rancheria of Pomo Indians	August 28, 2020	No reply received	
Mr. David DeLira	Dry Creek Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Michael Derry	Guidiville Rancheria	August 28, 2020	No reply received	
Mr. Anthony Duncan	Robinson Rancheria of Pomo Indians	August 28, 2020	No reply received	
The Honorable Sara Dutschke Setschwaelo	Ione Band of Miwok Indians	August 28, 2020	No reply received	
The Honorable John Feliz	Coyote Valley Band of Pomo Indians	August 28, 2020	No reply received	
Mr. David Fendrick	River Rock Casino	August 28, 2020	No reply received	
Mary Figueroa	Lytton Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Shannon Ford	Scotts Valley Band of Pomo Indians	August 28, 2020	No reply received	
The Honorable Dino Franklin	Kashia Band of Pomo Indians of the Stewarts Point Rancheria	August 28, 2020	No reply received	
The Honorable Silver Galleto	Cloverdale Rancheria of Pomo Indians of California	August 28, 2020	No reply received	
Mr. Andrew Galvan	The Ohlone Indian Tribe	August 28, 2020	No reply received	
The Honorable Philip Gomez	Big Valley Rancheria/Big Valley Band of Pomo Indians	August 28, 2020	No reply received	
The Honorable Michael Gomez	Big Valley Rancheria/Big Valley Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Walter Grey	Guidiville Rancheria	August 28, 2020	No reply received	
Ms. Nina Hapner	Kashia Band of Pomo Indians of the Stewarts Point Rancheria	August 28, 2020	No reply received	
The Honorable Patricia Hermosillo	Cloverdale Rancheria of Pomo Indians of California	August 28, 2020	No reply received	
Ms. Christina Hermosillo	Cloverdale Rancheria of Pomo Indians of California	August 28, 2020	No reply received	

Native American Contact Name	Native American Contact Group	Date of Initial Letter	Date(s) Reply Received	Comment
The Honorable Raymond Hitchcock	Wilton Rancheria	August 28, 2020	September 30, 2020	Ms. Mariah Mayberry requested to initiate consultation via email received on September 30, 2020. MTC-ABAG staff responded via email sent to Ms. Mayberry on October 6, 2020, with proposed dates for consultation. No response was received, and MTC-ABAG staff followed up via email sent to Ms. Mayberry on October 20, 2020. An additional follow up email was sent on May 17, 2021 to inform of the upcoming release of the Draft EIR for public review and comment. No response received to date.
The Honorable Harvey Hopkins	Dry Creek Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Zach Ippoliti	Coastanoan Rumsen Carmel Tribe	August 28, 2020	No reply received	
Ms. Sharon James-Tiger	Scotts Valley Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Tom Keagan	Dry Creek Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
The Honorable Leland Kinter	Yocha Dehe Wintun Nation	August 28, 2020	No reply received	
Mr. James Kinter	Yocha Dehe Wintun Nation	August 28, 2020	No reply received	
Ms. Angelique Lane	Kashia Band of Pomo Indians of the Stewarts Point Rancheria	August 28, 2020	No reply received	
Ms. Lisa Linder	Guidiville Rancheria	August 28, 2020	No reply received	
The Honorable Valentin Lopez	Amah Mutsun Tribal Band	August 28, 2020	September 3, 2020	Chair Lopez requested via email received on September 3, 2020, to be contacted to discuss the Formal Notice of Consultation Opportunity letter sent by MTC-ABAG. MTC-ABAG staff contacted Chair Lopez via phone on October 1, 2020. MTC-ABAG staff sent an email to schedule consultation with Chair Lopez on October 6, 2020. No response was received, and MTC-ABAG staff followed up via email sent to Chair Lopez on October 20, 2020 with a proposed date for consultation. An additional follow up email was sent on May 17, 2021 to inform of the upcoming release of the Draft EIR for public review and

Native American Contact Name	Native American Contact Group	Date of Initial Letter	Date(s) Reply Received	Comment
				comment. No response received to date.
The Honorable Cathy Lopez	Lytton Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Ms. Vickey Macias	Cloverdale Rancheria of Pomo Indians of California	August 28, 2020	No reply received	
Ms. Darlene Marsh	Cloverdale Rancheria of Pomo Indians of California	August 28, 2020	No reply received	
Ms. Elayne May-Muro	Kashia Band of Pomo Indians of the Stewarts Point Rancheria	August 28, 2020	No reply received	
Mr. Chris McCloud	Big Valley Rancheria/Big Valley Band of Pomo Indians	August 28, 2020	No reply received	
Ms. Vivian McCloud	Big Valley Rancheria/Big Valley Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Brad McDonald	Coyote Valley Band of Pomo Indians	August 28, 2020	No reply received	
The Honorable Marshall McKay	Yocha Dehe Wintun Nation	August 28, 2020	No reply received	
The Honorable Marjorie Mejia	Lytton Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Ms. Lisa Miller	Lytton Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Commissioner Laura Miranda	Native American Heritage Commission	August 28, 2020	No reply received	
Mr. Michael Mirelez	Torres Martinez Desert Cahuilla Indians	August 28, 2020	No reply received	
Ms. Brenda Muñoz	Coastanoan Rumsen Carmel Tribe	August 28, 2020	No reply received	
Mr. Joseph Myers	National Indian Justice Center	August 28, 2020	No reply received	
Ms. Raquelle Myers	National Indian Justice Center	August 28, 2020	No reply received	
Mr. Gabe Nevarez	Dry Creek Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Ms. Salvina Norris	Dry Creek Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Danny Ocampo	Lytton Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Kurt O'Regan	Scotts Valley Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Vaughn Pena	Kashia Band of Pomo Indians of the Stewarts Point Rancheria	August 28, 2020	No reply received	

Native American Contact Name	Native American Contact Group	Date of Initial Letter	Date(s) Reply Received	Comment
The Honorable Katherine Perez	North Valley Yokuts Tribe	August 28, 2020	No reply received	
Ms. Gina Perrine	Kashia Band of Pomo Indians of the Stewarts Point Rancheria	August 28, 2020	No reply received	
Mr. Gus Pina	Dry Creek Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
The Honorable Sandy Pinola	Kashia Band of Pomo Indians of the Stewarts Point Rancheria	August 28, 2020	No reply received	
Rosemary Rahmaoui	Potter Valley Rancheria	August 28, 2020	No reply received	
The Honorable Debra Ramirez	Redwood Valley Rancheria	August 28, 2020	No reply received	
Mr. Gabriel Ray	Scotts Valley Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Ben Ray, III	Big Valley Rancheria/Big Valley Band of Pomo Indians	August 28, 2020	No reply received	
Ms. Patricia Ray-Franklin	Scotts Valley Band of Pomo Indians	August 28, 2020	No reply received	
Sam Rodriguez	Coastanoan Rumsen Carmel Tribe	August 28, 2020	No reply received	
Ms. Sandra Roope	Cloverdale Rancheria of Pomo Indians of California	August 28, 2020	No reply received	
The Honorable Salvador Rosales	Potter Valley Rancheria	August 28, 2020	No reply received	
Ms. Linda Rosas	Redwood Valley Rancheria	August 28, 2020	No reply received	
Ms. Sarah Ryan	Big Valley Rancheria/Big Valley Band of Pomo Indians	August 28, 2020	No reply received	
The Honorable Marlene Sanchez	Guidiville Rancheria	August 28, 2020	No reply received	
Mr. James Sarmento	Yocha Dehe Wintun Nation	August 28, 2020	No reply received	
The Honorable Greg Sarris	Federated Indians of Graton Rancheria	August 28, 2020	September 1, 2020	Ms. Buffy McQuillen, Tribal Heritage Preservation Officer, Federated Indians of Graton Rancheria, requested formal consultation in a letter sent via email received on September 1, 2020. MTC-ABAG staff met for consultation with Ms. McQuillen and Mr. Gene Buvelot, Tribal Administrator, on November 18, 2020. A follow up email was sent on May 17, 2021 to inform of the

Native American Contact Name	Native American Contact Group	Date of Initial Letter	Date(s) Reply Received	Comment
				upcoming release of the Draft EIR for public review and comment.
The Honorable Ann Sayers	Indian Canyon Mutsun Band of Costanoan	August 28, 2020	No reply received	
Ms. Dianne Seidner	Lytton Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Leonard Sheard	Kashia Band of Pomo Indians of the Stewarts Point Rancheria	August 28, 2020	No reply received	
The Honorable Jose Simon	Middletown Rancheria of Pomo Indians	August 28, 2020	No reply received	
Burt Steele	Lytton Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Carol Steele	Lytton Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Daniel Steele, Jr.	Lytton Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
Mr. Lawrence Stra	Cloverdale Rancheria of Pomo Indians of California	August 28, 2020	No reply received	
The Honorable Carol Tapia	Koi Nation of Northern California	August 28, 2020	No reply received	
The Honorable Tracy Tripp	Ione Band of Miwok Indians	August 28, 2020	No reply received	
Mr. Glen Villa	Ione Band of Miwok Indians	August 28, 2020	No reply received	
Ms. Violet Wilder	Kashia Band of Pomo Indians of the Stewarts Point Rancheria	August 28, 2020	No reply received	
Ms. Elaine Willits	Cloverdale Rancheria of Pomo Indians of California	August 28, 2020	No reply received	
The Honorable Chris Wright	Dry Creek Rancheria Band of Pomo Indians	August 28, 2020	No reply received	
The Honorable Charlie Wright	Cortina Rancheria	August 28, 2020	No reply received	
Mr. Randy Yonemura	Ione Band of Miwok Indians	August 28, 2020	No reply received	
The Honorable Irene Zwierlein	Amah Mutsun Tribal Band of Mission San Juan Bautista	August 28, 2020	No reply received	

In addition to AB 52 consultation, MTC sent a copy of the Notice of Preparation to the following tribes and agencies on September 24, 2020:

- Amah Mutsun Tribal Band
- Amah Mutsun Tribal Band of Mission San Juan Bautista
- Big Valley Rancheria/Big Valley Band of Pomo Indians
- Bureau of Indian Affairs
- Cachil Dehe Band of Wintun Indians of the Colusa Indian Community
- Cloverdale Rancheria of Pomo Indians of California
- Coastanoan Rumsen Carmel Tribe
- Coyote Valley Band of Pomo Indians
- Dry Creek Rancheria Band of Pomo Indians
- Federated Indians of Graton Rancheria
- Guidiville Rancheria
- Indian Canyon Mutsun Band of Costanoan
- Ione Band of Miwok Indians
- Kashia Band of Pomo Indians of the Stewarts Point Rancheria
- Kletsel Dehe Band of Wintun Indians
- Koi Nation of Northern California
- Lytton Rancheria Band of Pomo Indians
- Middletown Rancheria of Pomo Indians
- Mishewal-Wappo Tribe of Alexander Valley
- Muwekma Ohlone Indian Tribe of the SF Bay Area
- Native American Heritage Commission
- North Valley Yokuts Tribe
- Pinoleville Pomo Nation
- Potter Valley Rancheria
- Redwood Valley Rancheria
- River Rock Casino
- Robinson Rancheria of Pomo Indians
- Scotts Valley Band of Pomo Indians
- The Confederated Villages of Lisjan
- The Ohlone Indian Tribe
- Torres Martinez Desert Cahuilla Indians
- United Auburn Indian Community of the Auburn Rancheria
- Wilton Rancheria
- Yocha Dehe Wintun Nation

Locations of Sensitivity

Dense concentrations of Native American archaeological sites occur along the historic margins of San Francisco and San Pablo Bays. In addition, archaeological sites have also been identified in the following environmental settings in all Bay Area counties: near sources of water, such as vernal pools and springs; along ridgetops and on midslope terraces; and at the base of hills and on alluvial flats.

Native American archaeological sites have also been identified in the inland valleys of all Bay Area counties. Remains associated with a Native American archaeological site may include chert or obsidian flakes, projective points, mortars and pestles, and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials.

Dense concentrations of historical resources are often found in large urban areas and smaller cities that experienced growth and development during the historic period. Historic resources are also found in rural settings where homesteads, ranches, or farms were once present. Historic period archaeological remains may include stone or adobe foundations or walls, structures and remains with square nails, and refuse deposits often in old wells and privies.

3.7.2 Regulatory Setting

FEDERAL REGULATIONS

National Historic Preservation Act

Among those statutes enacted by Congress that affect historic properties, the National Historic Preservation Act of 1966 (NHPA) is the most significant law that addresses historic preservation. One of the most important provisions of the NHPA is the establishment of the NRHP, the official designation of historical resources. Districts, sites, buildings, structures, and objects are eligible for listing in the NRHP. Nominations are listed if they are significant in American history, architecture, archaeology, engineering, and culture. The NRHP is administered by the National Park Service. To be eligible, a property must be significant under Criteria A through D (described below); and ordinarily be 50 years of age or more:

A. Are associated with events that have made a significant contribution to the broad patterns of our history; or

B. Are associated with the lives of persons significant in our past; or

C. Embody the distinctive characteristics of a type, period, or method of installation, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Have yielded, or may be likely to yield, information important in prehistory or history.

Listing in the NRHP does not entail specific protection or assistance for a property, but it does guarantee recognition in planning for federal or federally assisted projects, eligibility for federal tax benefits, and qualification for federal historic preservation assistance. Additionally, project effects on properties listed in the NRHP must be evaluated under CEQA.

Once a resource has been recorded and if it is determined to be significant, the potential impacts (or effects) of a project on a heritage property are assessed. Federal regulatory impact thresholds are contained in Section 106 of the NHPA and accompanying regulations (36 CFR Part 800). Section 106 requires that federal agencies consider the effects of their actions on significant archaeological properties before implementing a project or "undertaking." The criteria of effect are found in 36 CFR 800.0(a) and state that:

> [a]n undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register.

The Advisory Council on Historic Preservation's regulations require that the federal agency apply the criteria of adverse effect on historic properties that would be affected by a proposed undertaking (36 CFR 800.9b). An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association, or the quality of data suitable for scientific analysis. These seven aspects of integrity are described as follows:

- **Location**: "Integrity of location" refers to whether a property remains where it was originally constructed or was relocated.

- **Design**: "Integrity of design" refers to whether a property has maintained its original configuration of elements and style that characterize its plan, massing, and structure. Changes made after original construction can acquire significance in their own right.
- **Setting**: "Integrity of setting" refers to the physical environment surrounding a property that informs the characterization of the place.
- **Materials**: "Integrity of materials" refers to the physical components of a property, their arrangement or pattern, and their authentic expression of a particular time period.
- **Workmanship**: "Integrity of workmanship" refers to whether the physical elements of a structure express the original craftsmanship, technology, and aesthetic principles of a particular people, place, or culture at a particular time period.
- **Feeling**: "Integrity of feeling" refers to the property's ability to convey the historical sense of a particular time period.
- **Association**: "Integrity of association" refers to the property's significance defined by a connection to a particular important event, person, or design.

Secretary of the Interior's Standards for the Treatment of Historic Properties

The Secretary of the Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 2017) are intended to promote responsible preservation practices for treatment of historic properties (buildings, structures, objects, districts, and landscapes). The advisory, not regulatory, standards do not, in and of themselves, prescribe decisions about which features of a historic property should be saved and which can be changed. But once a treatment is selected, the standards provide philosophical consistency and guidance to the work. The four treatment approaches, in order of priority, are as follows:

- Preservation, which places a high premium on the retention of all historic fabric through conservation, maintenance, and repair. It reflects a property's continuum over time, through successive occupancies, and the respectful changes and alterations that are made.
- Rehabilitation, which emphasizes the retention and repair of historic materials, but more latitude is provided for replacement because it is assumed the property is more deteriorated before work. (Both preservation and rehabilitation standards focus attention on the preservation of those materials, features, finishes, spaces, and spatial relationships that, together, give a property its historic character.)
- Restoration, which focuses on the retention of materials from the most significant time in a property's history, while permitting the removal of materials from other periods.
- Reconstruction, which establishes limited opportunities to recreate a nonsurviving site, landscape, building, structure, or object in all new materials.

The standards are an important reference under CEQA because CEQA Guidelines Sections 15064.5(b)(3) and 15126.4(b) specify that a project that may cause a substantial adverse change in the significance of a historical built environment resource that generally follows the Secretary of the Interior's Standards shall be considered as mitigated to a level of less than significant on the historical resource.

U.S. Department of Transportation Act of 1966

Section 4(f) of the U.S. Department of Transportation Act, as amended and recodified in 1983 (49 U.S. Code Section 303), is triggered by projects funded or approved by a U.S. Department of Transportation agency, including the Federal Highway Administration, Federal Transit Administration, Federal Railroad Administration, and Federal Aviation Administration. Section 4(f) requires a comprehensive evaluation of all environmental impacts resulting from projects that involve the use, or interference with use, of the following types of land:

- publicly owned park lands that are open to the public;
- publicly owned recreation areas that are open to the public;
- publicly owned wildlife and waterfowl refuges that are open to the public; and
- publicly or privately owned historic sites of federal, state, or local significance that are eligible for listing in or are listed in the NRHP.

This evaluation, called the Section 4(f) statement, must be sufficiently detailed to permit the U.S. Secretary of Transportation to determine whether:

- there is no feasible and prudent alternative to the use of such land; or
- the program includes all possible planning to minimize harm to any park, recreation area, wildlife and waterfowl refuge, or historic site that would result from the use of such lands.

If a feasible and prudent alternative is available, a proposed project using Section 4(f) lands cannot be approved by the Secretary. If no feasible and prudent alternative is available, the proposed project must include all possible planning to minimize harm to the affected lands.

Detailed inventories of the locations and likely impacts on resources that fall into the Section 4(f) category are required in project-level environmental assessments.

In August 2005, Section 4(f) was amended under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users to simplify the process and approval of projects that have only de minimis impacts on lands protected by Section 4(f). Under these provisions, the U.S. Secretary of Transportation may find such a de minimis impact if consultation with the State Historic Preservation Officer (SHPO) under Section 106 of the NHPA results in a determination that a transportation project would have no adverse effect on the historic site or that there would be no historic sites (i.e., historic properties) affected by the proposed action. In this instance, analysis of avoidance alternatives of Section 4(f) protected properties is not required and the Section 4(f) evaluation process is complete.

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act of 1978 (AIRFA) (42 U.S. Code Section 1996) pledges to protect and preserve the traditional religious rights of American Indians, Aleuts, Eskimos, and Native Hawaiians. It establishes a national policy that traditional Native American practices and beliefs, sites (and right of access to those sites), and the use of sacred objects shall be protected and preserved. If a place of religious importance to American Indians could be affected by a federal undertaking, AIRFA promotes consultation with Indian religious practitioners, which could be coordinated with Section 106 consultation. Amendments to Section 106 of the NHPA in 1992 strengthened the interface between AIRFA and the NHPA by clarifying the following: (1) properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization could be determined to be

eligible for inclusion in the NRHP; and (2) in carrying out its responsibilities under Section 106, a federal agency shall consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to properties described under (1).

Archeological Resources Protection Act of 1979

The Archeological Resources Protection Act of 1979 (ARPA) (43 CFR Section 7) establishes uniform definitions, standards, and procedures to be followed by all federal land managers in providing protection for archaeological resources located on public lands and Native American lands. Under ARPA, additional requirements could apply to agency action if federal or Indian lands are involved. ARPA (1) prohibits unauthorized excavation on federal and Indian lands, (2) establishes standards for permissible excavation, (3) prescribes civil and criminal penalties, (4) requires agencies to identify archeological sites, and (5) encourages cooperation between federal agencies and private individuals.

Native American Graves Protection and Repatriation Act of 1990

The intent of the Native American Graves Protection and Repatriation Act of 1990 (25 U.S. Code Section 3001) is to identify Native American affiliation or lineal descent and ensure the rightful disposition, or repatriation, of Native American human remains, funerary objects, sacred objects, and items of cultural patrimony that are in federal possession or control. The regulations implementing the requirements of Native American Graves Protection and Repatriation Act relating to the inadvertent discovery of human remains and objects of cultural patrimony of Native American origin on federal or tribal lands are described in 43 CFR Section 10.4.

STATE REGULATIONS

California Register of Historic Resources

Historic properties listed, or formally designated for eligibility to be listed, on the NRHP are automatically listed on the CRHR (PRC Section 5024.1). State Landmarks and Points of Interest are also automatically listed. The CRHR can also include properties designated under local preservation ordinances or identified through local historic resource surveys.

For a historic resource to be eligible for listing on the CRHR, it must be significant at the local, State, or national level under one or more of the following four criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

2. It is associated with the lives of persons important to local, California, or national history.

3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values.

4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

California Environmental Quality Act

CEQA requires public agencies to consider the effects of their actions on “historical resources,” “unique archaeological resources,” and “tribal cultural resources.” Pursuant to PRC Section 21084.1, a “project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.” Section 21083.2 requires agencies to determine whether proposed projects would have effects on unique archaeological resources. PRC

Section 21084.2 establishes that "[a] project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment."

Archaeological Resources

CEQA also requires lead agencies to consider whether projects would affect unique archaeological resources. PRC Section 21083.2(g) states that "unique archaeological resource" means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. contains information needed to answer important scientific research questions. and there is a demonstrable public interest in that information;

2. has a special and particular quality, such as being the oldest of its type or the best available example of its type; and

3. is directly associated with a scientifically recognized important prehistoric or historic event or person.

Historical Resources

CEQA establishes that an adverse effect on a historical resource qualifies as a significant effect on the environment. "Historical resource" is a term with a defined statutory meaning (PRC Section 21084.1; State CEQA Guidelines Sections 15064.5[a] and [b]). Under State CEQA Guidelines Section 15064.5(a), historical resources include the following:

1. A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR (PRC Section 5024.1) will be presumed to be historically significant.

2. A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the PRC or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the PRC, will be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically significant.

3. Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource will be considered by the lead agency to be historically significant if the resource meets the criteria for listing in the CRHR (PRC Section 5024.1), including the following:

    a) is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

    b) is associated with the lives of persons important in our past;

    c) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

d) has yielded, or may be likely to yield, information important in prehistory or history.

4. The fact that a resource is not listed in or determined to be eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to Section 5020.1[k] of the PRC), or not identified in a historical resources survey (meeting the criteria in Section 5024.1[g] of the PRC) does not preclude a lead agency from determining that the resource may be a historical resource as defined in PRC Section 5020.1(j) or Section 5024.1.

Tribal Cultural Resources

CEQA also requires lead agencies to consider whether projects will affect tribal cultural resources. PRC Section 21074 states:

a) "Tribal cultural resources" are either of the following:

   1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

      A) Included or determined to be eligible for inclusion in the California Register of Historical Resources.

      B) Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

   2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

b) A cultural landscape that meets the criteria of subdivision (a) is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

c) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a tribal cultural resource if it conforms with the criteria of subdivision (a).

Mitigation of Cultural Resources Impacts

CEQA Guidelines Section 15126.4 states that "public agencies should, whenever feasible, seek to avoid damaging effects on any historical resources of an archaeological nature." The guidelines further state that preservation in place is the preferred approach to mitigate archaeological resource impacts. However, according to Section 15126.4, if data recovery through excavation is "the only feasible mitigation," then a "data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the historical resources, shall be prepared and adopted before any excavation being undertaken." Data recovery is *not* required for a resource of an archaeological nature if "the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource." The section further states that its provisions apply to those archaeological resources that also qualify as historic resources.

California Public Resources Code Section 5024 and State-Owned Lands

Historical resources on State-owned lands are subject to the requirements of PRC Section 5024. PRC Section 5024.5(f) requires State agencies to submit to SHPO for comment documentation for any project having the potential to affect historical resources under its jurisdiction listed in or potentially eligible for inclusion in the NRHP or registered or eligible for registration as California Historical Landmarks. The SHPO has 30 days after receipt of the notice for review and comment. If the SHPO determines that a proposed action would have an adverse effect on a listed historical resource, the relevant State agency shall adopt prudent and feasible measures that will eliminate or mitigate the adverse effects.

Native American Heritage Act

The Native American Heritage Act of 1976 established the NAHC and protects Native American religious values on State property (see PRC Section 5097.9).

California Native American Historical, Cultural, and Sacred Sites Act

The California Native American Historical, Cultural, and Sacred Sites Act (PRC Section 5097.9) applies to both State and private lands. The act requires, upon discovery of human remains, that construction or excavation activity cease and that the county coroner be notified. If the remains are those of a Native American, the coroner must notify the NAHC, which notifies and has the authority to designate the most likely descendant (MLD) of the deceased. The act stipulates the procedures that the descendants may follow for treating or disposing of the remains and associated grave goods.

Public Notice to California Native American Indian Tribes

Government Code Section 65092 includes California Native American tribes that are on the contact list maintained by the NAHC in the definition of "person" to whom notice of public hearings shall be sent by local governments.

Health and Safety Code Section 7050.5

Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If they are determined to be Native American, the coroner must contact the NAHC.

Public Resources Code Section 5097

PRC Section 5097 specifies the procedures to be followed in the event of the unexpected discovery of human remains on nonfederal land. The disposition of Native American burial falls within the jurisdiction of the NAHC. Section 5097.5 of the PRC states the following:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

Native American Graves Protection and Repatriation Act

Health and Safety Code Sections 8010–8011 establishes a State repatriation policy intent that is consistent with and facilitates implementation of the federal Native American Graves Protection and Repatriation Act. The act strives to ensure that all California Indian human remains and that cultural items are treated with dignity and respect. It encourages voluntary disclosure and return of remains

and cultural items by publicly funded agencies and museums in California. It also states the intent for the State to provide mechanisms for aiding California Indian tribes, including nonfederally recognized tribes, in filing repatriation claims and getting responses to those claims.

Senate Bill 18

SB 18 (Stats. 2004, ch. 904; Gov. Code, §§ 65352.3-5) requires that, before the adoption or amendment of a city or county's general plan or specific plans, the city or county shall consult with California Native American tribes that are on the contact list maintained by the NAHC. The intent of this law is to preserve or mitigate impacts on places, features, and objects, as defined in PRC Sections 5097.9 and 5097.993, which are located within the city or county's jurisdiction. The law also states that the city or county shall protect the confidentiality of information concerning the specific identity, location, character, and use of those places, features, and objects identified by Native American consultation. Government Code Sections 65362.3 to 65362.5 apply to all general and specific plans adopted and/or amended after March 1, 2005.

Since the proposed Plan is not a general plan or specific plan, SB 18 does not apply. However, SB 18 would apply to updates to future county or city general plans or specific plans that may be adopted by local jurisdictions in the region.

California Health and Safety Code Sections 18950 through 18961

The State Historic Building Code (HSC; Sections 18950–18961) provide alternative building regulations and building standards for the rehabilitation, preservation, restoration (including related reconstruction), or relocation of buildings or structures designated as historic buildings. Such alternative building standards and building regulations are intended to facilitate the restoration or change of occupancy so as to preserve their original or restored architectural elements and features, to encourage energy conservation and a cost-effective approach to preservation, and to provide for the safety of the building occupants.

Public Resources Code Section 21080.3

AB 52, signed by the California governor in September of 2014, established a new class of resources under CEQA: "tribal cultural resources," defined in PRC Section 21074. Pursuant to PRC Sections 21080.3.1, 21080.3.2, and 21082.3, lead agencies undertaking CEQA review must, upon written request of a California Native American tribe, begin consultation before the release of an EIR, negative declaration, or mitigated negative declaration.

PRC Section 21080.3.2 states:

> Within 14 days of determining that a project application is complete, or to undertake a project, the lead agency must provide formal notification, in writing, to the tribes that have requested notification of proposed projects in the lead agency's jurisdiction. If it wishes to engage in consultation on the project, the tribe must respond to the lead agency within 30 days of receipt of the formal notification. The lead agency must begin the consultation process with the tribes that have requested consultation within 30 days of receiving the request for consultation. Consultation concludes when either: 1) the parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource, or 2) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached.

If the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process, provisions

under PRC Section 21084.3 (b) describe mitigation measures that may avoid or minimize the significant adverse impacts. Examples include:

(1) avoiding and preserving the resources in place, including, but not limited to, planning and constructing to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria;

(2) treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

(A) protecting the cultural character and integrity of the resource,

(B) protecting the traditional use of the resource, and

(C) protecting the confidentiality of the resource;

(3) establishing permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places; and

(4) protecting the resource.

REGIONAL AND LOCAL REGULATIONS

Historic Preservation Ordinances

In addition to national and State historic preservation legislation, many Bay Area counties and cities have adopted optional historic preservation general plan elements or enacted local ordinances that recognize and preserve historic sites. At least 20 Bay Area cities participate in the Certified Local Government Program through the State Office of Historic Preservation. The Certified Local Government Program is a partnership among local governments, the State Office of Historic Preservation, and the National Park Service, which is responsible for administering the National Historic Preservation Program. Participating cities include Alameda, Benicia, Berkeley, Campbell, Danville, Los Altos, Los Gatos, Napa, Oakland, Palo Alto, Redwood City, Richmond, San Francisco, San José, Santa Clara, Saratoga, Sausalito, Sonoma, Sunnyvale, and Vallejo.

City and County General Plans

Most Bay Area counties and cities have general plan goals and policies that consider the protection and/or preservation of archaeological and historical resources. These goals and policies can be included in the open space and conservation elements of the general plan, or some general plans include a separate historic preservation element. Often these policies include the requirement that archaeological sites with significant cultural, historical, or sociological merit be preserved to the maximum extent feasible or the requirement that areas found to contain significant historical or prehistoric archaeological artifacts be examined by a qualified consulting archaeologist or historian for appropriate protection and preservation.

3.7.3 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the Plan Bay Area 2040 EIR (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the State CEQA Guidelines (Criterion CUL/TCR-1);
- cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines (Criterion CUL/TCR-2);
- disturb any human remains, including those interred outside of formal cemeteries (Criterion CUL/TCR-3); or
- cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe (Criterion CUL/TCR-4).

METHOD OF ANALYSIS

This program-level analysis identifies the potential impacts of implementation of the proposed Plan on archaeological, historical, and other cultural resources, including tribal cultural resources, within the Bay Area. The methodology related to assessment of land use development, sea level rise adaptation infrastructure, and transportation project-related impacts recognizes that important cultural resources may be encountered during ground-disturbing construction work. It also recognizes that projects associated with the operation and routine maintenance of the existing transportation system, such as signalization, equipment replacement, and asphalt overlay, would not directly affect cultural resources, because in most instances there would be no related ground disturbances. Ground disturbance related to routine maintenance is generally limited to the same depth as previous ground disturbance. Because the specific locations of some cultural resources are not mapped, and the exact extent of ground disturbance associated with forecasted land use growth, sea level rise adaptation infrastructure, and transportation projects under the proposed Plan is unknown at this time, it is not possible to assess impacts on specific cultural resources. Accordingly, neither project-specific reviews nor field studies are feasible or necessary for this program EIR. Additionally, records searches and field studies are considered “expired” after five years (PRC Section 5024.1(g)(4)), and therefore it is beneficial to conduct them closer to the time of implementation. Therefore, project-specific records searches and field studies will be conducted at the time of site-specific project implementation. The analysis is based on a review of the type and location of forecasted land use growth, sea level rise adaptation infrastructure, and transportation projects listed in the proposed Plan, and their potential to disturb both known and unknown cultural resources. The baseline for the following analysis is the date of the EIR NOP release in September of 2020.

For the purposes of the impact discussion, “historical resource” is used to describe built-environment historic-period resources. Archaeological resources (both prehistoric and historic-period) and tribal cultural resources, which may qualify as “historical resources” pursuant to CEQA, are analyzed separately from built-environment historical resources.

IMPACTS AND MITIGATION MEASURES

Impact CUL/TCR-1: Cause a substantial adverse change in the significance of a historical resource as defined in Guidelines Section 15064.5 (PS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

The effects of land use development, sea level rise adaptation infrastructure, and transportation projects would be similar; therefore, the discussion of their impacts is combined below. Historical resources are specific to their local context; therefore, impacts on these resources resulting from the proposed Plan would occur at the local level. As shown in **Table 3.7-1**, the nine counties of the Plan area have numerous historical resources that have been listed on the NRHP and CRHR, designated as a California Historical Landmark, or listed on the Caltrans Local Bridge Survey.

Construction and Operation

Projects located in areas with known historical sites, located in communities with established historic preservation programs, or involving activities that would introduce new visual elements or disturb the existing terrain have the potential to result in significant historical resource impacts. These projects could potentially reduce the aesthetic and physical integrity of historic districts and buildings. A higher incidence of conflict with historical sites is expected to occur in urban areas with buildings that are more than 45 years old.

As described in Chapter 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.7 million residents and 1.4 million jobs, resulting in 1.4 million new households. The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that result in focused housing and job growth concentrated primarily in or adjacent to developed areas and along existing transit corridors. Projects located in developed areas would be less likely to introduce new visual elements that could alter the visual character associated with historic districts or buildings. Projects located in or traversing rural lands could also have significant impacts related to sites that are singular examples of a historical setting or structures whose historic value and significance have not been previously evaluated and recognized.

Construction could directly impact historical resources and ongoing operation could have indirect impacts on historical resources. Identification of the degree and extent of impact requires project-specific analysis that includes a determination of the importance (i.e., the eligibility for local, State, or national register listing) of any historical resource recognized within a proposed alignment or project area. Given the magnitude and location of new development and transportation projects involving construction activities in the proposed Plan, it is possible that significant impacts on historical resources could occur. Examples of potential effects resulting from development or transportation projects include:

- damage to or destruction of a structure or property that is a designated historical resource, that is eligible for listing as a historical resource, or that has not yet been evaluated;
- infill development that is visually incompatible with a designated historic district; and
- roadway improvements that substantially alter the visual character of a designated historic structure or district.

Conclusion

Because implementation of the proposed Plan's land use development, sea level rise adaptation infrastructure, and transportation projects has the potential to significantly affect historical resources on a regional and localized level, these impacts are considered **potentially significant (PS)**. Mitigation Measure CUL/TCR-1 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure CUL/TCR-1 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Require a survey and evaluation of structures greater than 45 years in age within the area of potential effect to determine their eligibility for recognition under federal, State, or local historic preservation criteria. The evaluation shall be prepared by an architectural historian or historical architect meeting the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation Professional Qualification Standards (SOI PQS). The evaluation shall comply with CEQA Guidelines Section 15064.5(b) and, if federal funding or permits are required, with Section 106 of the National Historic Preservation Act of 1966 (16 U.S. Code Section 470 et seq.). Study recommendations shall be implemented.

- Realign or redesign projects to avoid impacts on known historical resources where possible.

- If avoidance of a significant historical resource is not feasible, implement additional mitigation options that include specific design plans for historic districts or plans for alteration or adaptive reuse of a historical resource that follows the Secretary of the Interior's *Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings*. The application of the standards shall be overseen by an architectural historian or historic architect meeting the SOI PQS. Prior to any construction activities that may affect the historical resource, a report meeting industry standards shall identify and specify the treatment of character-defining features and construction activities and be provided to the lead agency for review and approval.

- If a project would result in the demolition or significant alteration of a historical resource, the resource shall be recorded prior to demolition or alteration. Recordation shall take the form of Historic American Buildings Survey (HABS), Historic American Engineering Record (HAER), or Historic American Landscape Survey (HALS) documentation and shall be performed by an architectural historian or historian who meets the SOI PQS. The documentation package shall be archived in appropriate public and secure repositories. The specific scope and details of documentation shall be developed at the project level in coordination with the lead agency.

- Comply with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect historical resources.

Significance after Mitigation

Implementation of Mitigation Measure CUL/TCR-1 would reduce impacts associated with historical resources because it would require the performance of professionally accepted and legally compliant procedures for the avoidance of known historical resources and the evaluation of previously undocumented historical resources. To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact may be reduced to less than significant with mitigation (LTS-M) by avoidance or project redesign, by minimizing physical

alterations, or by designing building use while retaining a property's historic character. However, CEQA Guidelines [CCR 15126.4(b)(2)] note that in some circumstances, documentation of an historical resource will not mitigate the effects of demolition of that resource to a less-than-significant level because the historic resources would no longer exist. The entire removal of a historically significant building or structure and/or the loss of character-defining features, however, would result in a significant and unavoidable (SU) impact. Therefore, this impact would be **significant and unavoidable (SU)**.

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact CUL/TCR-2: Cause a substantial adverse change in the significance of a unique archaeological resource as defined in Guidelines Section 15064.5 (PS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Construction

Archaeological artifacts are by nature specific to their local context; therefore, impacts on these resources resulting from the proposed Plan would occur at the local level. Implementation of the land use development pattern, sea level rise adaptation infrastructure, and transportation projects could result in archaeological impacts if construction activities include the disturbance of previously identified or unidentified archaeological resources. Projects involving excavation, grading, or soil removal in previously undisturbed areas have the greatest likelihood to encounter significant archaeological resources. Likewise, the establishment of staging areas, temporary roads, and other temporary facilities necessary for construction activities has the potential to affect these cultural resources.

As shown in **Table 3.7-1**, the nine counties of the Plan area have only a few archaeological sites that have been listed on either the NRHP or the CRHR. Marin and San Francisco Counties have five sites that are listed on both the NRHP and the CRHR, Sonoma County has four, Santa Clara has two, and San Mateo has one. Archaeological sites listed on only the CRHR are more numerous; Contra Costa County has 41, Santa Clara County has 31, Sonoma County has 17, Alameda County has 12, Napa County has 11, Solano County has five, Marin County has four, and San Francisco County has two.

Both rural land conversion and urban infill have the potential to disturb cultural resources, although rural areas are more likely to contain intact archaeological resources that are situated in their historic context because these areas are less likely to have been subject to previous ground disturbance. Development anticipated as part of the proposed Plan would develop approximately 12,300 acres of land not currently designated as urban built-up by FMMP over the course of the planning period. **Table 3.7-3** indicates that this would primarily occur in Contra Costa, Solano, Alameda, and Santa Clara Counties.

Table 3.7-3: Future Acreages in "Urban" Land by County

County	Inside Urban and Built-Up Land (acres)	Inside Urban and Built-Up Land (%)	Outside Urban and Built-Up Land (acres)	Outside Urban and Built-Up Land (%)	Total (acres)	Total (%)
Alameda	5,600	79%	1,500	21%	7,100	100%
Contra Costa	4,400	45%	5,300	55%	9,700	100%
Marin	1,100	89%	130	11%	1,300	100%
Napa	300	38%	490	62%	790	100%
San Francisco	3,400	100%	< 1	< 1%	3,400	100%
San Mateo	2,300	87%	360	13%	2,700	100%
Santa Clara	7,600	89%	920	11%	8,500	100%
Solano	1,000	25%	3,100	75%	4,100	100%
Sonoma	1,400	73%	510	27%	1,900	100%
Total	27,200	69%	12,300	31%	39,400	100%

Note: Numbers less than 1 are shown as "<1; whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum due to independent rounding.
Source: Data compiled by MTC and ABAG 2021

Land use development projects in locations of sensitivity, such as the historic margins of San Francisco and San Pablo Bays, ridgetops, midslope terraces, hill bases, alluvial flats, and inland valleys, are more likely to encounter archaeological resources. Sea level rise adaptation infrastructure under the proposed Plan includes a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. Ground-disturbing construction of levees, seawalls, marsh restoration, and tidal gates would occur in the archaeologically sensitive areas of the San Francisco and San Pablo Bays, in areas that are likely to have not been developed. Sea level rise adaptation infrastructure such as elevated roadways, although also located in these same sensitive areas, would likely be located in previously disturbed areas, because they would follow existing roadways.

Most transportation corridors typically follow valleys and drainage areas, which often correspond with historic settlement patterns. Infill development and transportation projects involving improvements within existing urban areas, within existing transportation corridors, or to existing infrastructure or operations are less likely to affect archaeological resources because these projects are generally located in already-disturbed areas that typically have been subject to previous cultural resource surveys; as described previously, historically significant data are unlikely to be gained from archaeological materials located in areas that have been disturbed. Therefore, encountering intact, previously unknown archaeological resources, still associated with an archaeological site in its historic context, during ground-disturbing activities is less likely. Some transportation projects, particularly new rail projects, could be located in areas that have not been subject to previous ground disturbance. The Transbay rail crossing would span the bay and could require underwater ground-disturbing activities on the bay floor. The degree and extent of impacts would depend upon project location and construction methods. Project-specific analysis would be required to determine the precise area of impact and the value (i.e., the eligibility for local, State, or national register listing) of any archaeological resource identified within a proposed alignment or project area. Furthermore, all projects undertaken or overseen by Caltrans must abide by extensive procedures and policies, outlined in the *Caltrans Environmental Handbook, Volume 2*, that dictate the nature and extent of cultural resource protections consistent with State and federal law. Because ground disturbance has the potential to disturb unique archeological resources, this impact is potentially significant (PS).

Operation

Proposed Plan implementation would result in the placement and operation of land use development, sea level rise adaptation infrastructure, and transportation projects. Once developed, no additional earthmoving activities related to sea level rise adaptation infrastructure would occur that could disturb archaeological resources. This impact would be less than significant (LTS).

Conclusion

Because implementation of the proposed Plan's and use development pattern, sea level rise adaptation infrastructure, and transportation projects has the potential to adversely affect archaeological resources, these impacts are considered **potentially significant (PS)**. Mitigation Measure CUL/TCR-2 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure CUL/TCR-2 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Before construction activities, project sponsors shall retain a qualified archaeologist to conduct a record search at the appropriate information center to determine whether the project area has been previously surveyed and whether resources were identified; the record search shall include contacting the NAHC to request a Sacred Lands File search and a list of relevant Native American contacts who may have additional information. If a survey of the project area has not been conducted in the last 5 years, project sponsors shall retain a qualified archaeologist to conduct archaeological surveys prior to construction activities. Project sponsors shall follow recommendations identified in the survey, which may include activities such as subsurface testing, designing and implementing a Worker Environmental Awareness Program, construction monitoring by a qualified archaeologist, avoidance of sites, or preservation in place.

- Areas determined to be of cultural significance shall be monitored during the grading, excavation, trenching, and removal of existing features by a qualified archeologist and culturally affiliated California Native American tribal monitor.

- To ensure that new transportation facilities, such as the Transbay rail crossing, do not adversely affect potentially buried archaeological deposits, an underwater archaeological survey shall be conducted to identify, evaluate, and protect significant submerged cultural resources prior to activities that would disturb the shoreline or the floor of the bay. Additionally, the archaeologist shall request a search of California State Lands Commission's Shipwreck Database.

- When a project would impact a known archaeological site, the project sponsor and/or implementing agency shall determine whether the site is a historical resource (CEQA Guidelines Section 15064.5(c)(1)). If archaeological resources identified in the project area are considered potentially significant, the project sponsor and/or responsible implementing agency shall undertake additional studies overseen by a qualified archaeologist (36 CFR Section 61) to evaluate the resources eligibility for listing in the CRHR, NRHP, or local register and to recommend further mitigative treatment. Evaluations shall be based on, but not limited to, surface remains, subsurface testing, or archival and ethnographic resources, on the framework of the historic context and important research questions of the project area, and on the integrity of the resource. If a site to be tested is prehistoric, culturally affiliated California Native American tribal representatives shall be afforded the opportunity to monitor the ground-disturbing activities. Appropriate mitigation may include curation of artifacts removed during subsurface testing.

- If prehistoric archeological resources are identified through survey or discovered in the project area, the culturally affiliated California Native American tribe shall be notified. Both the archeologist and tribal monitor or tribal representative should strive for agreement on the determined significance of an artifact or cultural resource.

- If significant archaeological resources that meet the definition of historical or unique archaeological resources are identified in the project area, the preferred mitigation of impacts is preservation in place (CEQA Guidelines Section 15126.4(b); PRC Section 21083.2). Preservation in place may be accomplished by, but is not limited to, avoidance by project design, incorporation within parks, open space or conservation easements, covering with a layer of sterile soil, or similar measures. If preservation in place is feasible, mitigation is complete. Additionally, where the implementing agency determines that an alternative mitigation method is superior to in-place preservation, the project sponsor and/or implementing agency may implement such alternative measures.

- When preservation in place or avoidance of historical or unique archaeological resources are infeasible, data recovery through excavation shall be required (CEQA Guidelines Section 15126.4(b)). Data recovery would consist of approval of a Data Recovery Plan and archaeological excavation of an adequate sample of site contents so that research questions applicable to the site can be addressed. For prehistoric sites, the culturally affiliated California Native American tribe shall be afforded the opportunity to monitor the ground-disturbing activities. If only part of a site would be impacted by a project, data recovery shall only be necessary for that portion of the site. Data recovery shall not be required if the implementing agency determines prior testing and studies have adequately recovered the scientifically consequential information from the resources. Confidential studies and reports resulting from the data recovery shall be deposited with the Northwest Information Center. Mitigation may include curation for artifacts removed during data recovery excavation.

- If archaeological resources are discovered during construction, all work near the find shall be halted and the project sponsor and/or implementing agency shall follow the steps described under CEQA Guidelines Section 15064.5(f), including an immediate evaluation of the find by a qualified archaeologist (36 CFR Section 61) and implementation of avoidance measures or appropriate mitigation if the find is determined to be a historical resource or unique archaeological resource. If the find is a prehistoric archaeological site, the culturally affiliated California Native American tribe shall be notified and afforded the opportunity to monitor mitigative treatment. During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project area.

- Integrate curation of all historical resources or a unique archaeological resources and associated records in a regional center focused on the care, management, and use of archaeological collections. All Native American human remains and associated grave goods discovered shall be returned to their Most Likely Descendent and repatriated. The final disposition of artifacts not directly associated with Native American graves will be negotiated during consultation with the culturally affiliated California Native American tribes. Artifacts include material recovered from all phases of work, including the initial survey, testing, indexing, data recovery, and monitoring. Curated materials shall be maintained with respect for cultures and available to future generations for research.

- Project sponsors shall comply with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect archaeological resources.

Significance after Mitigation

Implementation of Mitigation Measure CUL/TCR-2 would reduce impacts associated with archaeological resources because it would require the performance of professionally accepted and legally compliant procedures for the discovery of previously undocumented significant archaeological resources. To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact may be less than significant with mitigation by avoiding or preserving in place unique archaeological resources through project design, and by avoiding or preserving inadvertent discoveries of significant archaeological resources through project redesign. If avoidance or preserving in place is infeasible, direct impacts may be reduced to a less-than-significant level by minimizing disturbance or undertaking additional investigation to determine the significance and integrity of the portion of the archaeological resource within the project area. The destruction or substantial alteration of the contributing physical characteristics or character of the physical setting of a unique archaeological resource, however, would result in a **significant and unavoidable (SU)** impact.

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact CUL/TCR-3: Disturb any human remains, including those interred outside of formal cemeteries (LTS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Construction

Impacts related to disturbance of human remains are construction impacts that occur from ground disturbance. Ground-disturbing effects of land use development pattern, sea level rise adaptation infrastructure, and transportation projects would be similar; therefore, the discussion of their impacts is combined below. Impacts on human remains are by nature specific to their local context, and for this reason, impacts on these resources resulting from the proposed Plan would occur at the local level. In general, potential impacts on human remains would be similar to those discussed for archaeological resource impacts discussed under Impact CUL/TCR-2. New land use development pattern, sea level rise adaptation infrastructure, and transportation projects involving construction activities that would disturb native terrain, including excavation, grading, or soil removal, would have the greatest likelihood to encounter human remains.

California law recognizes the need to protect Native American human burials, Native American skeletal remains, and items associated with Native American burials from vandalism and inadvertent destruction. The procedures for the treatment of Native American human remains are contained in California Health and Safety Code Section 7050.5 and PRC Section 5097 et seq.

If human remains are discovered during any construction activities, potentially damaging ground-disturbing activities in the area of the remains shall be halted immediately, and the project applicant shall notify the appropriate county coroner and the NAHC immediately, according to PRC Section 5097.98 and Section 7050.5 of the California Health and Safety Code. If the remains are determined by NAHC to be Native American, the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains. Following the coroner's findings, the NAHC-designated MLD and the

landowner shall determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting upon notification of a discovery of Native American human remains are identified in PRC Section 5097.94.

Compliance with California Health and Safety Code Section 7050.5 and PRC Section 5097 would provide an opportunity to avoid or minimize the disturbance of human remains and to appropriately treat any remains that are discovered. This would be less than significant (LTS).

Operation

Proposed Plan implementation would result in the operation of land use development, sea level rise adaptation infrastructure, and transportation projects, as well as transportation, housing, economic, and environmental strategies. Once developed, no additional earth moving activities that could disturb human remains would occur, and this would be less than significant (LTS).

Conclusion

This impact is **less than significant (LTS)** because there are existing State regulations and oversight in place that would effectively reduce the potential to disturb human remains to an acceptable level.

Mitigation Measures

None required.

Impact CUL/TCR-4: Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe (PS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Construction

Ground-disturbing effects of implementing the land use development pattern, sea level rise adaptation infrastructure, and transportation projects would be similar; therefore, the discussion of their impacts is combined below. Tribal cultural resources are by nature specific to their local context, and for this reason, impacts on these resources resulting from the proposed Plan would occur at the local level. In general, potential impacts on tribal cultural resources would be similar to those discussed for archaeological resources under Impact CUL/TCR-2. New land use development pattern, sea level rise adaptation infrastructure, and transportation projects involving construction activities that would disturb native terrain, including excavation, grading, or soil removal, would have the greatest likelihood to encounter tribal cultural resources. Because ground disturbance has potential to disturb tribal cultural resources, this impact is potentially significant (PS).

AB 52 requires that lead agencies undertaking CEQA review must, upon written request of a California Native American Tribe, begin consultation once the lead agency determines that the application for the project is complete. As detailed above in Section 3.7.1, “Environmental Setting,” MTC sent letters to 91 Native American tribal representatives in compliance with AB 52. Only the Wilton Rancheria, Amah Mutsun Tribal Band, and Federated Indians of Graton Rancheria (Graton Rancheria) replied to the August 28, 2020, letter. MTC requested consultation meetings with all three tribes; however, only Graton Rancheria responded. MTC/ABAG staff met for consultation with Graton Rancheria

representatives on November 18, 2020. As of the date of publication of this Draft EIR, no tribal cultural resources were identified.

Subsequent discretionary projects may be required to prepare site-specific project-level analysis to fulfill CEQA requirements, which may include additional AB 52 consultation that could lead to the identification of tribal cultural resources.

Operation

Proposed Plan implementation would result in land use development, sea level rise adaptation infrastructure, and transportation projects, as a result of housing, economic, transportation, and environmental strategies. Typically, once developed, there would be no additional earth moving activities affecting undisturbed ground that could disturb tribal cultural resources; rather, ongoing maintenance or repair activities would be in previously-disturbed areas. This would be less than significant (LTS).

Conclusion

Although no resources within the Plan area have been identified as meeting any of the PRC Section 5024.1(c) criteria, it is possible that tribal cultural resources could be identified during analysis of subsequent projects. Therefore, the proposed Plan would have a **potentially significant (PS)** impact on tribal cultural resources as defined in PRC Section 21074. Mitigation Measure CUL/TCR-4 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure CUL/TCR-4(a) If the implementing agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process required under PRC Section 21080.3.2, implementing agencies and/or project sponsors shall implement the following measures, where feasible and necessary, to address site-specific impacts and avoid or minimize the significant adverse impacts:

- Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource (PRC Section 21084.3[a]). If the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process, provisions in the PRC describe mitigation measures that, if determined by the lead agency to be feasible, may avoid or minimize the significant adverse impacts (PRC Section 21084.3[b]). Examples include:
  - avoiding and preserving the resources in place, including planning and constructing to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space to incorporate the resources with culturally appropriate protection and management criteria;
  - treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including:
    - protecting the cultural character and integrity of the resource,
    - protecting the traditional use of the resource, and
    - protecting the confidentiality of the resource;

- establishing permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or using the resources or places; and
- protecting the resource.

- The implementing agency shall determine whether or not implementation of a project would indirectly affect tribal cultural resources by increasing public visibility and ease of access. If it would, the implementing agency shall take measures to reduce the visibility or accessibility of the tribal cultural resource to the public. Visibility of the resource can be reduced through the use of decorative walls or vegetation screening. Accessibility can be reduced by installing fencing or vegetation barriers, particularly noxious vegetation, such as poison oak or blackberry bushes. It is important to avoid creating an attractive nuisance when protecting tribal cultural resources. Conspicuous walls or signs indicating that an area is restricted may result in more attempts to access the excluded area.

Mitigation Measure CUL/TCR-4(b) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Implement Mitigation Measure CUL/TCR-2.

Significance after Mitigation

Implementation of Mitigation Measure CUL/TCR-4 would reduce impacts associated with tribal cultural resources because it would require the performance of professionally accepted and legally compliant procedures for the identification of tribal cultural resources associated with subsequent projects. To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact may be less than significant (LTS-M) by avoiding or preserving in place tribal cultural resources through project design. If avoidance or preserving in place is infeasible, disturbance of a tribal cultural resource, however, would result in a **significant and unavoidable (SU) impact**.

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

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3.8 GEOLOGY, SEISMICITY, AND MINERAL RESOURCES

This section evaluates the potential impacts related to geology and seismicity resulting from the implementation of the proposed Plan. In addition to regional geologic and seismic hazards, the potential effects related to mineral resources and local hazards, such as risks related to underlying geologic materials and soils, are also evaluated. The effects of erosion on water quality are addressed in Section 3.10, "Hydrology and Water Quality."

Comments received in response to the Notice of Preparation (NOP) included a request for analysis of future housing in liquefaction zones (see Section 3.8.3, "Impact Analysis") and ensuring sufficient water supply for fire-fighting following a major earthquake. Water supply availability is addressed in Section 3.14, "Public Utilities and Facilities."

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important" (CEQA Guidelines Section 15083). Neither the CEQA Guidelines nor the statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.8.1 Environmental Setting

REGIONAL GEOLOGY

The State of California has eleven natural geologic regions, known as geomorphic provinces, which are defined by the presence of similar physical characteristics, such as relief, landforms, and geology (CGS 2002). The majority of the nine-county San Francisco Bay Area is located within what is known as the Coast Range geomorphic province, with eastern portions of Solano, Contra Costa, and Alameda Counties extending into the neighboring Great Valley geomorphic province located east of the Coast Ranges.

Coast Range Province

The Coast Range is a geologically complex province that extends 400 miles along the Pacific Coast, from Oregon south into southern California. The Coast Range province is characterized by a series of northwest-trending ridges and valleys that run roughly parallel to the San Andreas fault zone and can be further divided into the northern and southern ranges, which are separated by San Francisco Bay. The San Francisco Bay is a broad, shallow regional structural depression created from an east-west expansion between the San Andreas and the Hayward Fault Systems. In the southern Bay Area, the Santa Cruz Mountains border San Francisco Bay on the west, while the Berkeley Hills, an extension of the Diablo Range, are to the east. Mount Diablo marks the northern end of the Diablo Range, which stretches 130 miles southward to the Kettleman Hills at the cusp of the San Joaquin Valley. The broad, low-relief Santa Clara and San Benito Valleys lie between the Santa Cruz Mountains and the Diablo Range. In the North Bay, the rugged, mountainous character of the Marin Peninsula is dominated by Mount Tamalpais (elevation 2,604 feet above sea level).

Much of the Coast Range province is composed of marine sedimentary and volcanic rocks that form the Franciscan Assemblage, located east of the San Andreas Fault. The Franciscan Assemblage in this region of California is approximately 65–150 million years old and consists primarily of greenstone (altered volcanic rocks), basalt, chert (ancient silica-rich ocean deposits), and sandstone that originated as ancient sea floor sediments. The region west of the San Andreas Fault is underlain by a mass of basement rock known as the Salinian Block that is composed mainly of marine sandstone (up to 65 million years old) and various metamorphic rocks[1] believed to have originated some 350 miles to the south. The Salinian Block has been moving northward along the west side of the San Andreas Fault, and associated rocks can be found as far north as Point Arena, on the Mendocino County coast.

Marginal lands surrounding San Francisco Bay consist generally of alluvial plains of low relief that slope gently bayward from the bordering uplands and foothills. The alluvial plains that make up the bay margin are composed of alluvial sediments (up to two million years old) consisting of unconsolidated stream and basin deposits. These alluvial plains terminate bayward at the tidal marshlands that immediately surround the bay. Marshlands are composed of intertidal deposits, including widely found, fine-grained plastic clays commonly referred to as bay mud, which, in some areas, underlies artificial fills. Historic shoreline reclamation projects beginning at the turn of the 20th century have resulted in the placement of varying types of artificial fill that overlie intertidal deposits. San Francisco Bay is originally believed to have encompassed 700 square miles, although dredging and fill operations have reduced the extent of the bay to approximately 400 square miles.

Great Valley

Portions of Solano, Contra Costa, and Alameda Counties are in the Great Valley geomorphic province, which is characterized by a large, nearly level inland alluvial plain 400 miles in length and averaging 50 miles in width. The topography of the Great Valley is primarily flat, but it slopes gently along its eastern margin (Sierra Nevada foothills) and western margin (Coast Ranges). Sediments in the Great Valley consist of gravels, sands, clays, and silts that originated largely from the Sierra Nevada, with sediments from the Coast Ranges contributing to a lesser extent. The sediments that compose the valley floor are thick, in some areas extending as far as 10 miles below the surface. The Great Valley Sequence, a thick section of ancient sea floor sediments extending under the Great Valley, overlies the Coast Range Franciscan Assemblage along the valley's western flank.

SOILS

A wide variety of soils and soil types can be found throughout the nine-county Bay Area region. Soils in the Bay Area fall within four major classifications established by the U.S. Natural Resources Conservation Service. Depending on localized conditions, these general classifications are grouped into more specific soil types by location, climate, and slope. The Santa Clara Valley and the alluvial plains surrounding San Francisco Bay are classified as deep alluvial plain and floodplain soils. These soils occupy the valleys in areas with higher rainfall and are considered productive when drained and fertilized. Soils closer to the bay margin are generally dark-colored clays that have a high water table or are subject to flooding. Soils at the extreme edge of San Francisco Bay have a moderate to high content of soluble salts; these soils are referred to as alkali soils. Soils in northern San Mateo County, the eastern portion of San Francisco, and Marin County are classified as residual soils and are characterized by moderate depth to underlying bedrock. However, much of the Bay Area has been developed, and in urbanized areas, native soils are commonly no longer present or have been reworked and combined with imported fill materials over a long history of earthwork activities associated with development.

[1] Metamorphic rocks are sedimentary or volcanic rocks altered by prolonged heating and deformation.

Seismologists have observed differences in seismic shaking effects that are partially dependent on underlying soil deposits. Soft soils are known to amplify ground shaking and are considered in seismic design requirements. The National Earthquake Hazards Reduction Program (NEHRP) has defined five soil types based on several different criteria (Milsom and Eriksen 2011):

- **Soil Type A** includes unweathered intrusive igneous rock. Does not contribute greatly to shaking amplification.
- **Soil Type B** includes volcanics, most Mesozoic bedrock, and some Franciscan bedrock. Does not contribute greatly to shaking amplification.
- **Soil Type C** includes some Quaternary sands, sandstones and mudstones, some Upper Tertiary sandstones, mudstones and limestone, some Lower Tertiary mudstones and sandstones, and Franciscan melange and serpentinite. Can contribute to shaking amplification depending on site-specific characteristics.
- **Soil Type D** includes some Quaternary muds, sands, gravels, and silts. Significant amplification of shaking by these soils is generally expected.
- **Soil Type E** includes water-saturated mud and artificial fill. The strongest amplification of shaking is expected for this soil type.

SEISMICITY

The Bay Area is considered a region of high seismic activity with numerous active and potentially active faults capable of producing significant seismic events. An active fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 10,000 years). A potentially active fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years) unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not mean that faults lacking evidence of surface displacement are necessarily inactive. "Sufficiently active" is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (CGS 2018). The U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities has evaluated the probability of one or more earthquakes occurring in the Bay Area and concluded that there is currently a 72-percent likelihood of a magnitude 6.7 or higher earthquake occurring in the Bay Area over the 30-year period between 2014 and 2043 (USGS 2016). The Hayward, Calaveras, and San Andreas Faults are the three faults considered to have the highest probabilities of causing a significant seismic event in the Bay Area. These three faults are strike-slip-faults[2] that have experienced movement within the last 155 years.

The San Andreas Fault is a major structural feature in the region and forms a boundary between the North American and Pacific tectonic plates. Other principal faults capable of producing significant Bay Area ground shaking, listed in **Table 3.8-1** and shown in **Figure 3.8-1**, include the Hayward Fault, the Rodgers Creek–Healdsburg Fault, the Concord–Green Valley Fault, the Marsh Creek-Greenville Fault, and the West Napa Fault. A major seismic event on any of these active faults could cause significant ground shaking and surface fault rupture, as was experienced during earthquakes in recorded history, namely the 1868 Hayward earthquake, the 1906 San Francisco earthquake, and the 1989 Loma Prieta

[2] "Strike-slip" faults primarily exhibit displacement in a horizontal direction but may have a vertical component. During right-lateral strike-slip movement of the San Andreas Fault, for example, the western portion of the fault slowly moves north while the relative motion of the eastern portion is to the south.

earthquake. The estimated maximum moment magnitudes identified in **Table 3.8-1** represent *characteristic* earthquakes on particular faults.[3] In addition, active blind-thrust and reverse-thrust faults[4] in the region that accommodate compressional movement include the Monte Vista–Shannon and Mount Diablo Faults.

Table 3.8-1: Active Bay Area Faults

Fault	Recency of Movement	Historical Seismicity
Hayward	1868 Holocene	M7.0, 1868;
San Andreas	1989 Holocene	M6.9, 1989; M7.8, 1906; M7.4, 1838; Many < M6
Rodgers Creek- Healdsburg	1969 Holocene	M6.4, 1898; M5.6, M.7 1969
Concord–Green Valley	1955 Holocene	M5.4, 1955
Marsh Creek-Greenville	1980 Holocene	M5.4, 1980
San Gregorio–Hosgri	Holocene; Late Quaternary	Many M5.0 - M6.0
West Napa	2000 Holocene	M6.0, 2014; M5.0, 2000
Maacama	Holocene	Historic active creep
Calaveras	1984 Holocene	M6.2, 1984; Many < M5
Mount Diablo Thrust	Quaternary (possibly active)	N/A

Note: Magnitudes are shown in moment magnitude scale. Only the largest recorded earthquakes are listed.
Source: CGS 2021

GEOLOGIC AND SEISMIC HAZARDS

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults or even along different strands of the same fault. Future faulting is generally expected along different segments of faults with recent activity (CGS 2008). Structures and transportation and utility systems crossing fault traces are at risk during a major earthquake because of ground rupture caused by differential lateral and vertical movement on opposite sides of the active fault trace. Lateral displacement may range from a few inches to over 20 feet, as occurred in the 1906 San Francisco earthquake. Thrust faults, as well as faults with strike-slip movement, can have a vertical displacement component of several feet.

[3] Moment magnitude is related to the physical size of a fault rupture and movement across a fault, while Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave. Moment magnitude provides a physically meaningful measure of the size of a faulting event. The concept of "characteristic" earthquake means that we can anticipate, with reasonable certainty, the actual damaging earthquakes (the size of the earthquakes) that can occur on a fault.

[4] A reverse fault is one with predominantly vertical movement in which the upper block moves upward in relation to the lower block; a thrust fault is a low-angle reverse fault. Blind-thrust faults are low-angled subterranean faults that have no surface expression.

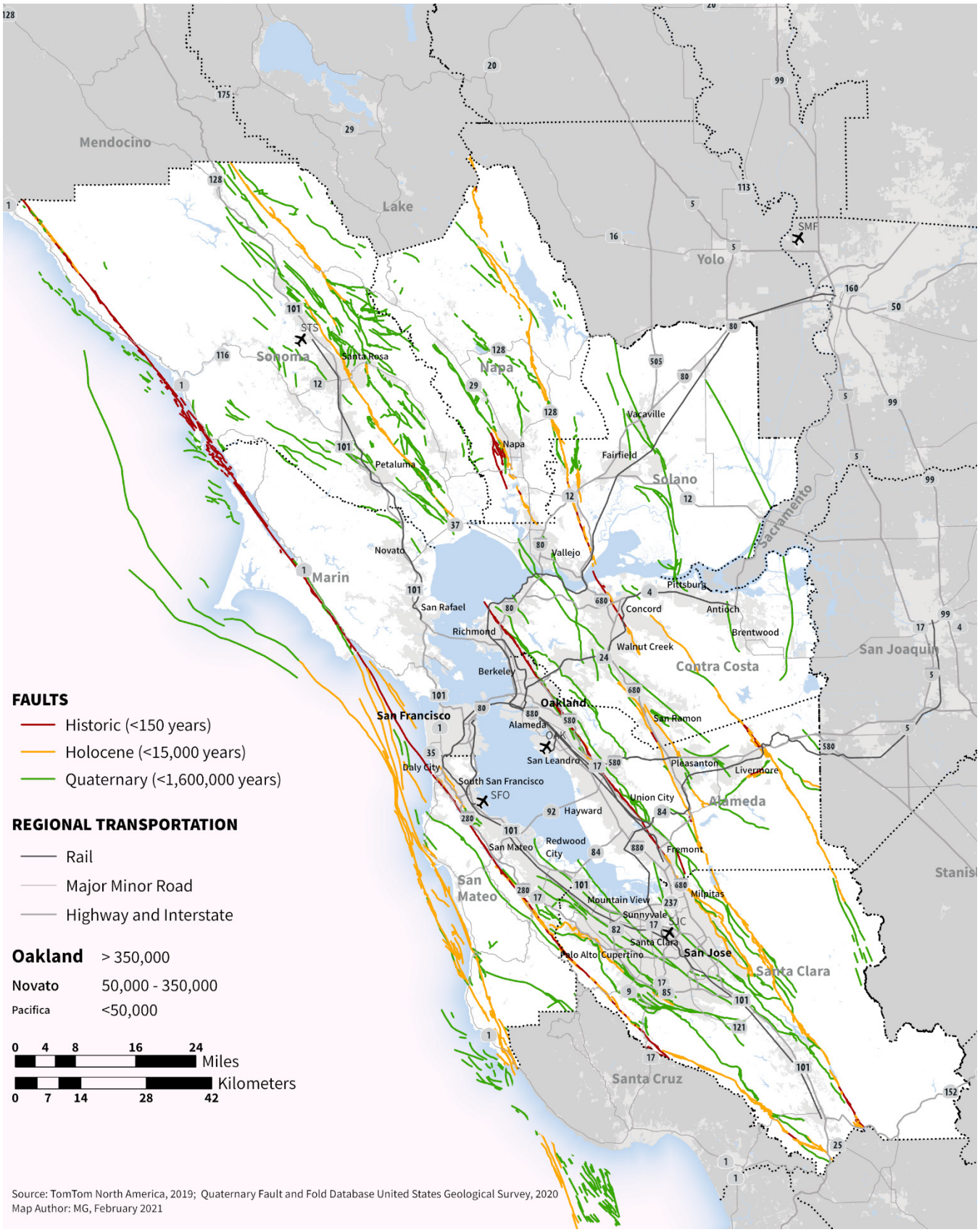

Figure 3.8-1: Principal Faults

The exception to obvious surface displacement is the "blind-thrust" fault. The Mount Diablo blind thrust fault has been mapped on the western base of Mount Diablo on the east side of the San Ramon Valley. This fault is considered a "blind thrust" because it does not exhibit a surficial expression of displacement. The Mount Diablo thrust fault slips at a long-term rate of about three millimeters per year, but it has not been zoned as an active fault under the Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) because of the inability to identify its exact location on the surface (see description of the Alquist-Priolo Act in Section 3.8.2, "Regulatory Setting"). Although surface fault rupture could occur on any of the multiple active and potentially active faults located within the Bay Area, ground rupture is most likely to occur along active faults zoned as Earthquake Fault Zones under mandate of the Alquist-Priolo Act.

Ground Shaking

Strong ground movement from a major earthquake could affect the Bay Area during the next 30 years. Ground shaking may affect areas hundreds of miles distant from the earthquake's epicenter. The intensity of ground movement during an earthquake can vary depending on the overall magnitude, distance from the fault, direction of earthquake energy, and type of geologic material.

Areas that are underlain by bedrock tend to experience less ground shaking than those underlain by unconsolidated sediments, such as artificial fill. Particularly, unconsolidated sediments in areas located relatively distant from faults can intensify ground shaking. For example, the areas that experienced the worst structural damage further away from the Loma Prieta epicenter were those locations with soils that amplified the effects of ground shaking. The Modified Mercalli Intensity (MMI) scale (see **Table 3.8-2**) is a common measure of earthquake effects attributable to ground shaking intensity. The MMI values range from I (earthquake not felt) to XII (damage nearly total), and intensities as low as V could cause structural damage.[5]

Table 3.8-2: Modified Mercalli Intensity Scale

Intensity	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck.
IV	Felt indoors by many, outdoors by a few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Note: The original MMI scale goes to XII, but those values are no longer reported or described by the U.S. Geological Survey. The description was adapted slightly from the U.S. Geological Survey.
Source: USGS data compiled by MTC and ABAG in 2021 based on USGS 2020

[5] The damage level represents the estimated overall level of damage that will occur for various MMI levels. The damage, however, will not be uniform. Some structures will experience substantially more damage than this overall level, and others will experience substantially less damage. Not all structures perform identically in an earthquake. The age, material, type, method of construction, size, and shape of a structure all affect its performance.

Areas in the Bay Area most susceptible to intense ground shaking are those areas located closest to the earthquake-generating fault and areas underlain by thick, loosely unconsolidated, saturated sediments, particularly soft, saturated bay muds, and artificial fill along the tidal margins of San Francisco Bay. Probabilistic ground shaking is mapped in **Figure 3.8-2**. This map shows likely shaking intensity in the Bay Area in any 50-year period from all possible faults.

Liquefaction

Liquefaction is a phenomenon whereby unconsolidated and/or nearly saturated soils lose cohesion and are converted to a fluid state as a result of significant shaking. The relatively rapid loss of soil shear strength during strong earthquake shaking results in the temporary fluidlike behavior of the soil. Soil liquefaction causes ground failure that can damage roads, airport runways, pipelines, underground cables, and buildings with shallow foundations. Liquefaction can occur in areas characterized by water-saturated, cohesionless, granular materials at shallow depths, or in saturated unconsolidated or artificial fill sediments located in reclaimed areas along the margin of San Francisco Bay and along Bay Area river systems. Liquefaction potential is highest in areas underlain by shallow groundwater and bay fills, bay mud, and unconsolidated alluvium. **Figure 3.8-3** illustrates liquefaction susceptibility in the Bay Area.

Expansive Soils

Expansive soils possess a "shrink-swell" characteristic. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying. Changes in soil moisture can result from rainfall, landscape irrigation, utility leakage, roof drainage, and/or perched groundwater. Perched groundwater is a local saturated zone above the water table that typically exists above an impervious layer (such as clay) of limited extent. Expansive soils are typically very fine grained and have a high to very high percentage of clay. Structural damage may occur incrementally over a long period of time, usually as a result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils. Soils with high clay content, such as the bay muds located on the margins of the San Francisco Bay, are highly expansive.

Soil Erosion

Soil erosion is the process whereby soil materials are worn away and transported to another area, either by wind or water. Rates of erosion can vary depending on soil material and structure, building placement, and human activity. The potential for soil erosion is variable throughout the Bay Area. Soil with high amounts of silt can be easily eroded, while sandy soils are less susceptible to erosion. Excessive soil erosion can eventually damage building foundations, roadways, and dam embankments. Erosion is most likely on sloped areas with exposed soil, especially where unnatural slopes are created by cut-and-fill activities. Soil erosion rates can, therefore, be higher during the construction phase. Typically, the soil erosion potential is reduced once the soil is graded and covered with vegetation, concrete, structures, or asphalt.

Settlement

Settlement is the depression of the bearing soil when a load, such as that of a building or new fill material, is placed upon it. Settlement can occur from immediate settlement, consolidation, shrinkage of expansive soil, and liquefaction (discussed above). Immediate settlement occurs when a load from a structure or placement of new fill material is applied, causing distortion in the underlying materials. This settlement occurs quickly and is typically complete after placement of the final load. Consolidation settlement occurs in saturated clay from the volume change caused by squeezing out water from the pore spaces. Consolidation occurs over a period of time and is followed by secondary compression, which is a continued change in void ratio under the application of the load. Soils tend

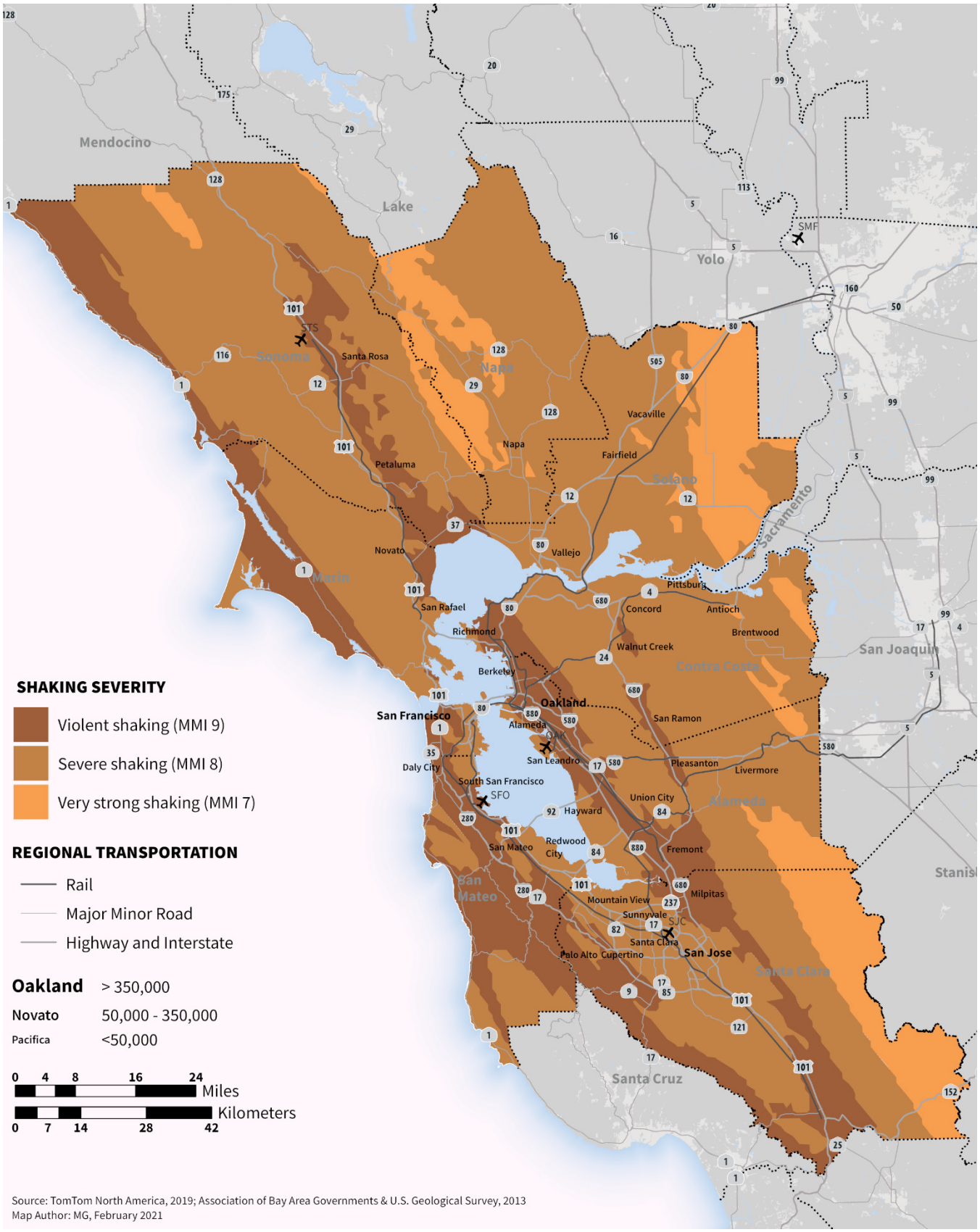

Figure 3.8-2: Ground Shaking Intensity

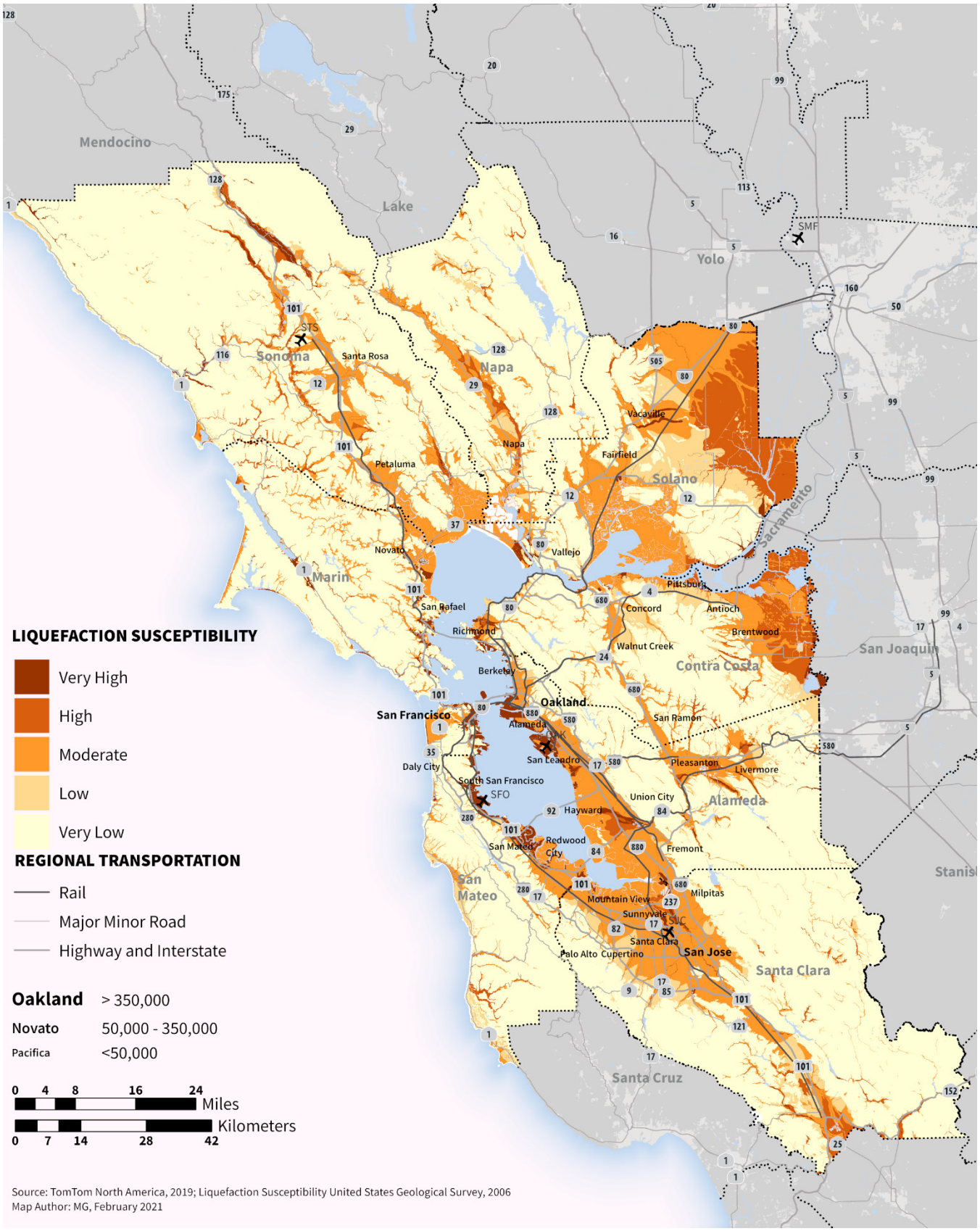

Figure 3.8-3: Liquefaction

to settle at different rates and by varying amounts, depending on the load weight, which is a phenomenon referred to as differential settlement. Areas are susceptible to differential settlement if underlain by compressible sediments, such as poorly engineered artificial fill or the bay mud present in the marshland on the San Francisco Bay margin.

Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid compaction and settling of subsurface materials (particularly loose, noncompacted, and variable sandy sediments) related to the rearrangement of soil particles during prolonged ground shaking. Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates).

Land Subsidence

Land subsidence can occur in areas experiencing significant declines in groundwater levels. When groundwater is extracted from aquifers in sufficient quantity, the groundwater level is lowered and the water pressure, which supports the sediment grains structure, decreases. In unconsolidated deposits, as aquifer pressures decrease, the increased weight from overlying sediments may compact the fine-grained sediments and permanently decrease the porosity of the aquifer and the ability of the aquifer to store water. In the Bay Area, historical land subsidence has been observed only in Santa Clara County. Nonetheless, contemporary groundwater management plans in the area address the potential for land subsidence (Valley Water 2021).

Landslides

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, triggered either by static (i.e., gravity) or by dynamic (i.e., earthquake) forces. A slope failure is a mass of rock, soil, and debris displaced downslope by sliding, flowing, or falling. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience shallow soil slides, rapid debris flows, and deep-seated rotational slides. Landslides may occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes that exhibit old landslide features, such as scarps, slanted vegetation, and transverse ridges. Cutting into the slope and removing the lower portion, or slope toe, can reduce or eliminate the slope support, thereby increasing stress on the slope.

Landslide-susceptible areas are characterized by steep slopes and downslope creep of surface materials. Debris flows consist of a loose mass of rocks and other granular material that, if saturated and present on a steep slope, can move downslope. The rate of rock and soil movement can vary from a slow creep over many years to a sudden mass movement. Landslides occur throughout California, but the density of incidents increases in zones of active faulting.

Slope stability can depend on a number of complex variables. The geology, structure, and amount of groundwater in the slope affects slope failure potential, as do external processes (i.e., climate, topography, slope geometry, and human activity). The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope. Slope failure under static forces occurs when those forces initiating failure overcome the forces resisting slope movement. For example, a soil slope may be considered stable until it becomes saturated with water (e.g., during heavy rains or because of a broken pipe or sewer line). Under saturated conditions, the water pressure in the individual pores within the soil increases, reducing the strength of the soil. Areas mapped by USGS as subject to rain-induced landslide hazards are shown in **Figure 3.8-4**. Areas classified as Mostly Landslides consist of mapped landslides and intervening areas between groups of mapped landslides. The Many Landslides designation also consists of mapped landslides and more extensive intervening areas than Mostly Landslides areas. Areas classified as Few

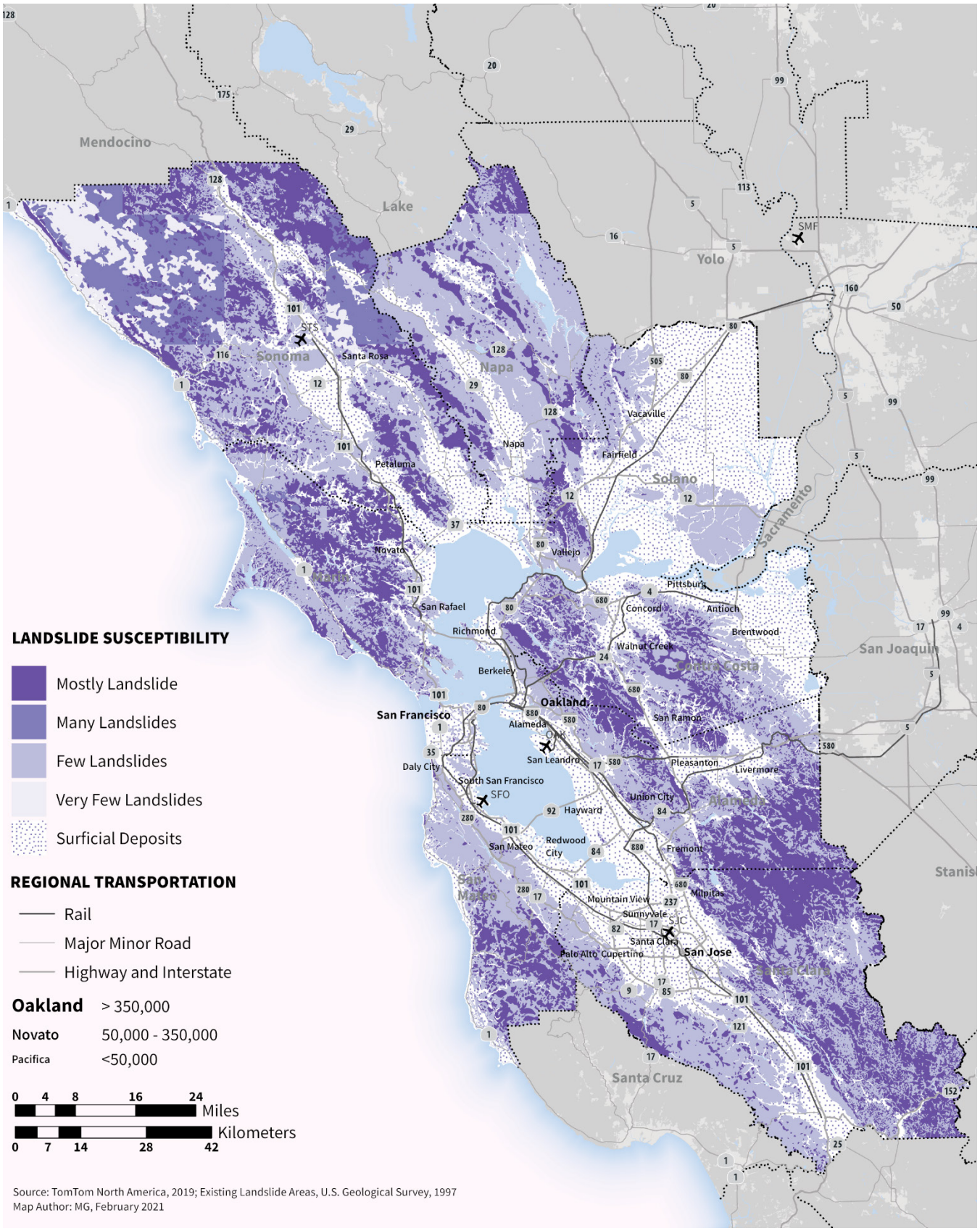

Figure 3.8-4: Landslides

Landslides contain few, if any, large, mapped landslides, but locally contains scattered small landslides and questionably identified larger landslides (USGS 1997).

Earthquake motions can induce significant horizontal and vertical dynamic stresses in slopes that can trigger failure. Earthquake-induced landslides can occur in areas with steep slopes that are susceptible to strong ground motion during an earthquake. Earthquake-induced landslide hazards have been mapped for only a portion of the Plan area. Where mapping is available, the hazard areas generally coincide with the areas mapped as Mostly, Many, and Few Landslides.

PALEONTOLOGICAL SETTING

Important vertebrate and invertebrate fossils and unique geologic units have been documented throughout California. The fossil yielding potential of a particular area is highly dependent on the geologic age and origin of the underlying rocks (refer to geologic timescale in **Table 3.8-3**). Paleontological potential refers to the likelihood that a rock unit will yield a unique or significant paleontological resource. All sedimentary rocks, some volcanic rocks, and some low-grade metamorphic rocks have potential to yield paleontological resources. Depending on location, the paleontological potential of subsurface materials generally increases with depth beneath the surface, as well as with proximity to known fossiliferous deposits.

Table 3.8-3: Divisions of Geologic Time

Era	Period	Time in Millions of Years Ago (approximately)	Epoch
Cenozoic	Quaternary	< 0.01	Holocene
		2.6	Pleistocene
	Tertiary	5.3	Pliocene
		23	Miocene
		34	Oligocene
		56	Eocene
		65	Paleocene
Mesozoic	Cretaceous	145	--
	Jurassic	200	--
	Triassic	251	--
Paleozoic	Permian	299	--
	Carboniferous	359	--
	Devonian	416	--
	Silurian	444	--
	Ordovician	488	--
	Cambrian	542	--
Precambrian		2,500	--

Source: USGS 2010

Pleistocene or older (older than 11,000 years) continental sedimentary deposits are considered to have a high paleontological potential while Holocene-age deposits (less than 10,000 years old) are generally considered to have a low paleontological potential because they are geologically immature and are unlikely to contain fossilized remains of organisms. Metamorphic and igneous rocks have a low paleontological potential, either because they formed beneath the surface of the earth (such as granite), or because they have been altered under high heat and pressures, chaotically mixed or

severely fractured. Generally, the processes that form igneous and metamorphic rocks are too destructive to preserve identifiable fossil remains.

Paleontological Resources

A search of the University of California Museum of Paleontology (UCMP) database at UC Berkeley was conducted on April 12, 2021. Records of paleontological finds maintained by the UCMP (UCMP 2021) state that there are approximately 5,809 sites at which fossil remains have been found in the Bay Area, with the greatest concentration of 2,570 occurring in Contra Costa County. San Mateo County has the second highest number of paleontological sites at 924. **Table 3.8-4** shows a breakdown of these paleontological resources by epoch of each site.

Table 3.8-4: Bay Area Recorded Paleontological Sites

	Alameda County	Contra Costa County	Marin County	Napa County	San Francisco County	San Mateo County	Santa Clara County	Solano County	Sonoma County
Holocene	5	4	11	0	57	73	5	86	11
Pleistocene	74	73	24	1	36	120	19	12	15
Pliocene	8	88	52	4	16	222	7	5	81
Miocene	239	1,148	24	9	3	27	53	8	24
Oligocene	0	134	0	0	0	5	2	0	0
Eocene	42	577	0	2	0	101	9	119	1
Paleocene	2	223	0	1	0	5	11	8	7
Cretaceous	51	110	0	76	1	51	30	35	10
Jurassic	13	2	1	23	0	0	9	0	0
Recent	49	90	241	3	83	305	8	8	379
Unknown	50	121	16	24	32	15	38	16	26
Total	533	2,570	369	143	228	924	191	297	554

Note: Two periods are identified for some sites listed in the University of California 2021 source. In those cases, the more recent period is identified in this table.
Source: UCMP 2021

MINERAL RESOURCES

Most of the mineral resources in the Bay Area are located in the populated plains or valleys (rather than in the mountainous areas), which limits the potential for extraction. Nevertheless, substantial mineral resource extraction has occurred. More than 25 mineral commodities have been recovered in substantial quantities (USGS 1975).

Table 3.8-5 lists key mineral resources in the Bay Area. The major mineral resources recovered in the Bay Area are (1) construction materials, such as limestone and oyster shells (used in manufacture of cement), sand and gravel, and crushed stone; (2) energy sources, such as gas, oil, and geothermal power; and (3) salines. Historically, most mineral products have been used locally, fulfilling a need for low-cost construction materials and a supply of energy (USGS 1975).

Table 3.8-5: Bay Area Mineral Resources, by County

	Alameda County	Contra Costa County	Marin County	Napa County	San Francisco County	San Mateo County	Santa Clara County	Solano County	Sonoma County
Asbestos	X	X		X					
Chromite	X	X	X	X	X	X	X	X	X
Clay	X	X	X	X	X	X	X	X	X
Coal	X	X							
Copper	X	X	X	X			X		X
Diatomite		X		X					X
Expansible shale	X	X	X	X	X	X	X	X	X
Gemstones	X	X	X	X	X	X	X	X	X
Geothermal Resources				X					X
Limestone and shells	X	X	X	X		X	X	X	X
Magnesite	X			X			X		X
Manganese	X	X	X	X			X		X
Mercury	X	X	X	X	X	X	X	X	X
Mineral water		X	X	X		X	X		X
Oil and gas	X	X	X	X		X	X	X	X
Peat		X					X	X	
Pumice		X		X	X			X	X
Pyrite	X								
Salines	X		X	X		X	X	X	
Sand and gravel	X	X	X	X	X	X	X	X	X
Sands, specialty	X	X			X	X			
Silver				X					
Stone, crushed and broken	X	X	X	X	X	X	X	X	X
Stone, dimension	X	X	X	X	X	X	X	X	X
Stone, ornamental			X					X	
Sulfur, byproduct		X							

Source: USGS 1975

3.8.2 Regulatory Setting

FEDERAL REGULATIONS

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1977 to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the act established the National Earthquake Hazard Reduction Program (NEHRP). NEHRP's mission includes improved understanding and characterization of hazards and vulnerabilities, improvement of building codes and land use practices, risk reduction through post-earthquake investigations and education, development and improvement of design and construction techniques, improvement of mitigation capacity, development of alternative performance objectives to advance functional recovery, and

accelerated application of research results. The NEHRP designates the National Institute of Standards and Technology as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Programs under the NEHRP help inform and guide planning and building code requirements, such as emergency preparedness responsibilities and seismic code standards.

U.S. Geological Survey Landslide Hazard Program

The USGS Landslide Hazard Program provides information on landslide hazards, including information on current landslides, landslide reporting, real-time monitoring of landslide areas, mapping of landslides through the National Landslide Hazards Map, local landslide information, landslide education, and research.

Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 (DMA2K) (Public Law 106-390) amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 to establish a predisaster mitigation program and new requirements for the federal postdisaster Hazard Mitigation Grant Program. DMA2K encourages and rewards local and state predisaster planning. It seeks to integrate state and local planning with an overall goal of strengthening statewide hazard mitigation. This enhanced planning approach enables local, tribal, and state governments to identify specific strategies for reducing probable impacts of natural hazards, such as floods, fires, and earthquakes. To be eligible for hazard mitigation funding, local governments are required to develop a hazard mitigation plan that incorporates specific program elements of the DMA2K law. In the Bay Area, all counties and most cities have adopted local hazard mitigation plan updates. Some cities have individual plans, while some counties have developed multijurisdictional updates that include all or many of the cities in the county (FEMA 2020).

Disaster Recovery Reform Act of 2018

The Disaster Recovery Reform Act was signed into law in 2018. The reforms acknowledge the shared responsibility for disaster response and recovery, are intended to reduce the complexity of the Federal Emergency Management Agency (FEMA), and build the nation's capacity for the next catastrophic event. The law, which amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act, contains 56 distinct provisions that require FEMA policy or regulation changes for full implementation. Examples of the provisions include expanding eligible hazard mitigation activities including the replacement of electric utility poles resilient to extreme winds (Section 1204) and earthquake early warning technology (Section 1233).

Clean Water Act Section 402

Section 402 of the Clean Water Act (33 U.S. Code Section 1251 et seq.) establishes a framework for regulating municipal and industrial stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) program. The act is also directly relevant to excavation and grading. The NPDES program controls water pollution by regulating point sources that discharge pollutants, including rock, sand, dirt, and agricultural, industrial, and municipal waste, into waters of the United States. The U.S. Environmental Protection Agency has delegated to the State Water Resources Control Board the authority for the NPDES program in California, which is implemented by the State's nine regional water quality control boards (RWQCBs). Under the NPDES Phase II Rule, construction activity disturbing 1 or more acres must obtain coverage under the State's General Permit for Discharges of Storm Water Associated with Construction Activity (Construction Stormwater General Permit). As described further in Section 3.10, "Hydrology and Water Quality," the Construction Stormwater General Permit requires that applicants develop and implement a storm water pollution prevention plan (SWPPP), which specifies best management practices (BMPs) that reduce pollution in

stormwater discharges to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology standards and require inspections and maintenance of all BMPs.

National Pollutant Discharge Elimination System

The NPDES program is a federal program for addressing discharges that adversely affect the quality of our nation's waters. NPDES stormwater permits are what regulate the implementation of controls designed to prevent harmful pollutants from being washed by stormwater runoff into local water bodies. Most states, including California, are authorized to implement the NPDES program and issue their own permits for stormwater discharges associated with construction activities. These permits generally can be thought of as umbrella permits that cover all stormwater discharges associated with construction activity for a designated period. Operators of individual construction sites then apply for coverage under the State's Construction Stormwater General Permit. In California, the Construction Stormwater General Permit (Order No. 2009-0009-DWQ) was issued by the State Water Resources Control Board and went into effect on July 1, 2010.

Dischargers whose projects disturb 1 or more acres of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres are required to obtain coverage under the Construction General Permit. Construction activity subject to this permit includes clearing, grading, and creating disturbances to the ground, such as stockpiling or excavating, but it does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development of a SWPPP by a certified Qualified SWPPP Developer.

The California Green Building Code (CALGreen) requires the preparation of SWPPPs for projects that disturb less than 1 acre. CALGreen also requires postconstruction treatment control BMPs that improve stormwater runoff quality. It also requires that projects reduce peak runoff through the use of “low impact development” BMPs that indirectly reduce erosion.

International Building Code

The International Building Code (IBC) is published by the International Code Council, a nonprofit organization dedicated to developing a single set of comprehensive and coordinated national model construction codes. The IBC addresses health and safety concerns related to structural stability through prescriptive and performance-related requirements. California has used the IBC as the model code since January 1, 2008, using the 2006 IBC. The IBC is updated every three years, with the most recent version IBC 2018 effective in California on January 1, 2020.

STATE REGULATIONS

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Act of 1972 (revised in 1994) is the State law that addresses hazards from earthquake fault zones and requires the delineation of zones along active faults. The purpose of this law is to mitigate surface fault rupture hazards by regulating development on or near active faults. As required by the act, the State has delineated Earthquake Fault Zones (formerly Special Studies Zones) along known active faults in California. Cities and counties must regulate certain development projects within these zones.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and from other hazards caused by earthquakes. This act requires the State geologist to delineate various seismic hazard zones and

requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit may be granted for a site within a Seismic Hazard Zone, a geotechnical investigation of the site must be conducted, and appropriate mitigation measures incorporated into the project design.

The Bay Area includes numerous Seismic Hazard Zones for liquefaction and earthquake-induced landslides, as designated by the California Geological Survey (CGS). Any projects in these designated zones require evaluation and mitigation of potential liquefaction or landslide hazards, which must be conducted in accordance with CGS Special Publication 117, adopted March 13, 1997, by the State Mining and Geology Board pursuant to the Seismic Hazards Mapping Act.

California Building Code

The California Building Code (CBC) has been codified in the CCR as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The 2019 CBC is based on the 2018 IBC published by the International Code Council. In addition, the CBC contains necessary California amendments, which are based on reference standards obtained from various technical committees and organizations, such as the American Society of Civil Engineers (ASCE), the American Institute of Steel Construction, and the American Concrete Institute. ASCE Minimum Design Standard 7-05 (ASCE 7-05) provides requirements for general structural design and includes means for determining earthquake loads, as well as other loads (e.g., flood, snow, wind), for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure, or any appurtenances connected or attached to such buildings or structures throughout California.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients that are used to determine a Seismic Design Category (SDC) for a project as described in Chapter 16 of the CBC. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to SDC E (very high seismic vulnerability and near a major fault) and SDC F (hospitals, police stations, emergency control centers in areas near major active faults). Design specifications are then determined according to the SDC in accordance with Chapter 16 of the CBC. Chapter 16, Section 1613 provides earthquake loading specifications for design and construction to resist the effects of earthquake motions in accordance with ASCE 7-05.

Chapter 18 of the CBC covers the requirements of geotechnical investigations (Section 1803); excavation, grading, and fills (Section 1804); load-bearing of soils (1806); foundations (Section 1808); shallow foundations (Section 1809); and deep foundations (Section 1810). Chapter 18 also describes analysis of expansive soils and the determination of the depth to groundwater table. For SDC D, E, and F, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading, plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also addresses mitigation measures to be considered in structural design, which may include ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific

peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions.

Specifically, Section 1803.7 of the CBC requires geologic and earthquake engineering reports for all proposed construction. The purpose of the engineering report is to identify geologic and seismic conditions that may require mitigation. The reports, which are prepared by a California certified engineering geologist in consultation with a California-registered geotechnical engineer, assess the nature of the site and potential for earthquake damage based on appropriate investigations of the regional and site geology, project foundation conditions, and potential seismic shaking at the site. These reports must consider the most recent CGS Note 48 (Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings), CGS Special Publication 42: Fault Rupture Hazard Zones in California (for project sites proposed within an Alquist-Priolo Zone), and the most recent version of CGS Special Publication 117: Guidelines for Evaluating and Mitigating Seismic Hazard in California (for project sites proposed within a Seismic Hazard Zone). All conclusions must be fully supported by satisfactory data and analysis.

The geotechnical report required by Section 1803 provides completed evaluations of the foundation conditions of the site and the potential geologic and seismic hazards. It includes site-specific evaluations of design criteria related to the nature and extent of foundation materials, groundwater conditions, liquefaction potential, and settlement potential and slope stability, as well as the results of the analysis of problem areas identified in the engineering geologic report. The geotechnical report incorporates estimates of the characteristics of site ground motion provided in the engineering geologic report. The geotechnical report must be prepared by a geotechnical engineer registered in the State of California with the advice of the certified engineering geologist and other technical experts, as necessary. The approved engineering geologic report is submitted with, or as part of, the geotechnical report. Local jurisdictions in the proposed Plan area typically regulate construction activities through a process that requires the preparation of a site-specific geotechnical investigation, consistent with Title 24, Part 2, Chapter 18 of the CBC.

CCR Title 24 also includes the California Residential Code and CALGreen, which have been adopted as separate documents (CCR Title 24, Part 2.5 and 11, respectively). CALGreen was the first State-mandated green building code in the nation. It establishes mandatory minimum green building standards and optional (more stringent) Tier 1 and Tier 2 provisions. Cities and counties have the discretion to adopt either tier as mandatory or to adopt their own more stringent standards. The green building standards included in CALGreen enhance the design and construction of buildings using planning and design concepts that reduce negative impacts on the environment through energy efficiency, water efficiency and conservation, and material conservation and resource efficiency. Sections 4.106.2 and 5.106.1 contain requirements intended to limit erosion related to development that would disturb less than one acre. The California Residential Code includes structural design standards for residential one- and two-family dwellings and covers all structural requirements for conventional construction. This part incorporates by adoption the 2009 International Residential Code of the International Code Council with necessary California amendments for seismic design. All other structures, including multifamily residential projects, are found in the other parts of the CBC, as discussed above.

California Department of Transportation Regulations and Seismic Design Criteria

The California Department of Transportation's (Caltrans's) jurisdiction includes rights-of-way (ROWs) of State and interstate routes within California. Any work within the ROW of a federal or State transportation corridor is subject to Caltrans regulations governing allowable actions and modifications. Caltrans issues permits to encroach on land within its jurisdiction to ensure that the

encroachment is compatible with the primary uses of the State highway system, ensure safety, and protect the State's investment in the highway facility. The encroachment permit requirement applies to persons, corporations, cities, counties, utilities, and other government agencies. A permit is required for specific activities, including opening or excavating a State highway for any purpose, constructing or maintaining road approaches or connections, grading within ROWs on any State highway, and planting or tampering with vegetation growing along any State highway. The encroachment permit application requirements relating to geology, seismicity, and soils include information on road cuts, excavation size, engineering and grading cross-sections, hydraulic calculations, and mineral resources approved under the Surface Mining and Reclamation Act of 1975 (SMARA).

Caltrans Seismic Design Criteria (SDC) were established after past California earthquakes caused damage to older structures designed according to nonductile design standards. As a result, Caltrans initiated an extensive seismic retrofit program to strengthen the State's inventory of bridges to ensure satisfactory performance in future earthquakes. Caltrans has funded an extensive research program and developed design procedures that have furthered the state of practice of earthquake bridge engineering. The SDC are an encyclopedia of new and currently practiced seismic design and analysis methodologies for the design of new bridges in California. The SDC have a performance-based approach specifying minimum levels of structural system performance, component performance, analysis, and design practices for ordinary standard bridges. Bridges with nonstandard features or operational requirements above and beyond those of standard bridges may require a greater degree of attention than specified by the SDC.

California Surface Mining and Reclamation Act

SMARA mandated the initiation by the State geologist of mineral land classification to help identify and protect mineral resources in areas within the State subject to urban expansion or other irreversible land uses that would preclude mineral extraction. Areas are classified into mineral resource zones based on the presence of deposits and how much evaluation of the resource has occurred.

SMARA also allowed the State Mining and Geology Board (SMGB), after receiving classification information from the State geologist, to designate lands containing mineral deposits of regional or Statewide significance. Areas designated by SMGB are incorporated by regulation into Title 14, Division 2 of the CCR. Such designations require that a lead agency's land use decisions involving designated areas be made in accordance with its mineral resource management policies and that the lead agency consider the importance of the mineral resource to the region or the State as a whole and not just the lead agency's jurisdiction. In 1979, SMGB adopted guidelines for the management of mineral resources and preparation of local plans. The guidelines require local general plans to reference the State-identified mineral deposits and sites that are identified by the State geologist for conservation and/or future mineral extraction. Subsequently, SMGB identified urbanized areas where irreversible land uses precluded mineral extraction.

CGS has mapped mineral resource zones in parts of the Bay Area but has not created comprehensive digital maps for much of the Plan area.

REGIONAL AND LOCAL REGULATIONS

City and County General Plans

Safety elements are one of the seven required elements of a general plan listed in Section 65302 of the California Government Code. Among other mandatory topics, the safety element establishes policies and programs to protect the community from risks associated with seismic and geologic

hazards. Every city and county must consult with CGS and the Office of Emergency Services before adopting or revising a safety element.

Hazard Mitigation Plans

As discussed above (see "Disaster Mitigation Act of 2000"), cities and counties in the Bay Area adopt hazard mitigation plans. Most communities are on their third or fourth update with the majority of jurisdictions covered by an annex to a multijurisdictional plan at the county level. Some Bay Area cities have a local hazard mitigation plan adopted specific to their jurisdiction.

Local Building Codes

Local building codes, like the CBC, are generally customized versions of the IBC. Local boards, councils, and assemblies may exclude portions of the standard codes or adopt more specific requirements to regulate individual land use for the health, safety, and general welfare of the people.

Local Grading and Erosion Control Ordinances

Most counties and cities in the Plan area have grading and erosion control ordinances. These ordinances control erosion and sedimentation caused by construction activities. A grading permit is typically required for construction-related projects. As part of the permit, project applicants are typically required to submit a grading and erosion control plan, vicinity and site maps, and other supplemental information. Standard conditions in the grading permit typically include a description of BMPs similar to those contained in a SWPPP.

3.8.3 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the 2017 Plan Bay Area 2040 EIR, and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (Criterion GEO-1);
- directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking (Criterion GEO-2);
- directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction, lateral spreading, and subsidence (Criterion GEO-3);
- directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides (Criterion GEO-4);
- result in substantial soil erosion or the loss of topsoil (Criterion GEO-5);
- be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property (Criterion GEO-6);

- directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? (Criterion GEO-7); or
- result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or a locally-important mineral resources recovery site delineated on a local land use plan (Criterion MR-1).

METHOD OF ANALYSIS

This program-level EIR evaluates potential impacts on geology, seismicity, and mineral resources based on the location of the proposed Plan's footprint associated with the forecasted development pattern (i.e., the land use growth footprint), sea level rise adaptation infrastructure (i.e., sea level rise adaptation footprint), and transportation projects (i.e., transportation system footprint) relative to the known distribution of geology, seismicity, and mineral resources throughout the Bay Area. The baseline for the following analysis reflects existing conditions when the EIR NOP was released in September 2020.

Quantitative results are presented for the region (i.e., the entire footprint, often summarized by county) and for the portions of the land use growth footprint specifically within transit priority areas (TPAs). TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county.

For this impact assessment, a geographic information system (GIS) was used to digitally overlay the proposed Plan's footprints associated with forecasted land use development, sea level rise adaptation infrastructure, and transportation projects onto Alquist-Priolo fault zones from CGS, probabilistic earthquake shaking hazard zones from ABAG, and earthquake liquefaction susceptibility and rainfall induced landslide hazard zones from USGS. Because the effects of seismic activity and geological conditions would be primarily related to operational impacts (effects on buildings and infrastructure following construction) the impact discussions are not separated by construction and operation.

This evaluation of geological, seismic, and mineral resource impacts assumes that construction and development under the proposed Plan would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts. For additional information on analysis methodology, refer to Section 3.1.3, "General Methodology and Assumptions."

IMPACTS AND MITIGATION MEASURES

Impact GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (LTS)

Land Use Impacts

Surface fault rupture could occur along any of the active fault traces or within the associated Alquist-Priolo Zone for the active faults within the proposed Plan area. Although fault rupture is not entirely confined to the boundaries of an Alquist-Priolo Zone, the zone represents the known areas with the

highest likelihood of rupture occurring based on historical evidence and geologic records. The risk outside these zones is considered acceptable based on established State regulations, including California Building Code (CBC) requirements tied to seismic risk in building design, and is, therefore, not considered substantial for purposes of this analysis. The amount and location of surface displacement would depend on the magnitude and nature of the seismic event. In some cases, surface fault rupture can cause displacement of the ground surface, resulting in substantial damage to foundations, roadways, and utilities. Buried thrust faults and inferred faults are also located within the boundaries of the proposed Plan area; however, these fault types do not typically experience surface ruptures and are not officially recognized by the Alquist-Priolo Act. The proposed Plan's land use growth footprint includes a variety of land uses (e.g., residential and commercial) that could potentially be exposed to hazards as a result of surface fault rupture.

The acreage of the proposed Plan's land use growth footprint that either fully or partially intersect Alquist-Priolo Zones are listed below in **Table 3.8-6** delineating between acreage within TPAs for each county. Approximately 670 acres of the land use growth footprint is within an Alquist-Priolo Zone (**Table 3.8-6**). This includes TPAs in Alameda County (150 acres) and Contra Costa County (30 acres). TPAs in Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties are not located in Alquist-Priolo Zones; in other words, where the growth footprint within these counties overlaps with Alquist-Priolo Zones, these areas do not include any area identified as a TPA. Projects in TPAs that are located in delineated earthquake fault zones do not qualify for the exemption from CEQA review for sustainable community projects under PRC Section 21155.1 unless the applicable general plan or zoning ordinance contains provisions to mitigate the risk.

Table 3.8-6: Acreage of Land Use Growth Footprint within Alquist-Priolo Zones

County		Total (acres)
Alameda	County Total	210
	Within TPAs	150
Contra Costa	County Total	350
	Within TPAs	30
Marin	County Total	0
	Within TPAs	0
Napa	County Total	60
	Within TPAs	0
San Francisco	County Total	0
	Within TPAs	0
San Mateo	County Total	30
	Within TPAs	0
Santa Clara	County Total	4
	Within TPAs	0
Solano	County Total	20
	Within TPAs	0
Sonoma	County Total	1
	Within TPAs	0
Regional Total	County Total	670
	Within TPAs	170

Note: TPA acreages are a subset of county acreages. Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on CGS 2019

Federal, State, and local laws, regulations, and programs in place and described herein avoid or reduce impacts from earthquakes and other seismic-related geologic hazards. To reduce impacts related to fault rupture, implementing agencies require project sponsors to comply with provisions of the Alquist-Priolo Act for project sites located within or across an Alquist-Priolo Zone. Lead agencies must prepare site-specific fault identification investigations conducted by licensed geotechnical professionals in accordance with the requirements of the Act, as well as any existing local policies that exceed or reasonably replace any of the Alquist-Priolo Act's requirements. Fault identification studies required by the Alquist-Priolo Act involve on-site trenching and excavation for site-specific identification and location of fault rupture planes where any future rupture would be anticipated. Structures intended for human occupancy (defined in the Act as a structure that might be occupied more than 2,000 hours per year) must be located a minimum distance of 50 feet from any identified active fault traces. All projects are required to adhere to design standards described in the CBC and all standard geotechnical investigation, design, grading, and construction practices to avoid or reduce impacts from earthquakes, ground shaking, ground failure, and landslides.

Regulatory agencies with oversight of development associated with the proposed Plan have developed regulations and engineering design specifications that address and substantially reduce hazards associated with site-level geological and seismic conditions. Therefore, the impact related to fault rupture hazards would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

Surface fault rupture could cause ground surface displacement, resulting in substantial damage to sea level rise adaptation infrastructure. Different types of sea level rise adaptation infrastructure would have different levels of sensitivity to the ground surface displacement. Marsh systems would likely be largely unaffected by lateral deformation while elevated roadways or levee systems would require design considerations. The acreage of the proposed Plan's sea level rise adaptation infrastructure that either fully or partially intersect Alquist-Priolo Zones are listed below in **Table 3.8-7** by county. Similar to land use development and transportation projects, the design of sea level rise infrastructure in the Alquist-Priolo Zone would require site-specific investigations conducted by licensed geotechnical professionals to fully evaluate the level of potential damage from fault rupture. Depending on the agency with oversight for the infrastructure, construction and operation would be subject to applicable regulations from agencies such as the U.S. Army Corps of Engineers (USACE) or the California Department of Water Resources (DWR). USACE follows seismic standards like ASCE/SEI 7-10 to set the site class designation that infrastructure must be designed to, and DWR requires a 200-year return period ground motion analysis for the design of infrastructure like levees. DWR has also established the Urban Levee Design Criteria, which include criteria related to seismic vulnerability.

The potential for adverse fault impacts related to sea level rise projects from implementation of the proposed Plan would be less than significant (LTS).

Transportation System Impacts As noted above for the land use growth footprint, surface fault rupture could cause displacement of the ground surface, resulting in substantial damage to transportation projects including transit expansion projects, foundations, roadways, roadway interchanges, and utilities. Improvements associated with the transportation projects within the region would include a variety of different projects that could potentially be exposed to hazards as a result of surface fault rupture. There are approximately 250 acres associated with transportation projects that are within an Alquist-Priolo Zone and could be developed in conjunction with the proposed Plan (see **Table 3.8-8**).

Table 3.8-7: Acreage of Sea Level Rise Adaptation Footprint within Alquist-Priolo Zones

County	Total (acres)
Alameda	0
Contra Costa	10
Marin	6
Napa	0
San Francisco	0
San Mateo	0
Santa Clara	0
Solano	20
Sonoma	0
Regional Total	30

Note: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on CGS 2019

Table 3.8-8: Acreage of Transportation Projects Footprint within Alquist-Priolo Zones

County	Total (acres)
Alameda	180
Contra Costa	10
Marin	0
Napa	4
San Francisco	0
San Mateo	0
Santa Clara	0
Solano	50
Sonoma	0
Regional Total	250

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on CGS 2019

To reduce impacts related to fault rupture, implementing agencies require project sponsors to comply with provisions of the Alquist-Priolo Act for project sites located within or across an Alquist-Priolo Zone. Project sponsors must prepare site-specific fault identification investigations conducted by licensed geotechnical professionals in accordance with the requirements of the Act, as well as any existing local or Caltrans regulations and policies that exceed or reasonably replace any of the Act's requirements. Projects such as interchange improvements to existing roadways that are located within an Alquist-Priolo Zone would not result in a substantial change to the risk or hazard but would nonetheless be constructed following preparation of a required geotechnical investigation to fully evaluate the level of potential damage from fault rupture. The potential for adverse fault impacts related to transportation projects from implementation of the proposed Plan would be less than significant (LTS).

Conclusion

The land use development pattern, sea level rise adaptation infrastructure, and transportation project effects related to fault rupture hazards are site specific and dependent on the location of the individual projects in relation to the active fault traces. The Alquist-Priolo Act regulates where development and

road projects can occur in relation to faults by requiring detailed fault identification studies and stipulating minimum setback requirements. Local agencies and Caltrans also have requirements to address impacts related to fault rupture. The potential for adverse fault impacts related to land use changes from implementation of the proposed Plan therefore would be **less than significant (LTS)** because there are the existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with these conditions to an acceptable level.

Mitigation Measures

None required.

Impact GEO-2: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking (LTS)

Land Use Impacts

According to modeling conducted by USGS in conjunction with CGS, the Bay Area has a nearly three in four chance of a magnitude 6.7 or greater earthquake over the next 30 years. The shaking intensity of the next significant earthquake depends on the causative fault and the distance to the epicenter, the magnitude, the duration of shaking, and the characteristics of the underlying geologic materials. The potential for damage or loss during an earthquake of this magnitude could be substantial, especially in non-retrofitted older structures and infrastructure that were constructed under less stringent building codes. As shown in **Figure 3.8-2**, the entire Bay Area is classified as potentially experiencing very strong to violent ground shaking (MMI 7-9). **Table 3.8-9**, below, quantifies the area within the land use growth footprint potentially subject to strong, very strong, or violent ground shaking based on this data.

Table 3.8-9: Acreage of Land Use Growth Footprint Subject to Ground Shaking

County		Strong – MMI 7 (acres)	Very Strong – MMI 8 (acres)	Violent – MMI 9 (acres)
Alameda	County Total	0	2,600	4,500
	Within TPAs	0	680	2,600
Contra Costa	County Total	300	8,100	1,300
	Within TPAs	20	1,100	230
Marin	County Total	0	1,100	140
	Within TPAs	0	390	80
Napa	County Total	< 1	790	0
	Within TPAs	0	70	0
San Francisco	County Total	0	2,500	990
	Within TPAs	0	1,700	980
San Mateo	County Total	0	1,200	1,500
	Within TPAs	0	490	830
Santa Clara	County Total	0	7,400	1,100
	Within TPAs	0	4,800	460
Solano	County Total	950	3,100	0
	Within TPAs	0	160	0
Sonoma	County Total	0	1,000	840
	Within TPAs	0	110	140
Regional Total	County Total	1,300	27,800	10,400
	Within TPAs	20	9,600	5,400

Note: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC/ABAG in 2021; ABAG and USGS 2013

In general, ground shaking is more severe in softer sediments, such as alluvial deposits where surface waves can be amplified, causing a longer duration of ground shaking compared to bedrock materials. Areas where bedrock is exposed or located at relatively shallow depth tend to experience surface waves from an earthquake as more of a sharp jolt, compared to other areas. Areas located within or near the Bay shoreline where alluvial sediments tend to be thicker, especially in areas where un-engineered fill or loose alluvial materials are found, could experience considerable ground shaking.

To reduce impacts related to ground shaking, implementing agencies require project sponsors to comply with the applicable version of the CBC. Compliance with the regulatory requirements in the CBC and any applicable local ordinances and ensuring that structures are constructed in compliance with the law, is the responsibility of the project engineers and building officials (typically associated with the local jurisdiction). The geotechnical engineer, as a registered professional with the State of California, is required to comply with the CBC and local codes while applying standard engineering practice and the appropriate standard of care for the particular region in California.

Projected development must comply with Chapter 16, Section 1613 of the CBC, which provides earthquake loading specifications for structures and associated attachments that must also meet the seismic criteria of ASCE Standard 07-05. To determine seismic criteria for proposed improvements, geotechnical investigations would be prepared by State-licensed engineers and engineering geologists that provide recommendations for site preparation and foundation design, as required by Chapter 18, Section 1803 of the CBC. Geotechnical investigations would also evaluate hazards such as liquefaction, lateral spreading, landslides, and expansive soils in accordance with CBC requirements and CGS's Guidelines for Evaluating and Mitigation Seismic Hazards in California (Special Publication 117A, 2008), where applicable.

The geotechnical engineer is responsible for investigating the underlying soils and bedrock on a site and, if necessary, developing remedies to improve soil conditions based on standard engineering practices. The geotechnical investigation must characterize, log, and test soils and bedrock conditions and determine the response of those underlying materials to ground shaking generated during an earthquake. Seismic response to varying material types is particularly critical in the Plan area, where construction may occur over soft clay and fills at the San Francisco Bay margin. The geotechnical investigation and the recommendations developed during the investigation must be presented in a report, which is reviewed, signed, and stamped by the professional engineer in charge. Based on the site's geotechnical conditions, the geotechnical report must include methods and materials for all aspects of the site development, including the site preparation, building foundations, structural design, utilities, and sidewalks and roadways, to remedy any geotechnical conditions related to seismic impacts. Once finalized, the geotechnical report would be submitted to the local permitting agency for review and comment. The local building officials work with the applicant and the geotechnical engineer to resolve inconsistencies and ensure that the investigation complies with the CBC and local ordinances. In connection with grading, foundation, building, and other site development permits, the local jurisdiction reviews the geotechnical investigation and recommendations and imposes permit requirements based on the geotechnical recommendations and CBC provisions. Recommended corrective measures, such as structural reinforcement and replacing native soils with engineered fill, must be incorporated into project designs. Developments must also adhere to local building code requirements for seismic safety, which identify and require specified construction techniques that aid in structural resistance to ground shaking, as well as local general plans and zoning ordinances, where applicable policies exist.

As discussed above, State laws and local regulations require that potential seismic hazards be identified and remedied prior to construction. Reliable mechanisms are in place to enforce these

regulations and the implementation of design strategies identified in required geotechnical investigations are anticipated to protect public health and safety from substantial risks through appropriate engineering practices. Therefore, the potential for adverse ground shaking impacts related to land use changes from implementation of the proposed Plan would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

As mentioned above, softer soils result in stronger shaking during earthquakes, which is one reason why all sea level rise infrastructure sited around the bay and ocean shoreline is in the very strong and violent probabilistic earthquake shaking hazard zones (**Table 3.8-10**). Similar to land use and transportation projects, the design of sea level rise infrastructure would build off of site-specific investigations conducted by licensed geotechnical professionals for each individual project site. Engineering professionals would then use the site-specific information to design infrastructure to withstand the corresponding level of shaking. Sea level rise adaptation infrastructure may shore up existing shoreline infrastructure that was built before modern code, improving the seismic stability of flood protection assets that previously may have been more sensitive to earthquake shaking. The potential for adverse ground shaking impacts related to sea level rise projects from implementation of the proposed Plan would be less than significant (LTS).

Table 3.8-10: Acreage of Sea Level Rise Adaptation Footprint Subject to Ground Shaking

County	Strong – MMI 7 (acres)	Very Strong – MMI 8 (acres)	Violent – MMI 9 (acres)
Alameda	0	340	820
Contra Costa	0	230	40
Marin	0	420	400
Napa	0	0	< 1
San Francisco	0	60	0
San Mateo	0	580	110
Santa Clara	0	590	110
Solano	0	600	80
Sonoma	0	0	170
Regional Total	0	2,800	1,700

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on ABAG and USGS 2013

Transportation System Impacts

As noted above for the projected land use growth, an earthquake on any one of the active faults in the Bay Area region could cause a large degree of ground shaking, resulting in damage to transportation projects if they are not engineered appropriately. Further, the proposed transportation projects within the region would include a variety of transit modifications that could increase the number of people in transit corridors potentially exposed to ground shaking hazards. There are transportation projects totaling 420 acres located in areas of very strong ground shaking, 9,300 acres located in areas of severe ground shaking, and 4,200 acres in areas of violent ground shaking (see **Table 3.8-11**).

Seismic design criteria are required of all construction, including transportation projects, where adverse effects from ground shaking could occur. The most current applicable version of the CBC and local building standards require roadway projects to employ design standards that consider

seismically active areas to safeguard against major structural failures or loss of life. Similarly, bridge and overpass design is required to comply with Caltrans' design criteria. Caltrans provides seismic design criteria for new bridges in California, specifying minimum levels of structural system performance, component performance, analysis, and design practices. Based on application of these requirements, the potential for adverse ground shaking impacts related to transportation projects would be less than significant (LTS).

Table 3.8-11: Acreage of Transportation Projects Footprint Subject to Ground Shaking

County	Strong – MMI 7 (acres)	Very Strong – MMI 8 (acres)	Violent – MMI 9 (acres)
Alameda	0	1,400	1,500
Contra Costa	220	1,400	420
Marin	0	160	30
Napa	0	160	3
San Francisco	0	500	70
San Mateo	0	780	840
Santa Clara	190	3,700	1,100
Solano	6	1,400	70
Sonoma	0	6	120
Regional Total	420	9,300	4,200

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on ABAG and USGS 2013

Conclusion

The proposed Plan would accommodate an increased population within the seismically active Plan area. The degree of risk associated with the specific land use development pattern, sea level rise adaptation infrastructure, and transportation projects is dependent on site-specific criteria, including the location of the projects in relation to the seismic event, underlying geologic materials, and magnitude of the event. Regulatory requirements exist that specify mandatory actions that must occur during project development to address these risks which exist across the entire proposed Plan area. These impacts would be **less than significant (LTS)** because there are existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with these conditions to an acceptable level.

Mitigation Measures

None required.

Impact GEO-3: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction, lateral spreading, and subsidence (LTS)

Land Use Impacts

Liquefaction typically occurs in areas underlain with loose, saturated, cohesion-less soils within the upper 50 feet of subsurface materials. These soils, when subjected to ground shaking, can lose their strength due to buildup of excess pore water pressure, causing them to function in a manner closer to a liquefied state. As shown in **Figure 3.8-3** and summarized below in **Table 3.8-12**, there are many areas throughout the Bay Area region that are prone to seismic-related ground failure.

Table 3.8-12: Acreage of Land Use Growth Footprint Susceptible to Liquefaction

County		Very Low Potential (acres)	Low Potential (acres)	Medium Potential (acres)	High Potential (acres)	Very High Potential (acres)
Alameda	County Total	840	430	4,700	360	750
	Within TPAs	110	320	2,500	30	370
Contra Costa	County Total	3,600	1,600	3,300	890	230
	Within TPAs	390	540	410	3	60
Marin	County Total	430	10	350	0	450
	Within TPAs	160	5	190	0	110
Napa	County Total	180	250	300	50	6
	Within TPAs	1	0	30	30	<1
San Francisco	County Total	990	60	860	10	1,500
	Within TPAs	910	60	850	10	880
San Mateo	County Total	780	200	790	70	850
	Within TPAs	350	90	540	40	310
Santa Clara	County Total	180	690	6,100	940	590
	Within TPAs	30	220	4,300	470	300
Solano	County Total	1,100	1,300	1,400	0	250
	Within TPAs	10	80	30	0	30
Sonoma	County Total	420	140	1,100	100	60
	Within TPAs	10	<1	220	10	3
Regional Total	County Total	8,500	4,700	19,000	2,400	4,700
	Within TPAs	2,300	1,300	9,000	600	2,100

Note: TPA acreages are a subset of County acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.

Sources: Data compiled by MTC and ABAG in 2021 based on USGS 2006

Ground failure, including liquefaction, lateral spreading, and subsidence, as a result of an earthquake could occur in the Plan area depending on the underlying conditions including ground water level, relative size of soil particles, and density of subsurface materials within 50 feet of ground surface. Damage from earthquake-induced ground failure associated with liquefaction, lateral spreading, and subsidence could be high in buildings with foundations not properly constructed for such hazards. The impacts from ground failure, including liquefaction, lateral spreading, and subsidence, from development of land uses associated with the proposed Plan would be addressed through site-specific geotechnical studies prepared in accordance with CBC requirements, the Seismic Hazards Mapping Act, and standard industry practices. The State provides guidance in CGS Special Publication 117A, which includes uniform guidelines for evaluating seismic hazards other than surface fault-rupture, as well as mitigation measure recommendations as required by PRC Section 2695(a). Chapters 6 and 7 of CGS Special Publication 117A provide standards for site evaluation and provide strategies that can be implemented to address liquefaction. These chapters also provide guidance to consider variations of liquefaction where soils laterally spread or subside. The guidance recommends that geotechnical evaluations determine the amount of liquefiable soil, which may provide an indication of the magnitude of subsidence and/or the presence of a gentle slope and open face, such as a river bank or shoreline, where lateral spreading can occur. The Seismic Hazards Mapping Act requires a geotechnical site-specific investigation before any parcel subdivisions or structure permits may be issued, to determine the strength of underlying soils or rock. Subsequent development (excavations, foundations, building

frames, retaining walls, and other building elements) would be required to conform to the current seismic design provisions of the CBC to reduce potential losses from ground failure as a result of an earthquake. Section 1613 of the CBC states that projects located in liquefaction zones shall incorporate seismic design features into both grading and construction plans. Chapter 18 of the CBC includes the requirements of geotechnical investigations (Section 1803), as well as foundations (Section 1808). For SDC D, E, and F, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading, plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also addresses measures to be considered in structural design, which may include ground stabilization, selecting appropriate foundation type and depths, selecting appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. These future projects would also be required to adhere to the local general plans and local building code requirements that contain seismic safety policies to resist ground failure through modern construction techniques. Therefore, the potential for adverse ground failure impacts related to accommodating future growth in the proposed Plan would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

Liquefaction hazard is generally greatest along the San Francisco Bay shoreline and along existing and historic riverine systems. Lateral spreading occurs when liquefaction occurs in a location with a gentle slope and an open face, making many of the sea level rise adaptation footprints with liquefaction exposure a likely location for lateral spreading to occur if soils liquify. Ground failure associated with liquefaction could result in damage to sea level rise infrastructure if not engineered appropriately. Implementation of the proposed Plan could result in sea level rise adaptation infrastructure covering up to 90 acres of very low liquefaction hazard, 50 acres in areas classified as low liquefaction hazard, 2,400 acres in areas classified as medium liquefaction hazard, 60 acres in areas of high liquefaction hazard, and 1,600 acres in areas classified as very high liquefaction hazard (see **Table 3.8-13**). Sea level rise infrastructure would be constructed in compliance with applicable versions of local, State, and federal standards that regulate the infrastructure, such as the USACE or DWR standards and regulations. Design criteria would require employing geotechnical practices such as ground treatment, replacing existing soils with engineered fill, or using deep foundation systems. The appropriate design approach would be dependent upon the unique conditions for each segment of shoreline and the various adaptation project types. The potential for adverse ground failure impacts related to sea level rise projects from implementation of the proposed Plan would be less than significant (LTS).

Table 3.8-13: Acreage of Sea Level Rise Adaptation Footprint Susceptible to Liquefaction

County	Very Low Potential (acres)	Low Potential (acres)	Medium Potential (acres)	High Potential (acres)	Very High Potential (acres)
Alameda	< 1	0	500	50	540
Contra Costa	4	20	90	1	140
Marin	60	0	410	5	280
Napa	-	0	< 1	0	-
San Francisco	-	0	0	0	50
San Mateo	< 1	0	420	0	230
Santa Clara	-	0	530	< 1	100
Solano	20	30	360	0	230
Sonoma	9	10	110	3	30
Regional Total	90	50	2,400	60	1,600

Note: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on USGS 2006

Transportation System Impacts

Although regional mapping of areas considered to have higher liquefaction potential has been conducted throughout the Plan area, liquefaction hazards are generally determined on a site-specific basis. The areas that are exposed to liquefaction hazard may also have lateral spreading or differential settlement and subsidence concerns. Areas not at risk of liquefaction do not have lateral spreading potential. As noted above for development pursuant to the proposed Plan, ground failure associated with liquefaction could result in damage to transportation projects if not engineered appropriately. Improvements associated with the proposed transportation projects within the region would include a variety of transit and roadway modifications that could increase the number of people and transit corridors potentially exposed to liquefaction hazards. The proposed Plan could result in transportation projects covering 2,600 acres of very low liquefaction hazard, 2,000 acres in areas classified as low liquefaction hazard, 7,200 acres in areas classified as medium liquefaction hazard, 520 acres in areas of high liquefaction hazard, and 1,600 acres in areas classified as very high liquefaction hazard (see **Table 3.8-14**).

Table 3.8-14: Acreage of Transportation Projects Footprint Susceptible to Liquefaction

County	Very Low Potential (acres)	Low Potential (acres)	Medium Potential (acres)	High Potential (acres)	Very High Potential (acres)
Alameda	490	210	1,700	220	270
Contra Costa	780	440	680	40	60
Marin	30	0	110	1	40
Napa	90	10	50	<1	2
San Francisco	180	20	130	0	250
San Mateo	180	90	570	3	770
Santa Clara	580	870	3,100	260	170
Solano	220	320	840	0	50
Sonoma	20	10	90	<1	2
Regional Total	2,600	2,000	7,200	520	1,600

Note: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on USGS 2006

Roadway projects must comply with the applicable version of the CBC and local building standards by employing geotechnical practices such as ground treatment, replacing existing soils with engineered fill, or using deep foundation systems to anchor improvements into more competent materials. Similarly, bridge and overpass design must comply with Caltrans design criteria. As stated above, Caltrans provides seismic design criteria for new bridges in California, specifying minimum levels of structural system performance, component performance, analysis, and design practices that would include minimizing damage that could be expected from potential ground failure hazards. Therefore, the potential for ground failure hazards, including liquefaction, lateral spreading, and subsidence, to result in adverse impacts related to the transportation projects would be less than significant (LTS).

Conclusion

Implementation of the land use development pattern, sea level rise adaptation infrastructure, and transportation projects would result in projects being constructed or redeveloped in areas that could be susceptible to ground failure due to liquefaction, lateral spreading, or subsidence. Ground failure hazards are dependent on site-specific conditions and other considerations, such as the severity of and duration of shaking in a seismic event. The impacts of ground failure, including liquefaction, lateral spreading, and subsidence on development of the land use development, sea level rise

infrastructure, transportation projects in the proposed Plan would be addressed through site-specific geotechnical studies required by local jurisdictions in accordance with standard industry practices and State-provided guidance, such as CGS Special Publication 117A. In addition, development would conform to the current seismic design provisions of the IBC and CBC to reduce potential losses from ground failure as a result of an earthquake. Proposed projects would also adhere to local general plans and local building code requirements that contain seismic safety requirements to resist ground failure through modern construction techniques. Therefore, ground failure hazards related to liquefaction, lateral spreading, and subsidence would be **less than significant (LTS)** because there are existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with these conditions to an acceptable level.

Mitigation Measures

None required.

Impact GEO-4: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides (LTS)

Land Use Impacts

The Plan area includes a wide range of topographical conditions, and landslide hazards vary from very low in low lying areas to very high in some upland areas, especially areas with slopes that exceed 15 percent. **Figure 3.8-4** shows areas throughout the region that are considered prone to rain-induced landslide hazards. The proposed Plan's strategies focus 67 percent of the land use growth footprint into the designated growth geographies; however, the remainder (33 percent) of the land use growth footprint is outside designated growth geographies but consistent with existing local land use plans (See Table 2-4). According to regional data, approximately 900 acres of the land use growth footprint are located in areas mapped as many landslides, and 5,500 acres are mapped as few landslides. **Table 3.8-15** summarizes the acreage of land use growth footprint within counties and TPAs (this number is a subset of the county total) within areas subject to landslides.

Existing slopes and slope stability are generally considered in local land use planning and zoning, and areas within landslide zones tend to be designated for uses other than development. Approvals of development projects in areas subject to slope failures are also generally contingent on geologic and engineering studies that define and delineate potentially hazardous conditions and recommend adequate mitigation. The Seismic Hazard Mitigation Act addresses landslide hazards from earthquake shaking, requiring site evaluation in areas identified by the State. Earthwork recommendations for improved slope stability follow adopted State standards, such as the Guidelines for Evaluating and Mitigation Seismic Hazards in California (CGS 2008); incorporate site-evaluation findings; and inform the eventual engineered design of slope stabilization systems and other designed infrastructure. These documents are checked by the appropriate building official or engineer and may be reviewed by other departments of the county or city to check compliance with the laws and ordinances under their jurisdiction.

Future proposed developments must also be consistent with the CBC and adhere to the requirements for structural design, special inspections, and soils and foundations contained in Chapters 16 through 18 of the code. Local general plans and local building codes also often contain development policies to avoid landslides through construction design and slope stabilization techniques. Because local jurisdictions require a site-specific geologic investigation and analysis in accordance with standard industry practices and State-provided guidance, such as CGS Special Publication 117A, to minimize risk associated with landslides and because new development would be subject to local building codes and the CBC, which require implementation of design standards, the

potential for adverse landslide impacts related to land use changes from implementation of the proposed Plan would be a less-than-significant (LTS) impact.

Table 3.8-15: Acreage of Land Use Growth Footprint within Landslide Zones

County		Few (acres)	Many (acres)
Alameda	County Total	1,200	70
	Within TPAs	440	< 1
Contra Costa	County Total	2,100	480
	Within TPAs	210	20
Marin	County Total	300	130
	Within TPAs	150	20
Napa	County Total	9	< 1
	Within TPAs	< 1	0
San Francisco	County Total	450	20
	Within TPAs	370	2
San Mateo	County Total	300	20
	Within TPAs	40	4
Santa Clara	County Total	190	4
	Within TPAs	20	< 1
Solano	County Total	840	80
	Within TPAs	6	0
Sonoma	County Total	180	90
	Within TPAs	10	0
Regional Total	County Total	5,500	900
	Within TPAs	1,200	40

Note: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.

Sources: Data compiled by MTC and ABAG in 2021 based on USGS 1997

Sea Level Rise Adaptation Impacts

Most of the sea level rise infrastructure is located on gently sloped terrain. **Table 3.8-16** summarizes the acreage of land use growth footprint within areas subject to landslides by county. Sea level rise infrastructure within landslide zones would follow the same process outlined in the "Transportation System Impacts" section, below, working with a geotechnical and engineering professional to identify slope stability hazards and slope stability measures that must be implemented to meet local, State, and federal standards. As noted above under "Land Use Impacts," there are existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with landslides. The Seismic Hazards Mapping Act requires a geotechnical site-specific investigation before any parcel subdivisions or structure permits are permitted. Subsequent development (excavations, foundations, building frames, retaining walls, and other building elements) would be required to conform to the current seismic design provisions of the CBC. DWR has established the Urban Levee Design Criteria, which include criteria related to landside slope stability and landslides. Therefore, the potential for adverse landslide impacts related to sea level rise adaptation projects would be a less-than-significant (LTS) impact because there are existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with these conditions to an acceptable level.

Table 3.8-16: Acreage of Sea Level Rise Adaptation Footprint within Landslide Zones

County	Few (acres)	Many (acres)
Alameda	0	0
Contra Costa	0	0
Marin	70	4
Napa	0	0
San Francisco	< 1	0
San Mateo	0	0
Santa Clara	0	0
Solano	30	0
Sonoma	0	0
Regional Total	100	4

Note: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on USGS 1997

Transportation System Impacts

Of the transportation projects, 1,900 acres would be located in areas zoned few landslides and 310 acres would be located in areas zoned many landslides (see **Table 3.8-17**). Most of the transportation projects would be outside of landslide zones. Projects that would develop land identified as mostly landslides generally include construction of transportation system expansions, as well as corridor improvements. These hazards would generally be addressed through compliance with existing regulations, as discussed in the "Land Use Impacts" section, above. The Caltrans Seismic Design Criteria require Project Specific Design Criteria (PSDC) for any projects that coincide with additional seismic hazards, which include landslide. As part of the PSDC process, a seismic safety peer review team would be established to check project designs. Transportation projects would be required to identify potential slope stability hazards and provide slope stabilization measures to meet the applicable version of the CBC and local building standards by employing geotechnical practices such as use of retaining walls, setback requirements, and deep foundation systems. Incorporation of slope stability measures would be effective in minimizing landslide hazards on proposed transportation projects. Therefore, the potential for landslide impacts related to the transportation projects at the regional level would be less than significant (LTS).

Table 3.8-17: Acreage of Transportation Projects Footprint within Landslide Zones

County	Few (acres)	Many (acres)
Alameda	440	90
Contra Costa	660	50
Marin	20	30
Napa	40	10
San Francisco	90	0
San Mateo	30	10
Santa Clara	420	110
Solano	190	10
Sonoma	30	< 1
Regional Total	1,900	310

Note: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on USGS 1997

Conclusion

Landslide hazards are dependent on site-specific conditions, including the steepness of slopes, and other conditions such as, in the case of seismically induced landslides, the distance and magnitude of the seismic event. Implementation of the land use development pattern, sea level rise adaptation infrastructure, and transportation projects would result in projects being constructed or redeveloped in areas that could be susceptible to landslides. State and local standards have been developed to address this condition. Landslide hazards would have a **less-than-significant (LTS) impact** because there are existing requirements under federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with these conditions to an acceptable level.

Mitigation Measures

None required.

Impact GEO-5: Result in substantial soil erosion or the loss of topsoil (LTS)

Land Use Impacts

Development associated with the proposed Plan would include earthwork activities that could expose soils to the effects of erosion or loss of topsoil. Once disturbed, either through removal of vegetation, asphalt, or demolition of a structure, stockpiled soils may be exposed to the effects of wind and water. Generally, earthwork and ground-disturbing activities, unless below minimum requirements, require a grading permit, compliance with which minimizes erosion, and local grading ordinances ensure that construction practices include measures to protect exposed soils such as limiting work to dry seasons, covering stockpiled soils, and use of straw bales and silt fences to minimize off-site sedimentation. Additional reports, such as a soil engineering report, engineering geology report, or plans and specifications for grading may be required by the local building or engineering departments, depending on the proposal. The application, plans, and specifications (if any) would be checked by the appropriate building official or engineer and may be reviewed by other departments of the county or city to ensure compliance with the laws and ordinances under their jurisdiction. Earthwork recommendations for improved erosion controls, based on site conditions, would be incorporated into the project construction documents.

Development that disturbs more than 1 acre is subject to compliance with a NPDES permit, including the implementation of BMPs, some of which are specifically implemented to reduce soil erosion or loss of topsoil, and the implementation of a SWPPP through the local jurisdiction. BMPs that are required under a SWPPP would include erosion prevention measures that have proven effective in limiting soil erosion and loss of topsoil. Projects that would disturb less than 1 acre would be subject to the CalGreen requirements related to stormwater drainage that have been designed to prevent or reduce discharges of sediments through BMPs that include on-site retention and filtration. Generally, once construction is complete and exposed areas are revegetated or covered by buildings, asphalt, or concrete, the erosion hazard is substantially eliminated or reduced.

Existing regulatory requirements specify mandatory and prescriptive actions that must occur during project development, and it is reasonable to assume compliance with existing regulations and permitting requirements of independent regulatory agencies to address potential project effects. Therefore, because there are regulations in place that would effectively reduce the potential for loss of topsoil or erosion impacts related to land use changes from implementation of the proposed Plan at the regional, local, and TPA level, there would be a less-than-significant (LTS) impact.

Sea Level Rise Adaptation Impacts

Sea level rise adaptation infrastructure would require the movement of large amounts of earthwork and ground-disturbing activities, which could result in erosion or loss of topsoil. The sea level rise adaptation infrastructure, including restored marshes and levees, would in many instances reduce erosion; however, the infrastructure could also result in erosion elsewhere. Additional hydromodification impacts are explored in Section 3.10, "Hydrology and Water Quality." Local, regional, State, and federal regulations and permit requirements will address potential project effects. As with land use development, earthwork activities for sea level rise adaptation infrastructure would be required to adhere to NPDES permit requirements for construction, as well as any local grading ordinance requirements that may include erosion prevention measures. One of the requirements of this permit is the implementation of nonpoint source control of stormwater runoff through the application of BMPs. Therefore, as described in the "Land Use Impacts" section, above, the potential for loss of topsoil or erosion impacts related to land use changes from implementation of the proposed Plan would result in a less-than-significant (LTS) impact.

Transportation System Impacts

Transportation projects within the region would also include earthwork activities that would disturb underlying soils during construction, potentially exposing them to erosion and loss of topsoil in the same manner discussed above for projected land use. Construction of additional lanes on freeways and other transportation facilities could result in loss of topsoil if work includes grading, trenching, excavation, or soil removal of any kind in an area not previously used as a paved transportation facility. As with land use development, earthwork activities for transportation projects would be required to adhere to NPDES permit requirements for construction, as well as any local grading ordinance requirements that may include erosion prevention measures. Throughout California, the RWQCBs set erosion control standards because one of the major effects of grading is sedimentation of receiving waters. These control standards are administered via the NPDES permit process for storm drainage discharge. One of the requirements of this permit is the implementation of nonpoint source control of stormwater runoff through the application of BMPs. A storm water pollution prevention plan (SWPPP) is required by the RWQCB to describe the BMPs that would control both the quality and amount of stormwater runoff on a project site. Transportation projects and development that would occur under the Plan would be required to comply with this process.

Incorporation of erosion control BMP measures, such as use of straw bales, inlet protective measures, silt fences, and construction scheduling, in accordance with grading codes and any revegetation requirements, would be effective in minimizing erosion hazards and loss of topsoil associated with transportation projects. Therefore, the potential for loss of topsoil or erosion impacts related to the transportation projects included in the proposed Plan is less than significant (LTS).

Conclusion

As noted above, construction associated with the land use development pattern, sea level rise adaptation infrastructure, and transportation projects would include ground disturbance that could expose underlying soils to the effects of erosion. Existing regulatory requirements specify mandatory actions that must occur during project development that would address this potential impact. Therefore, this impact is **less than significant (LTS)** because there are existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with these activities to an acceptable level.

Mitigation Measures

None required.

Impact GEO-6: Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property (LTS)

Land Use Impacts

Soils with high percentages of clay can expand when wet, causing structural damage to surface improvements. These clay soils can occur in localized areas throughout the San Francisco Bay Area region, making it necessary to survey project areas prior to construction. Expansive soils are generally removed during foundation work to avoid structural damage. The majority of projected growth occurs in already developed areas where expansive soils may have already been removed. However, expansive soils may remain in many parts of the Plan area. Some land use development associated with implementation of the proposed Plan could be located on soils that exhibit expansive properties when exposed to varying moisture content over time that could result in damage to foundations, walls, or other improvements. Structures, including residential units and commercial buildings, could be damaged as a result of settlement or differential settlement where structures are underlain by materials of varying engineering characteristics.

All site designs would be reviewed and approved by the appropriate federal, State, and local agencies. Project-specific geotechnical investigations consistent with existing regulatory requirements would identify expansive soil conditions, which would be addressed through the integration of geotechnical site investigations that characterize the soil strength and profile before being incorporated into the design process for development projects. The site investigation would ensure site suitability for projects and inform any geotechnical measures to ensure long-term stability, ensuring that regional growth and land use changes on geologic units or soils that are expansive would not become unstable as a result of development. Compliance with CBC requirements and adherence to local building codes and ordinances would reduce hazards relating to expansive soils. The potential for expansive soils to result in adverse impacts related to land use changes from implementation of the proposed Plan at the regional, local, and TPA level would be a less-than-significant (LTS) impact.

Sea Level Rise Adaptation Impacts

As described above, the construction of new structures near or above unstable soil or geologic units would be largely addressed through the implementation of geotechnical recommendations in the planning and design process in accordance with local, State, and federal code and regulation requirements. Compliance with CBC requirements, adherence to local building codes and ordinances, as well as federal levee requirements, where relevant, would reduce hazards relating to expansive soils. Sea level rise adaptation infrastructure on roadways or highways subject to review by the Federal Highway Administration (FHWA) would also be subject to compliance with FHWA regulations and design guidelines. The potential for adverse impacts related to sea level rise projects from implementation of the proposed Plan would be less than significant (LTS).

Transportation System Impacts

Transportation projects within the planning area would include a variety of transit modifications that could be located on unstable soil or geologic units. In general, many of the transportation projects would be in areas where previous roads or other improvements have occurred, and unstable soils or geologic units would have been addressed at the time of construction. However, some may have been addressed under older code requirements that may not be as stringent as current codes. Development of transportation projects, particularly projects involving large-scale ground disturbance during construction may expose people and structures to risks where located on expansive soils. Industry practice and State-provided guidance would minimize risk associated with

geologic hazards. As described above for land use projects, the potential hazards of unstable soil or geologic units would be addressed through the implementation of geotechnical recommendations in the planning and design process. Preventative measures, such as structural reinforcement for unstable geologic units and using engineered fill to replace unstable soils, would be required for the design of individual future projects. All site designs would be reviewed and approved by the appropriate federal, State, and local agencies.

The potential for expansive soils to result in adverse impacts to the transportation projects at the regional, local, and TPA level would be less than significant (LTS).

Conclusion

The proposed changes related to land use development pattern, sea level rise infrastructure, and transportation projects would be located on a range of different geologic materials and conditions. Hazards associated with unstable soils or geologic units are dependent on site- specific conditions, as well as the specific nature of the individual project proposed. With adherence to grading permit and building code requirements, including seismic design criteria as required by the CBC, and local building code requirements, the land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the proposed Plan would be designed to minimize potential risks related to expansive soils. Existing regulatory requirements specify mandatory and prescriptive actions that must occur during project development and would effectively reduce the inherent hazard. Therefore, this impact is **less than significant (LTS).**

Mitigation Measures

None required.

Impact GEO-7: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature (PS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Paleontological and geological resources are by nature specific to their local context, and as such, impacts on these resources resulting from the proposed Plan would occur at the local level. Therefore, regional effects are not addressed. In general, potential impacts on paleontological or geologic resources would be similar to those identified for archaeological resources discussed Impact CUL/TCR-2. Projects involving excavation, grading, or soil removal in previously undisturbed areas have the greatest likelihood to encounter these resources.

Table 3.8-4 shows a breakdown of these paleontological resources by epoch and county. There are 5,809 sites at which fossil remains have been found in the nine-county area, with the greatest concentration of 2,570 occurring in Contra Costa County and the second highest of 924 in San Mateo County. Napa County had the fewest paleontological sites at 143. Most paleontological resources were from the Miocene epoch (1,535), while the fewest were found from the Jurassic period (48).

The degree and extent of impacts would depend upon project location, and as such, project-specific analysis would be required to determine the precise area of impact and the importance of any paleontological or geologic resource identified within a proposed alignment or project area. This would be a potentially significant (PS) impact.

Conclusion

Because individual land use development pattern, sea level rise adaptation infrastructure, and transportation projects have the potential to adversely affect paleontological and geologic resources on a regional and localized level, these impacts would be **potentially significant (PS)**. Mitigation Measure GEO-7 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure GEO-7 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Ensure compliance with the Paleontological Resources Preservation Act, the Federal Land Policy and Management Act, the Antiquities Act, Section 5097.5 of the PRC, adopted county and city general plans, and other federal, State, and local regulations, as applicable and feasible, by adhering to and incorporating the performance standards and practices for the assessment and mitigation of adverse impacts on paleontological resources.

- Obtain review by a qualified paleontologist to determine whether the project has the potential to require ground disturbance of parent material with potential to contain unique paleontological resources or to require the substantial alteration of a unique geologic feature. The assessment should include museum records searches, a review of geologic mapping and the scientific literature, geotechnical studies (if available), and potentially a pedestrian survey if units with paleontological potential are present at the surface.

- Avoid exposure or displacement of parent material with potential to yield unique paleontological resources.

- Implement the following measures where avoidance of parent material with the potential to yield unique paleontological resources is not feasible:

  - All on-site construction personnel shall receive Worker Education and Awareness Program training before the commencement of excavation work to understand the regulatory framework that provides for protection of paleontological resources and become familiar with diagnostic characteristics of the materials with the potential to be encountered.

  - A qualified paleontologist shall prepare a paleontological resource management plan (PRMP) to guide the salvage, documentation, and repository of unique paleontological resources encountered during construction. If unique paleontological resources are encountered during construction, qualified paleontologist shall oversee the implementation of the PRMP.

  - Ground-disturbing activities in parent material with a moderate to high potential to yield unique paleontological resources shall be monitored using a qualified paleontological monitor to determine whether unique paleontological resources are encountered during such activities, consistent with the specified or comparable protocols.

- Identify where ground disturbance is proposed in a geologic unit having the potential to contain fossils, and specify the need for a paleontological monitor to be present during ground disturbance in these areas.

- Avoid routes and project designs that would permanently alter unique geological features.

- Salvage and document adversely affected resources sufficient to support ongoing scientific research and education.

- If paleontological resources are discovered during earthmoving activities, the construction crew will be directed to immediately cease work and notify the implementing agencies and/or project sponsors. The project sponsor will retain a qualified paleontologist for identification and salvage of fossils so that construction delays can be minimized. The paleontologist will be responsible for implementing a recovery plan which could include the following:

  - in the event of discovery, salvage of unearthed fossil remains, typically involving simple excavation of the exposed specimen but possibly also plaster-jacketing of large and/or fragile specimens, or more elaborate quarry excavations of richly fossiliferous deposits;

  - recovery of stratigraphic and geologic data to provide a context for the recovered fossil remains, typically including description of lithologies of fossil-bearing strata, measurement and description of the overall stratigraphic section, and photographic documentation of the geologic setting;

  - laboratory preparation (cleaning and repair) of collected fossil remains to a point of curation, generally involving removal of enclosing rock material, stabilization of fragile specimens (using glues and other hardeners), and repair of broken specimens;

  - cataloging and identification of prepared fossil remains, typically involving scientific identification of specimens, inventory of specimens, assignment of catalog numbers, and entry of data into an inventory database;

  - transferal, for storage, of cataloged fossil remains to an appropriate repository, with consent of property owner;

  - preparation of a final report summarizing the field and laboratory methods used, the stratigraphic units inspected, the types of fossils recovered, and the significance of the curated collection; and

  - project sponsors shall comply with existing local regulations and policies that exceed or reasonably replace any of the above measures that protect paleontological or geologic resources.

- Prepare significant recovered fossils to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated paleontological curation facility.

  - Following the conclusion of the paleontological monitoring, ensure that the qualified paleontologist prepares a report stating that the paleontological monitoring requirement has been fulfilled and summarizes the results of any paleontological finds. The report should be submitted to the CEQA lead agency and to the repository curating the collected artifacts and should document the methods and results of all work completed under the PRMP, including the treatment of paleontological materials; results of specimen processing, analysis, and research; and final curation arrangements.

Significance after Mitigation

Implementation of Mitigation Measure GEO-7 would reduce impacts associated with paleontological resources because construction workers would be alerted to the possibility of encountering paleontological resources, and professionally accepted and legally compliant procedures for the

discovery of paleontological resources would be implemented in the event of a find. To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M).

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact MR-1: Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or a locally-important mineral resources recovery site delineated on a local land use plan (LTS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

Local jurisdictions have general plan policies to manage mineral resources and are required under SMARA to consider significant mineral deposits identified by CGS. The proposed Plan relies on local general plan development regulations to identify appropriate areas to protect and/or allow harvesting/mining of mineral resources. By developing more compactly, the proposed Plan directs more growth to the areas that are already developed and away from undeveloped land. Harvesting/mining of mineral resources in or near urban development may create incompatibilities, and/or may be economically infeasible. Compact growth and urban infill allow for the preservation of non-urban areas where mineral recourses may be more feasible to remove.

Local general plans, specific plans, and other land use plans include policies to protect existing and planned future mineral production and extraction activities from surrounding uses and require that future projects near mining activities have compatible land uses. In addition, the potential loss of availability of a designated mineral resource is a consideration in the final design of individual land use projects.

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the proposed Plan have been developed to most efficiently meet the demands created by the forecasted growth in population and jobs and focus mainly on development within designated growth geographies and the existing regional transportation system. Proposed transportation improvements would largely be constructed within existing ROWs. Sea level rise adaptation infrastructure located along the San Francisco Bay shoreline is mostly adjacent to developed areas or transportation infrastructure. In addition, the potential loss of availability of a designated mineral resource is a consideration in the final design of individual land use, sea level rise, or transportation projects and are addressed through local general plan policies consistent with SMARA requirements. Therefore, the proposed Plan would have a less-than-significant (LTS) impact.

Conclusion

Although implementing the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects could result in development that would preclude the future extraction of mineral resources, these impacts would be less than significant because the projected land use growth was designed to be consistent with local planning documents, which are required to consider mineral resource zones mapped by the State in the land use decisions. Further,

most development would be located in urban areas or within existing right of way for transportation-related uses where extraction of mineral resources is unlikely. This would be a **less-than-significant (LTS)** impact.

Mitigation Measures

None required.

3.9 HAZARDS AND WILDFIRE

This section evaluates the potential impacts related to hazards resulting from the implementation of the proposed Plan. It describes the existing conditions for hazardous materials, airports, emergency planning, and wildland fires in the Bay Area. Environmental impacts associated with implementation of the proposed Plan as they relate to these conditions are provided below. Impacts related to emission of toxic air contaminants along transportation routes are addressed in Section 3.4, "Air Quality."

Comments received in response to the Notice of Preparation expressed concerns about development in proximity to known sites of contamination, including former landfills and plugged and abandoned oil and gas wells, as well as wildfire hazards, planned development in recognized fire hazard zones, and emergency evacuation plans. Potential for hazards related to development on or near sites that could result in a hazard are generally addressed in this section. The potential for exacerbation of wildfire risks and the consequences of development in recognized fire hazard zones are also evaluated in this section. Water supply, including fire flows, is addressed in Section 3.14, "Public Utilities and Facilities." The potential for future land use growth to affect water quality and the release of potentially hazardous materials as a result of flooding are addressed in Section 3.10, "Hydrology and Water Quality."

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important" (CEQA Guidelines Section 15083). Neither the CEQA Guidelines nor Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require they be considered. Consistent with these requirements, the comments received on the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of impacts in this section. Appendix B includes all NOP comments received.

3.9.1 Environmental Setting

PHYSICAL SETTING

Generation and Disposal of Hazardous Materials and Waste

Materials and waste may be considered hazardous if they are poisonous (toxic); can be ignited by open flame (ignitable); corrode other materials (corrosive); or react violently, explode, or generate vapors when mixed with water (reactive). The term "hazardous material" is defined in the State of California's Health and Safety Code, Chapter 6.95, Section 25501(o) as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment. In some cases, past industrial or commercial uses on a site have resulted in spills or leaks of hazardous materials and petroleum that caused contamination of underlying soil and groundwater. Federal and State laws require that soils and groundwater having concentrations of contaminants that are higher than certain acceptable levels are handled and disposed of as hazardous waste during excavation, transportation, and disposal. CCR Title 22, Sections 66261.20–66261.24, contains technical descriptions of characteristics that would cause a soil to be classified as a hazardous waste. The use of hazardous materials and disposal of hazardous wastes are subject to numerous laws and regulations at all levels of government (see the "Regulatory Setting" section, below).

Various hazardous materials are commonly transported, stored, used, and disposed of in activities such as construction, industry (both light and heavy), dry cleaning, film processing, landscaping, automotive maintenance and repair, and common residential/commercial maintenance activities. The use, transport, storage, and disposal of hazardous materials is regulated by the U.S. Environmental Protection Agency (EPA) and California Environmental Protection Agency (CalEPA) plus six boards, departments, and offices: California Air Resources Board (CARB), California Department of Pesticide Regulation, California Department of Toxic Substances Control (DTSC), Office of Environmental Health Hazard Assessment (OEHHA), State Water Resources Control Board (SWRCB), and California Department of Public Health Center for Environmental Health. State and local regulatory agencies closely monitor businesses and industry in the control of hazardous materials. Hazardous materials require special methods of disposal, storage, and treatment, and any unintentional release of hazardous materials requires an immediate response to protect human health and safety, and the environment.

Transportation of Hazardous Materials and Waste

Hazardous materials, hazardous wastes, and petroleum products are a subset of the goods routinely shipped along the transportation corridors in the Plan area. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. DTSC maintains a list of active registered hazardous waste transporters throughout California, and the California Department of Public Health regulates the haulers of hazardous waste. Three agencies maintain searchable databases that track hazardous material releases in reportable quantities: EPA maintains the Hazardous Materials Incident Report System, which contains data on hazardous material spill incidents reported to the U.S. Department of Transportation (DOT); the California Office of Emergency Services (OES) maintains the California Hazardous Materials Incident Report System, which contains information on reported hazardous material accidental releases or spills; and SWRCB's Site Cleanup Program maintains information on reported hazardous material accidental releases or spills. DOT also provides grants to local agencies for preparing and training for hazardous materials incidents through its Hazardous Materials Emergency Preparedness Program, administered by OES.

Shipments of hazardous materials and wastes include a wide variety of chemicals, such as petroleum products, medical waste, and radioactive materials. Each movement of hazardous materials/wastes has a degree of risk, depending on the material being moved, the mode of transport, and numerous other factors. On a tonnage basis, petroleum products make up the majority—more than 80 percent—of hazardous material moved around the State.

Truck

The transport of hazardous materials by truck is regulated by DOT. **Figure 3.9-1** identifies the hazardous materials routes established by DOT in the Plan area. Hazardous materials transported by truck use many of the same freeways, arterials, and local streets as other traffic.

Railroads

The transport of hazardous materials by rail is also regulated by DOT. Freight railroads have employee safety training requirements and operating procedures that govern the handling and movement of hazardous goods, including crude oil. Federal regulations and self-imposed safety practices dictate train speeds, equipment and infrastructure inspections, and procedures for how to handle and secure trains carrying hazardous materials. The freight rail industry provides instruction to local public safety officials at the Transportation Technology Center's Security and Emergency Response Training Center, and individual railroads conduct additional local training for first responders (AAR 2020). Freight railroads also work with State emergency planning committees and local first responders to develop emergency response plans. In accordance with a February 2014 agreement between DOT and the Association of American Railroads, railroads have developed an inventory of emergency response resources and provided DOT with information on the deployment of those resources. This information is available upon request from appropriate emergency responders (AAR 2020).

Ship

The Plan area includes several marine oil terminals and shipping routes used for the transport of various hazardous materials. The California State Lands Commission regulates marine oil terminals throughout California.

Transmission Pipelines

Underground (and in isolated instances, aboveground) pipelines are used to transport a variety of potentially hazardous substances throughout the Plan area. The American Petroleum Institute recommends setbacks of 50 feet from petroleum and hazardous liquids lines for new homes, businesses, and places of public assembly. It also recommends 25 feet for garden sheds, septic tanks, and water wells and 10 feet for mailboxes and yard lights. The Transportation Research Board encourages the use of zoning regulations to minimize casualties in the event of a catastrophic rupture. Possible land use techniques include, for example, establishing setbacks; regulating or prohibiting certain types of structures and uses near transmission pipelines; and encouraging, through site and community planning, other types of activities and facilities (e.g., ministorage businesses, linear parks, recreational paths) within or in the vicinity of pipeline rights-of-way.

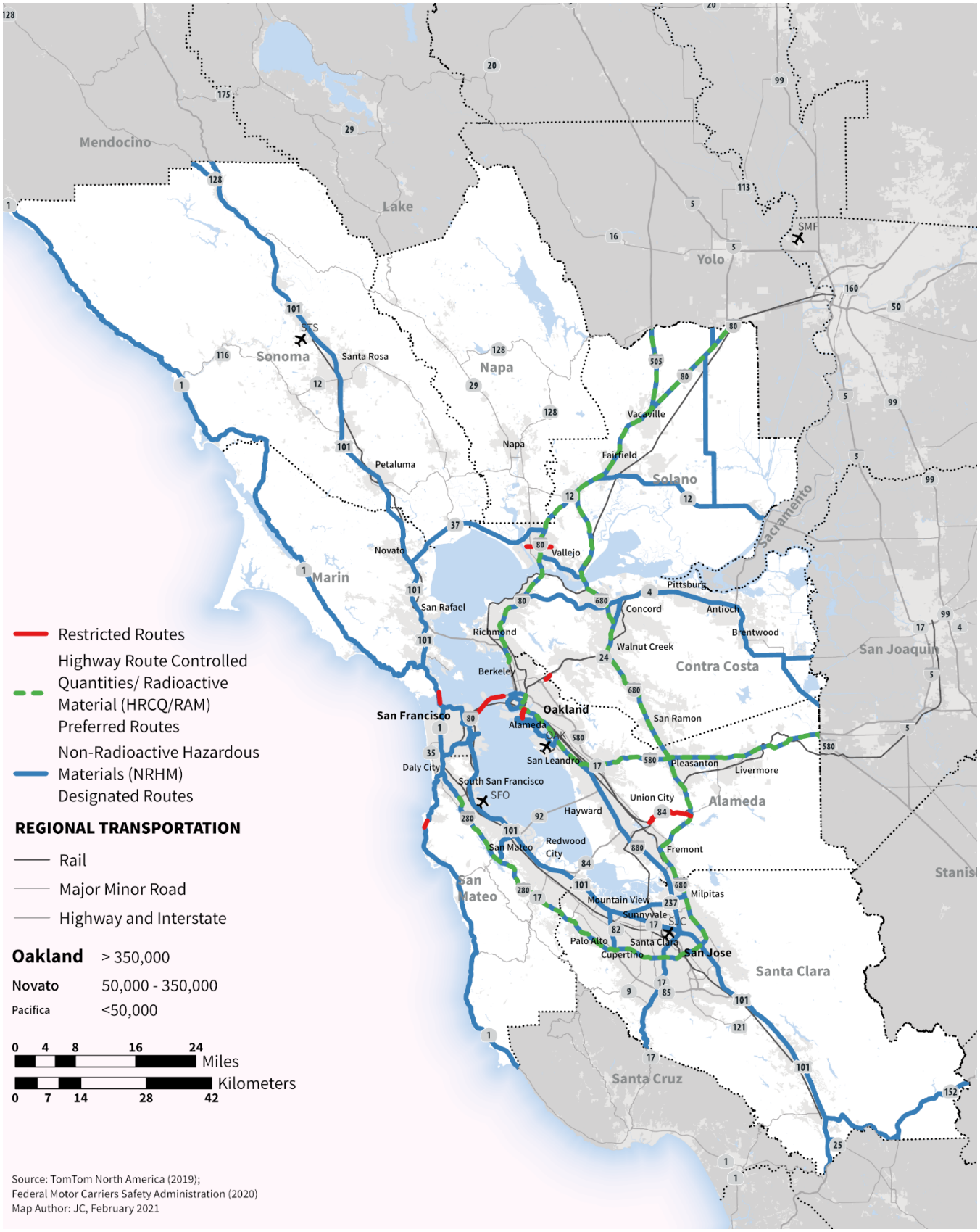

Figure 3.9-1: Hazardous Material Routes

Potential Presence of Hazardous Materials in Soil and Groundwater

Hazardous materials, including pesticides and herbicides, heavy metals, volatile organic compounds, and oil and gas, may be present in soil and groundwater in areas where land uses have resulted in leaking fuel or chemical storage tanks or where other releases of hazardous materials have occurred. Land uses that typically involve the handling of hazardous materials include commercial or industrial operations, as well as agricultural areas where soils may contain pesticides and herbicides.

Various federal, State, and local regulatory agencies maintain lists of hazardous materials sites where soil and/or groundwater contamination is known or suspected to have occurred. These facilities are readily identified through regulatory agency database searches, such as SWRCB's GeoTracker online database; DTSC's EnviroStor online database; and several other federal, State, and local regulatory agency databases. These databases include closed sites that have been fully remediated; sites where contamination is contained but land use restrictions are in place; and sites under evaluation, active remediation, and monitoring. Sites listed on these databases are generally located in more densely populated areas with a history of light and heavy industrial uses. A large number of Bay Area sites are listed in these databases. The quantity of sites listed on two key databases (GeoTracker and EnviroStor) are summarized by county in **Table 3.9-1**.

Table 3.9-1: Documented Hazardous Materials Cleanup Sites in the Bay Area

Sites	Alameda County	Contra Costa County	Marin County	Napa County	San Francisco County	San Mateo County	Santa Clara County	Solano County	Sonoma County
GeoTracker cleanup sites	3,652	1,204	443	424	2,270	1,734	3,528	696	1,611
EnviroStor cleanup sites	605	360	70	29	175	209	701	96	91

Note: Sites may be listed on both databases.
Sources: DTSC 2020; SWRCB 2020

To address the potential for documented and undocumented hazards on a site, the American Society for Testing and Materials has developed widely accepted practice standards for the preliminary evaluation of site hazards (E-1527-05). Phase I Environmental Site Assessments (ESAs) include an on-site visit to determine current conditions, an evaluation of possible risks posed by neighboring properties, interviews with persons knowledgeable about the site's history, an examination of local planning files to check prior land uses and permits granted, file searches with appropriate agencies having oversight authority relative to water quality and/or soil contamination, examination of historic aerial photography of the site and adjacent properties, a review of current topographic maps to determine drainage patterns, and an examination of chain-of-title for environmental lines and/or activity and land use limitations. If a Phase I ESA indicates the presence or potential presence of contamination, a site-specific Phase II ESA is generally conducted to test soil and/or groundwater. Based on the outcome of a Phase II ESA, remediation of contaminated sites under federal and State regulations may be required prior to development. Phase I ESAs can also be used to identify the potential for presence of hazardous building materials in situations where older structures intended for demolition could contain lead-based paint, asbestos containing materials, mercury, or polychlorinated biphenyls. The Preliminary Endangerment Assessment (PEA) process, which is typically conducted for sites with DTSC oversight, is similar, but includes screening evaluations and public participation.

Naturally Occurring Asbestos

Asbestos is not a formal mineralogical term, but rather a commercial and industrial term historically applied to a group of silica-containing minerals that form long, very thin mineral fibers (termed amphiboles), which generally form in bundles, that were once widely used in commercial products. Naturally occurring asbestos (NOA) includes minerals in their natural state, such as in bedrock or soils. NOA, which was identified as a toxic air contaminant by CARB in 1986, is of concern due to potential exposures to the tiny fibers that can become airborne if asbestos-bearing rocks are disturbed by natural erosion or human activities, such as road building, excavations, and other ground-disturbing activities. Once disturbed, microscopic fibers can become lodged in the lungs, which can potentially lead to serious health problems. All nine Bay Area counties contain reported NOA and/or ultramafic rocks, such as serpentinite, which can contain asbestos fibers (USGS 2011). As shown in **Figure 3.9-2**, most of the reported asbestos occurrences are located in San Francisco and Marin Counties, while ultramafic rock occurrences are most prominent in Napa County. In general, NOA fibers do not pose a threat unless disturbed and introduced into the air as fugitive dust.

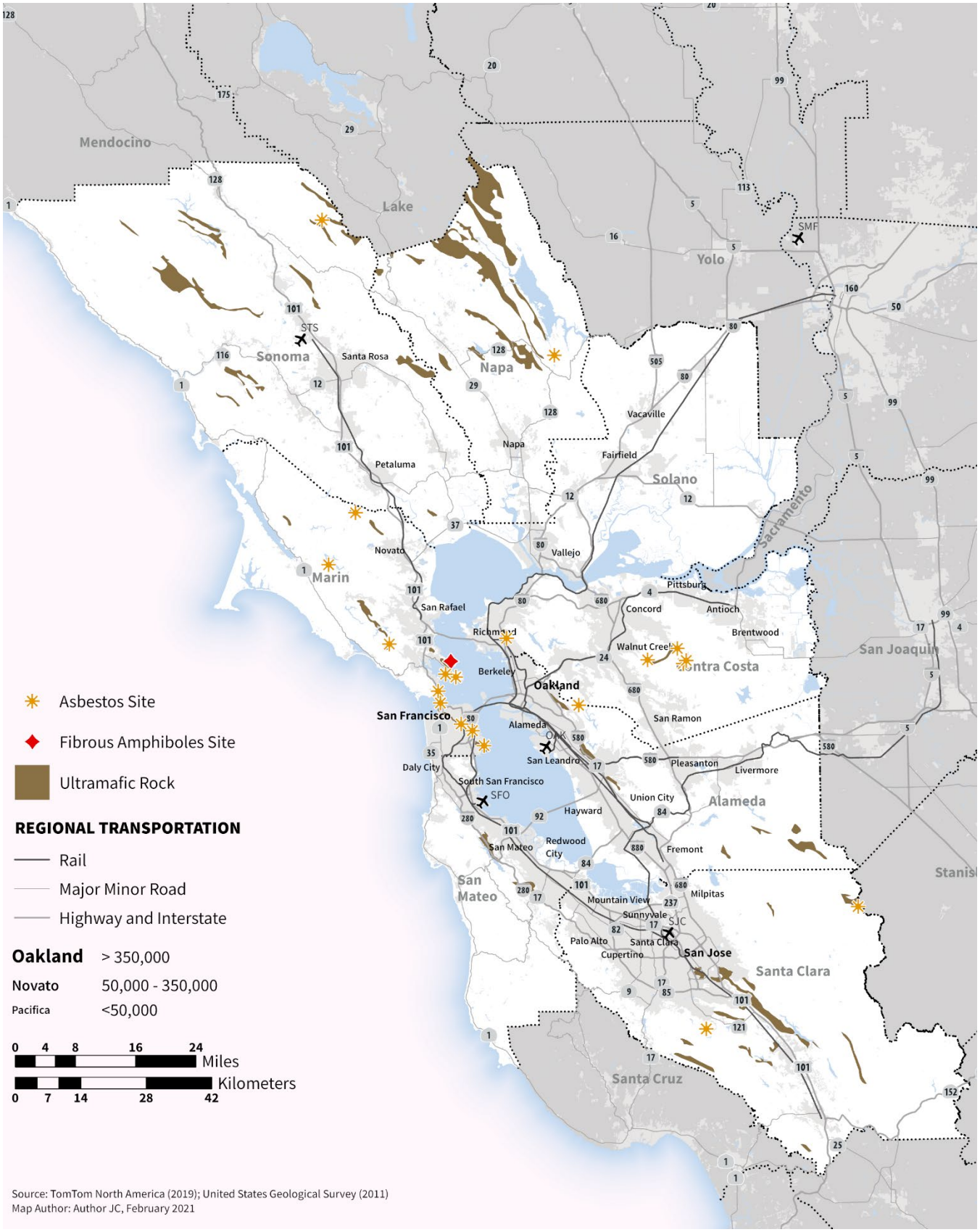

Figure 3.9-2: Naturally Occurring Asbestos and Ultramafic Rocks

Schools

Children are particularly susceptible to long-term effects from emissions of hazardous materials. Therefore, locations where children spend extended periods of time, such as schools, are particularly sensitive to hazardous air emissions and accidental release associated with the handling of extremely hazardous materials, substances, or wastes. There are nearly 2,000 public schools located throughout the Bay Area with over 1 million students, as described further in Section 3.13, "Public Services and Recreation."

Airports

There are 26 public use airports in the Bay Area that serve commercial and general aviation users (see **Table 3.9-2** and **Figure 3.9-3**). This regional airport system forms an integral part of the Bay Area's transportation network by providing links to communities throughout the United States and abroad. Bay Area communities must consider housing and economic development along with airport interests in making decisions concerning the amount and type of new development to allow in and near airport flight corridors. Potential hazards in relationship to airport operations are generally regulated by the Federal Aviation Administration (FAA), with local planning and evaluation of proposed projects (in terms of a proposed project's compatibility in relationship to air and ground operations and the safety of the public) under the authority of the applicable airport land use commission (ALUC) through airport land use compatibility plans (ALUCPs).

Table 3.9-2: Public Use Airports and Military Airfields in the San Francisco Bay Area

County	Airport Name	Caltrans Classification
Alameda	Hayward Executive Airport	Metropolitan
Alameda	Livermore Municipal Airport	Metropolitan
Alameda	Oakland International Airport	Commercial/Primary
Contra Costa	Buchanan Field	Metropolitan
Contra Costa	Byron Airport	Community
Marin	Gnoss Field	Regional
Napa	Angwin Parrett Field Airport	Limited Use*
Napa	Napa County Airport	Regional
San Mateo	Half Moon Bay Airport	Regional
San Mateo	San Carlos Airport	Metropolitan
San Mateo	San Francisco International Airport**	Commercial/Primary
Santa Clara	Moffett Federal Airfield	Military/NASA
Santa Clara	Norman Y. Mineta San José International Airport	Commercial/Primary
Santa Clara	Palo Alto Airport of Santa Clara County	Metropolitan
Santa Clara	Reid-Hillview Airport	Metropolitan
Santa Clara	San Martin Airport	Regional
Solano	Nut Tree Airport	Regional
Solano	Rio Vista Municipal Airport	Regional
Solano	Travis Air Force Base	Military/NASA
Sonoma	Charles M. Schulz - Sonoma County Airport	Commercial/Primary
Sonoma	Cloverdale Municipal Airport	Community
Sonoma	Healdsburg Municipal Airport	Community
Sonoma	Petaluma Municipal Airport	Regional
Sonoma	Sonoma Skypark	Community
Sonoma	Sonoma Valley Airport	Community

Notes: Caltrans = California Department of Transportation. There are no public use airports within the City and County of San Francisco.
* Privately owned airport that is open to the general public. Owned by Pacific Union College.
** The City and County of San Francisco owns and operates San Francisco International Airport.
Source: FAA 2020

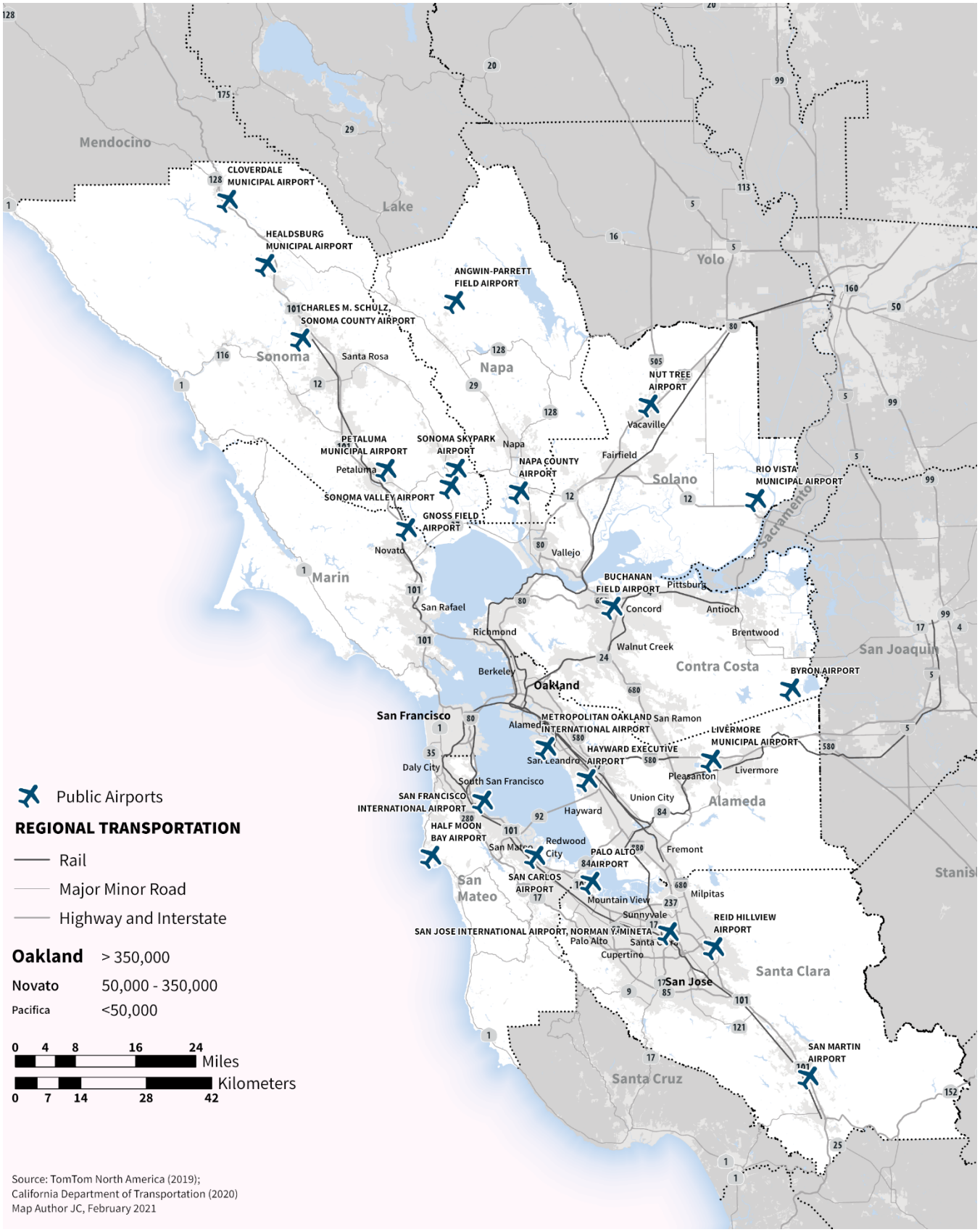

Figure 3.9-3: Public Use Airports

WILDLAND FIRE

In California, responsibility for wildfire prevention and suppression is shared by federal, State, and local agencies. Federal agencies are responsible for federal lands in Federal Responsibility Areas. The State of California has determined that some nonfederal lands in unincorporated areas with watershed value are of Statewide interest and have classified those lands as State Responsibility Areas (SRAs), which are managed by the California Department of Forestry and Fire Projection (CAL FIRE). All incorporated areas and other unincorporated lands are classified as Local Responsibility Areas (LRAs).

While all of California is subject to some degree of wildfire hazard, there are specific features that make certain areas more hazardous. CAL FIRE is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors (PRC Sections 4201–4204 and Government Code 51175–51189). Factors that increase an area's susceptibility to fire hazards include slope, vegetation type and condition, and atmospheric conditions, as described further below.

Wildfire Behavior and Controlling Factors

Wildfire behavior is a product of several variables—primarily weather, vegetation, topography, and human influence—that combine to produce local and regional fire regimes that affect how, when, and where fires burn. The fire regime, meanwhile, is characterized by several factors, including fire frequency, intensity, severity, and area burned.

Human Influence on Wildfire

Human influence on wildfire includes direct influences, such as the ignition and suppression of fires, and indirect influence through climate change, the alteration of native vegetation, fire suppression, and development patterns. Human-induced wildfire ignitions can change fire regime characteristics in two ways: (1) changing the distribution and density of ignitions and (2) changing the seasonality of burning activity (Balch et al. 2017). Human-induced ignition sources include escapes from debris and brush-clearing fires, electrical equipment malfunctions, campfires, smoking, fire play (e.g., fireworks), vehicles, and arson. Consequently, areas near human development more frequently experience fires than very remote or urban areas (Syphard et al. 2007; Mann et al. 2016; Balch et al. 2017).

Once a fire is started, the spread and behavior of a fire become a function of fuel characteristics, terrain, and weather conditions (Syphard et al. 2008). Development that has spread into less densely populated, often hilly areas has increased the number of people living in heavily vegetated areas that are prone to wildfire. This area where wildlands meet urban development is referred to as the wildland-urban interface (WUI) and is subject to urban wildfire. Nationwide, the number of houses in the WUI increased by 41 percent between 1990 and 2010 (Radeloff et al. 2018), and an estimated 95 percent of wildfires in California are caused by people (Syphard et al. 2007).

Fire Fuel Management

People have intervened deliberately and dramatically in the natural fire regime through fire suppression and, more recently, actions that affect fuel connectivity. Historically, fire suppression was used to prevent and limit wildfires. Although an important practice in limiting fire spread, over time, this land management practice (combined with forest regrowth after extensive logging in the late 19th century) has led to a buildup of forest fuels and an increase in the occurrence and threat of large, severe fires (Westerling et al. 2006). Contemporary fire management practices include fuel management activities that are intended to reduce the intensity and severity of wildfires. Reducing fuels through mechanical treatments and prescribed fire have been found to be effective at reducing fire frequency, fire severity, and annual area burned when applied at the landscape scale over an extended period of time (Kim et al. 2013; Martinson and Omi 2013; Prichard and Kennedy 2014; Tubbesing et al. 2019).

Climate Change and Wildfire

Wildfire activity is closely related to temperature and drought conditions, and in recent decades, increasing drought frequency and warming temperatures have led to an increase (Westerling et al 2006; Schoennagel et al. 2017). In particular, the western United States, including California, has seen increases in wildfire activity in terms of area burned, number of large fires, and fire season length (Westerling et al. 2006; Abatzoglou and Williams 2016). These conditions have resulted in the largest, most destructive, and deadliest wildfires on record in California history.

Climate change is expected to continue to produce conditions that facilitate a longer fire season, which, when coupled with human-caused changes in the seasonality of ignition sources, will produce more, longer, and bigger fires during more times of the year. According to California's Fourth Climate Change Assessment, Statewide Summary Report (OPR et al. 2018a), if greenhouse gas emissions continue to rise, the frequency of extreme wildfires burning over 25,000 acres could increase by

50 percent by 2100, and the average area burned Statewide could increase by 77 percent by the end of the century (OPR et al. 2018b). Refer to Section 3.6, "Climate Change, Greenhouse Gases, and Energy," for additional discussion of climate change trends and the effects of climate change on the environment.

Wildfire Conditions in the Plan Area

Throughout the Bay Area, there is a full range of conditions and fire hazards as indicated in **Figure 3.9-4**, with all Bay Area counties except San Francisco having areas of High and Very High Fire Hazard in areas of CAL FIRE responsibility. The areas of greatest wildfire hazard are concentrated in the hillside areas of San Mateo, Santa Clara, Sonoma, and Napa Counties, with smaller hazard areas in Marin County, the East Bay Hills of Alameda and Contra Costa Counties, and on the slopes of Mount Diablo. CAL FIRE has also mapped Very High Fire Hazard Severity Zones in LRAs to provide guidance to local agencies (CAL FIRE 2016).

Wildfires tend to be larger under drier atmospheric conditions and when fed by drier fuel sources (Balch et al. 2017). In 2020, several large fires occurred in California as a result of lightning storms coupled with dry fuels. Currently the third largest fire in recent California history, the SNU Lightening Complex fires, burned 396,624 acres in Stanislaus, Santa Clara, Alameda, Contra Costa, and San Joaquin Counties in August 2020. At the same time, the LNU Lightening Complex fire burned an additional 363,200 acres in Sonoma, Lake, Napa, and Yolo Counties (CAL FIRE 2020a). In 2017, the Tubbs Fire caused substantial destruction in parts of Napa and Sonoma Counties. Believed to have been started by a private electrical system, the fire is the second most destructive in recent California history. The Tubbs fire damaged 5,636 structures and resulted in 22 deaths, with much of the destruction in Santa Rosa. The 1991 Tunnel fire in the Oakland Hills above Berkeley and Oakland, an urban wildfire, resulted in 25 deaths and the loss of 2,900 structures. It remains the third most destructive wildfire in California history (CAL FIRE 2020b). A fire along the WUI can result in major losses of property and structures.

3.9.2 Regulatory Setting

FEDERAL REGULATIONS

EPA is the lead agency responsible for enforcing federal regulations that affect public health or the environment. The primary federal laws and regulations include the Resource Conservation and Recovery Act of 1976 (RCRA) and the Hazardous and Solid Waste Amendments enacted in 1984; the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA); and the Superfund Act and Reauthorization Act of 1986 (SARA). Federal statutes pertaining to hazardous materials and wastes are contained in CFR Title 40, Protection of the Environment.

Toxic Substances Control Act

The Toxic Substances Control Act of 1976 (15 U.S. Code Section 2601 et seq.) grants EPA the authority to develop reporting, record-keeping, and testing requirements for, as well as restrictions on, the manufacture, use, and sale of chemical substances.

Resource Conservation and Recovery Act

RCRA Subtitle C regulates the generation, transportation, treatment, storage, and disposal of hazardous waste by "large-quantity generators" (1,000 kilograms per month or more) through comprehensive life cycle or "cradle to grave" tracking requirements. The requirements include maintaining inspection logs of hazardous waste storage locations, records of quantities being generated and stored, and manifests of pickups and deliveries to licensed treatment/storage/disposal facilities. RCRA also identifies standards for treatment, storage, and disposal, which is codified in CFR Title 40 Part 260.

Comprehensive Environmental Response Compensation and Liability Act

Congress enacted CERCLA, setting up what has become known as the Superfund program, in 1980 to establish prohibitions and requirements concerning closed and abandoned hazardous waste sites, provide for liability of persons responsible for releases of hazardous waste at these sites, and establish a trust fund to provide for cleanup when no responsible party can be identified. Generally, CERCLA authorizes two kinds of response actions:

- short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response, and
- long-term remedial response actions that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening.

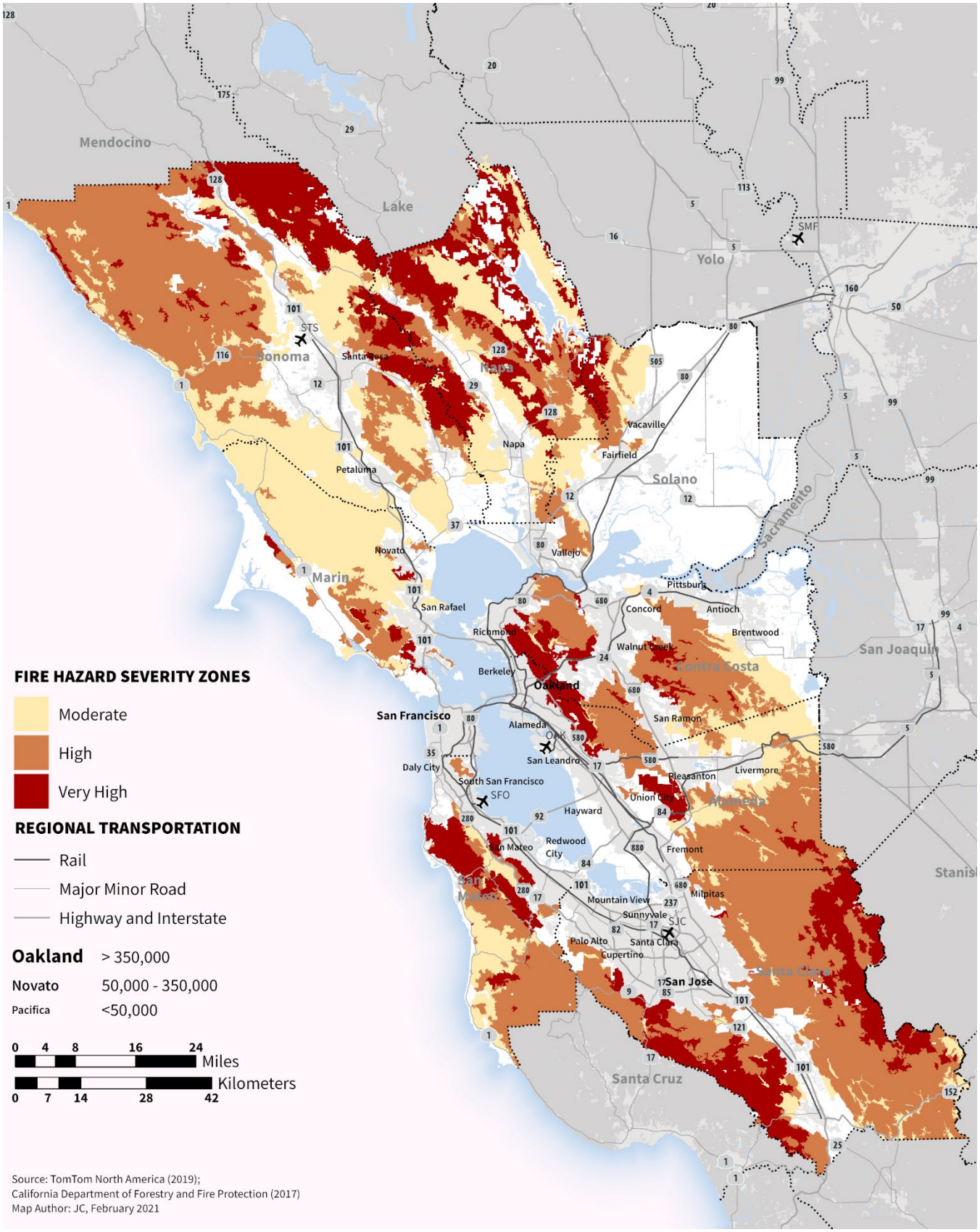

Figure 3.9-4: Fire Hazards

Superfund Amendments and Reauthorization Act

SARA amended CERCLA in 1986, emphasizing the importance of permanent remedies and innovative treatment technologies to clean up hazardous waste sites, requiring Superfund actions to consider the standards and requirements found in other State and federal environmental laws and regulations, providing new enforcement authorities and settlement tools, increasing involvement of the states in every phase of the Superfund program, increasing the focus on human health problems posed by hazardous waste sites, encouraging greater citizen participation in making decisions on how sites should be cleaned up, and increasing the size of the trust fund to $8.5 billion.

Emergency Planning Community Right-to-Know Act

The Emergency Planning Community Right-to-Know Act (EPCRA), or SARA Title III, was enacted in October 1986. SARA Title III requires any infrastructure at the State and local levels to plan for chemical emergencies, including identifying potential chemical threats. Reported information is then made publicly available so that interested parties may become informed about potentially dangerous chemicals in their community. EPCRA Sections 301–312 are administered by EPA's Office of Emergency Management. EPA's Office of Information Analysis and Access implements EPCRA's Section 313 program. In California, SARA Title III is implemented through the California Accidental Release Prevention Program (CalARP).

Code of Federal Regulations, Title 29

The Occupational Safety and Health Act (29 CFR Section 1910.120) establishes regulations for employers that provide employees with an environment free from recognized hazards, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions. Pursuant to Occupational Safety and Health Administration regulations, standard accident training for cleaning up small spills would be provided to all individuals prior to their work with hazardous substances, and the appropriate types and amounts of spill cleanup materials and personal protective equipment would be immediately available.

National Emission Standards for Hazardous Air Pollutants

The National Emission Standards for Hazardous Air Pollutants is an Environmental Protection Agency (EPA) standard that is applicable within the United States to the emissions of hazardous air pollutants produced by corporations, institutions and at Agencies at all levels of government. The hazardous air pollutants are those pollutants that are known or suspected to cause cancer, serious health effects, or adverse environmental effects.

Code of Federal Regulations, Title 14, Part 77

FAA's primary role is to promote aviation safety and control the use of airspace. Public use airports that are subject to FAA's grant assurances must comply with specific FAA design criteria, standards, and regulations. Land use safety compatibility guidance from FAA is limited to the immediate vicinity of the runway, the runway protection zones at each end of the runway, and the protection of navigable airspace. FAA enforces safety standards and investigates and corrects violations, as appropriate.

Title 14, Part 77 of the CFR, *Safe Efficient Use and Preservation of the Navigable Airspace,* establishes the federal review process for determining whether proposed development activities in the vicinity of an airport have the potential to result in a hazard to air navigation. 14 CFR Part 77 identifies criteria that govern which projects require notice to be filed with FAA, as well as identifying standards for determining whether a proposed project would represent an obstruction "that may affect safe and efficient use of navigable airspace and the operation of planned or existing air navigation and communication facilities." Objects that are identified as obstructions based on these standards are presumed to be hazards until an aeronautical study conducted by FAA determines otherwise.

14 CFR Part 77.9, *Construction or Alteration Requiring Notice*, indicates that notice must be filed with FAA for any construction or alteration of objects within 20,000 feet of a public use airport runway when the height of the objects exceeds (i.e., is taller than) an imaginary surface with a 100:1 (1 foot upward per 100 feet horizontally) slope from the nearest point of the nearest runway. This requirement applies when the airport has at least one runway that exceeds 3,200 feet in length; for shorter runways, the notification surface has a 50:1 slope and extends 10,000 feet from the runway. For heliports, the notification surface has a 25:1 slope and extends 5,000 feet from the helicopter takeoff and landing area, commonly referred to as final approach and takeoff area. The notification requirements apply to all public-use airports, military airports, and heliports. When FAA notification is required, it must be provided using FAA Form 7460-1, Notice of Proposed Construction or Alteration.

Hazardous Materials Transportation Act

The transportation of hazardous materials is regulated by the Hazardous Materials Transportation Act (HMTA), which is administered by the Research and Special Programs Administration of DOT. HMTA provides DOT with a broad mandate to regulate the transport of hazardous materials, with the purpose of adequately protecting the nation against risk to life and property, which is inherent in the commercial transportation of hazardous materials. The HMTA governs the safe transportation of hazardous materials by all modes. DOT regulations that govern the transportation of hazardous materials are applicable to any person who transports, ships, causes to be transported or shipped, or who is involved in any way with the manufacture or testing of hazardous materials packaging or containers. DOT regulations govern every aspect of the movement, including packaging, handling, labeling, marking, placarding, operational standards, and highway routing. Additionally, DOT is responsible for developing curriculum to train for emergency response and administers grants to states and Indian tribes for ensuring the proper training of emergency responders.

Code of Federal Regulations, Title 49

Title 49, Transportation, of the CFR includes hazardous materials regulations in the volume containing Parts 100–185 and governs the transport of hazardous materials in all modes of transportation: air, highway, rail, and water. Hazardous materials regulations are subdivided by function into four basic areas: Procedures and/or Policies (49 CFR Parts 101, 106, and 107), Material Designations (49 CFR Part 172), Packaging Requirements (49 CFR Parts 173, 178, 179, and 180), and Operational Rules (49 CFR Parts 171, 173, 174, 175, 176, and 177).

Pipeline and Hazardous Materials Safety Administration Hazardous Materials Regulations

The Pipeline and Hazardous Materials Safety Administration is the federal regulator for the movement of hazardous materials by rail. Regulations cover product classification, operating rules, and tank car standards.

Federal Railroad Administration Office of Railroad Safety

The Federal Railroad Administration's Office of Railroad Safety promotes and regulates safety throughout the nation's railroad industry. The regional offices enforce compliance with regulations related to hazardous materials, motive power equipment, operating practices, signal and train control, and tracks. California is in Region 7, which is headquartered in Sacramento, California (FRA 2015).

International Fire Code

The International Fire Code (IFC), created by the International Code Council, is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The IFC regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. The IFC and the International Building Code use a hazard classification system to determine what protective measures are required for fire and life safety. These measures may include construction standards, separations from property lines, and specialized equipment. To ensure that these safety measures are met, the IFC employs a permit system based on hazard classification. The IFC is updated every 3 years and is the basis for the California Fire Code (CFC) (also updated triennially). Local jurisdictions, including Bay Area cities and counties, then adopt the CFC, in some cases with local amendments.

National Fire Plan

The U.S. Department of the Interior's National Fire Plan is intended to ensure an appropriate federal response to severe wildland fires, reduce fire impacts on rural communities, and ensure sufficient firefighting capacity in the future. The Rural Fire Assistance program is funded to enhance the fire protection capabilities of rural fire districts and safe and effective fire suppression in the wildland/urban interface. The program promotes close coordination among local, state, tribal, and federal firefighting resources by conducting training, equipment purchase, and prevention activities on a cost-shared basis.

Federal Disaster Mitigation Act

The Disaster Mitigation Act of 2000 provided a set of mitigation plan requirements that encourage state and local jurisdictions to coordinate disaster mitigation planning and implementation. States are encouraged to complete a "Standard" or an "Enhanced" Natural Mitigation Plan. "Enhanced" plans demonstrate increased coordination of mitigation activities at the state level and, if completed and approved, increase the amount of funding through the Hazard Mitigation Grant Program.

STATE REGULATIONS

California Fire Code

The CFC is Chapter 9 of CCR Title 24. It is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The CFC regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. The CFC and the California Building Code use a hazard classification system to determine what protective measures are required for fire and life safety. These measures may include construction standards, separations from property lines, and specialized equipment. To ensure that these safety measures are met, the CFC employs a permit system based on hazard classification. The CFC is updated every 3 years.

CFC Chapter 49 provides minimum standards to increase building resistance to the intrusion of flame or burning embers projected by a vegetation fire and identifies performance and prescriptive requirements. Section 4906 provides hazardous vegetation fuel management requirements for buildings and structures located on land in a Very High Fire Hazard Severity Zone in LRAs and land in a Moderate Fire Hazard Severity Zone, High Fire Hazard Severity Zone, or Very High Fire Hazard Severity Zone in SRAs.

2019 Strategic Plan for California

The 2019 Strategic Plan prepared by CAL FIRE and the California Natural Resources Agency lays out central goals for reducing and preventing the impacts of fire in the State. The goals are meant to establish, through local, State, federal, and private partnerships, a natural environment that is more resilient and human-made assets that are more resistant to the occurrence and effects of wildland fire.

In addition to the 2019 Strategic Plan for California, individual CAL FIRE units develop fire plans, which are major strategic documents that establish a set of tools for each CAL FIRE unit for its local area. Updated annually, unit fire plans identify wildfire protection areas, initial attack success, assets and infrastructure at risk, prefire management strategies, and accountability within their unit's geographical boundaries. The unit fire plan identifies strategic areas for prefire planning and fuel treatment as defined by the people who live and work locally. The plans include contributions from local collaborators and stakeholders and are aligned with other plans for the area.

California Unified Program Administration

The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs, as listed below:

- Hazardous Materials Release Response Plans and Inventories (Business Plans),
- CalARP,
- Underground Storage Tank Program,
- Aboveground Petroleum Storage Act Program,
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs, and
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements.

The State agency partners involved in the Unified Program have the responsibility of setting program element standards, working with CalEPA on program consistency, and providing technical assistance to the Certified Uniform Program Agencies (CUPAs). The following State agencies are involved with the Unified Program:

- **California Environmental Protection Agency.** The Secretary of CalEPA is directly responsible for coordinating the administration of the Unified Program. The Secretary certifies Unified Program agencies.

- **California Department of Toxic Substances Control.** DTSC provides technical assistance and evaluation for the hazardous waste generator program, including on-site treatment (tiered permitting). Under CCR Title 22 and the California Hazardous Waste Control Law, Chapter 6.5, DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste.

- **Governor's Office of Emergency Services.** OES is responsible for providing technical assistance and evaluation of the Hazardous Material Release Response Plan (Business Plan) Program and the CalARP programs.

- **Office of the State Fire Marshal.** The Office of the State Fire Marshal is responsible for ensuring the implementation of the Hazardous Material Management Plans and the Hazardous Material Inventory Statement Programs. These programs tie in closely with the Business Plan Program.

- **State Water Resources Control Board.** SWRCB provides technical assistance and evaluation for the underground storage tank program in addition to handling the oversight and enforcement for the aboveground storage tank program.

Both RCRA and the Hazardous Waste Control Law impose "cradle to grave" regulatory systems for handling hazardous waste in a manner that protects human health and the environment. CalEPA has delegated some of its authority under the Hazardous Waste Control Law to county health departments and other CUPAs. Specific CUPAs in the Bay Area are identified in **Table 3.9-3**.

Table 3.9-3: Bay Area CUPAs

County	CUPA(s)
Alameda	Alameda County Department of Environmental Health Berkeley City Toxics Management Department Fremont City Fire Department Hayward City Fire Department Livermore-Pleasanton Fire Department City of San Leandro Union City Environmental Programs
Contra Costa	Contra Costa Health Services Department
Marin	Marin County Department of Public Works
Napa	Napa County Department of Environmental Management
San Francisco	San Francisco City & County Public Health Department
San Mateo	San Mateo County Environmental Health
Santa Clara	Gilroy City Fire Department Santa Clara City Fire Department Santa Clara County Environmental Health Sunnyvale Department of Public Safety
Solano	Solano County Environmental Health
Sonoma	Healdsburg/Sebastopol Joint Powers Authority Petaluma City Fire Department Santa Rosa City Fire Department Sonoma County Fire and Emergency Services Department

Source: CalEPA 2016

Title 26 of the California Code of Regulations

In California, transportation of hazardous materials and wastes is regulated by Caltrans (26 CCR). CHP and Caltrans enforce both federal and state regulations and respond with the county fire department to hazardous materials transportation emergencies. Emergency responses are coordinated as necessary between federal, state, and local governmental authorities and private persons through the state-mandated Emergency Response Plan.

Worker And Workplace Hazardous Materials Safety

Cal OSHA is responsible for developing and enforcing workplace safety standards and assuring worker safety in the handling and use of hazardous materials. California standards for workers dealing with hazardous materials are contained in Title 8 of the CCR and include practices for all industries (General Industrial Safety Orders), and specific practices for construction and other industries. Workers at hazardous waste sites (or working with hazardous wastes as might be encountered during excavation of contaminated soil) must receive specialized training and medical supervision according to the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations. Additional regulations have been developed for construction workers potentially exposed to lead and asbestos. Cal OSHA enforcement units conduct on-site evaluations and issue notices of violation to enforce necessary improvements to health and safety practices. Among other requirements, Cal OSHA obligates many businesses to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans. The Hazard

Communication Standard requires that workers be informed of the hazards associated with the materials they handle. For example, manufacturers are to appropriately label containers, material safety data sheets are to be available in the workplace, and employers are to properly train workers.

California Human Health Screening Levels

The California Human Health Screening Levels (CHHSLs) were developed as a tool to assist in the evaluation of contaminated sites for potential adverse threats to human health. Preparation of the CHHSLS was required by the California Land Environmental Restoration and Reuse Act of 2001. The CHHSLs were developed by OEHHA, an agency under the umbrella of CalEPA, and are contained in its report entitled *Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil* (OEHHA and CalEPA 2005). The thresholds of concern used to develop the CHHSLs are an excess lifetime cancer risk of one in 1 million and a hazard quotient of 1.0 for noncancer health effects. The CHHSLs were developed using standard exposure assumptions and chemical toxicity values published by EPA and CalEPA. The CHHSLs can be used to screen sites for potential human health concerns where releases of hazardous chemicals to soils have occurred. Under most circumstances, the presence of a chemical in soil, soil gas, or indoor air at concentrations below the corresponding CHHSLs can be assumed to not pose a significant health risk to people who may live (residential CHHSLs) or work (commercial/ industrial CHHSLs) at thesite.

California Accidental Release Prevention Program

CalARP addresses facilities that contain specified hazardous materials, known as "regulated substances," that, if involved in an accidental release, could result in adverse off-site consequences. CalARP defines regulated substances as chemicals that pose a threat to public health and safety or the environment because they are highly toxic, flammable, or explosive.

California Health and Safety Code

The Hazardous Waste Control Act of 1972 (Health & Safety Code Section 25100 et seq.) is the seminal hazardous waste control law in California. It establishes standards for regulating the generation, handling, processing, storage, transportation, and disposal of hazardous wastes. The hazardous waste control program is administered by DTSC and local CUPAs.

Asbestos Regulations

In 1990, CARB issued an Airborne Toxic Control Measure (ATCM), which prohibited the use of serpentine aggregate for surfacing if the asbestos content was 5 percent or more. In July 2000, CARB adopted amendments to the existing ATCM prohibiting the use or application of serpentine, serpentine-bearing materials, and asbestos-containing ultramafic rock for covering unpaved surfaces unless it has been tested using an approved asbestos bulk test method and determined to have an asbestos content that is less than 0.25 percent. In July 2001, CARB adopted a new ATCM for construction, grading, quarrying, and surface mining operations in areas with serpentine or ultramafic rocks. These regulations are codified in Title 17, Section 93105 of the CCR. The regulations require preparation and implementation of an Asbestos Dust Mitigation Plan for construction or grading activities on sites greater than 1 acre in size with known NOA soils. The air districts enforce this regulation.

In October 2000, the Governor's Office of Planning and Research issued a memorandum providing guidance to lead agencies in analyzing the impacts of NOA on the environment through the CEQA review process. In November 2000, the California Department of Real Estate added a section to subdivision forms that includes questions related to NOA on property proposed fordevelopment. In 2004, as part of its school-site review program, DTSC's School Property Evaluation and Cleanup Division released interim guidance on evaluating NOA at school sites.

In addition, California Health and Safety Code Section 19827.5 prohibits issuance of demolition permits by local and State agencies without assessment of the potential for the structure to contain asbestos.

California Environmental Quality Act

Pursuant to PRC Section 21098, lead agencies must provide notice to the military service for certain projects with specified proximity to a low-level flight path, military impact zone, or special use airspace. Similarly, Government Code Section 65352 requires that, prior to taking certain actions, the lead agency shall refer the proposed action to the appropriate branch of the U.S. Military if a project would be:

- located within 1,000 feet of a military installation,
- located beneath a low-level flight path, or
- within special use airspace as defined in CEQA Section 21098.

Pursuant to PRC Section 21151.4, projects that can be reasonably anticipated to produce hazardous air emissions or handle extremely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school must consult with the potentially affected school district and provide written notification not less than 30 days prior to the proposed certification or approval of an environmental document. Where a school district proposes property acquisition or the construction of a school, the environmental document must address existing environmental hazards, and written findings must be prepared regarding existing pollutant sources (see PRC Section 21151.8; Appendix G of the State CEQA Guidelines). PRC Section 21151.2 requires school districts to notify the applicable planning commission before acquiring property for a new school or expansion to identify potential land use conflicts.

California Education Code

Sections 17071.13, 17072.13, 17210, 17210.1, 17213.1-3, and 17268 of the California Education Code became effective January 1, 2000. Together, they establish requirements for assessments and approvals regarding toxic and hazardous materials that school districts must follow before receiving final site approval from the California Department of Education and funds under the School Facilities Program. These requirements are consistent with those described above for certification or approval of an environmental document under CEQA.

For example, the site approval package must include written determinations regarding the presence of hazardous wastes or pipelines carrying hazardous substances on the site (the adopted CEQA document is often used for these purposes). The code also requires that a Phase I ESA is conducted according to the American Society of Testing and Materials standards (ASTM E-1527-2000) and transmitted to DTSC. If the Phase I ESA concludes that further investigation is needed or DTSC requires it, a PEA must be completed under DTSC oversight and review. See the discussion above, under "Potential Presence of Hazardous Materials in Soil and Groundwater," for additional information regarding Phase I ESAs and PEAs.

Hazardous Air Emissions and Facilities within a Quarter Mile of a School

When evaluating potential school sites, Education Code Section 17213(b) and PRC Section 21151.8(a)(2) require the local educational agency (LEA) to consult with the applicable air district to identify facilities within 0.25 mile of a proposed school site that might reasonably be anticipated to emit hazardous air emissions or handle hazardous materials, substances, or wastes. The LEA must prepare written findings that either there are no such facilities, the facilities do not pose a health risk, or corrective measures will be taken. In the final instance, the LEA should make an additional finding that emissions will be mitigated before occupancy of the school. These written findings, as adopted by the LEA governing board, must be submitted to the California Department of Education as a part of the site approval package. Often this information is included in the Phase I ESA and in the adopted CEQA document.

Safety Hazards within 2 miles of an Airport

The Caltrans Division of Aeronautics is also required to review proposals for acquisition of a school site by school districts that are situated within 2 miles of an existing or planned airport runway (Education Code Sections 17215 and 81033).

California State Aeronautics Act of 1951

At the state level, the California Department of Transportation (Caltrans) Division of Aeronautics administers FAA regulations (Stats. 1951, Ch. 764; PUC Section 21001 et seq.). The division issues permits for hospital heliports and public-use airports, reviews potential and future school sites proposed within 2 miles of an airport, and authorizes helicopter landing sites at or near schools. In addition, the Division of Aeronautics administers noise regulation and land use planning laws, which regulate the operational activities and provides for the integration of aviation planning on a regional basis.

FAA regulations outline the statutory requirements for ALUCPs, including referencing the Division of Aeronautics ALUP Handbook. The California ALUP Handbook was most recently updated in 2011. Lead agencies utilize the ALUP Handbook as a technical resource with respect to airport noise and safety compatibility issues. The California ALUP Handbook provides examples of safety zones for five types of general aviation runways, an air carrier runway, and a military runway. The shapes and sizes of the zones are largely based on the spatial distribution of potential aircraft accidents. The handbook provides a qualitative description of the land use characteristics considered acceptable or unacceptable within each of the basic safety zones.

Title 14 Division 1.5 of the California Code of Regulations

CCR Title 14 Division 1.5 establishes the regulations for CAL FIRE and is applicable in all SRAs. These regulations constitute the basic wildland fire protection standards of CAL FIRE. They have been prepared and adopted for the purpose of establishing minimum wildfire protection standards in conjunction with building, construction, and development in state responsibility

areas. Among other things, Title 14 establishes minimum standards for emergency access, fuel modification, setback to property line, signage, and water supply.

Specifically, Article 2, "Emergency Access and Egress," requires provision of safe access for emergency wildfire equipment and civilian evacuation concurrently and unobstructed traffic circulation during a wildfire emergency. To accomplish this, all roads must provide a minimum of two 10 foot traffic lanes that provide for two-way traffic flow to support emergency vehicle and civilian egress, unless other standards are provided in this article, or additional requirements are mandated by local jurisdictions or local subdivision requirements. All one-way roads must be constructed to provide a minimum of one 12-foot traffic lane. All one-way roads shall connect to a road with two traffic lanes at both ends, and shall provide access to an area currently zoned for no more than ten residential units. In addition, roads cannot have a horizontal inside radius of curvature of less than 50 feet. Turnarounds are required on driveways and dead-end roads.

Government Code Section 65962.5

Government Code Section 65962.5 is commonly referred to as the "Cortese List" (after the legislator who authored the legislation that enacted it). The list, or a site's presence on the list, has bearing on the local permitting process, as well as on compliance with CEQA. However, because this statute was enacted over 20 years ago, some of the provisions refer to agency activities that are no longer being implemented and, in some cases, the information to be included in the Cortese List does not exist. While Government Code Section 65962.5 makes reference to the preparation of a "list," many changes have occurred related to web-based information access since 1992, and this information is now largely available on the Internet sites of the responsible organizations. A centralized list is no longer compiled, and those requesting a copy of the Cortese "list" are now referred directly to the appropriate information resources contained on the Internet sites of the boards or departments that are referenced in the statute.

California Emergency Services Act

The California Emergency Services Act of 2008 merged the duties, powers, purposes, and responsibilities of OES and the Governor's Office of Homeland Security into a new cabinet-level agency, the California Emergency Management Agency (Cal EMA). In 2013, Governor Edmund G. Brown Jr. merged the California Emergency Management Agency with the Office of Public Safety Communications and renamed the organization the California Governor's Office of Emergency Services (Cal OES). CAL OES is responsible for overseeing and coordinating emergency preparedness, response, recovery, and homeland security activities within the California. Section 8687.7 of the California Disaster Assistance Act required the development of a Standard Emergency Management System (SEMS) program, for managing multiagency and multijurisdictional responses to emergencies in California. The Cal OES Emergency Management Systems Unit is a multi-agency group charged with methodical review, evaluation, and approval of needed improvements to SEMS. State agencies are required to use SEMS and local government entities must use SEMS in order to be eligible for any reimbursement of response-related costs under the State's disaster assistance programs.

Cal OES serves as the lead State agency for emergency management and coordinates the State response to major emergencies in support of local government. SEMS provides the mechanism by which local governments request assistance from Cal OES, and Cal OES maintains oversight of the State's mutual aid system.

State of California Emergency Plan

The Cal OES Emergency Plan outlines a state-level strategy to support local government efforts during a large-scale emergency. In accordance with the California Emergency Services Act, the State Emergency Plan describes methods for carrying out emergency operations, mutual aid processes, emergency services of governmental agencies, resource mobilization, emergency public information, and continuity of government.

California Multi-Hazard Mitigation Plan

The State Hazard Mitigation Plan (SHMP) represents the state's primary hazard mitigation guidance document - providing an updated analysis of the state's historical and current hazards, hazard mitigation goals and objectives, and hazard mitigation strategies and actions. The plan represents the state's overall commitment to supporting a comprehensive mitigation strategy to reduce or eliminate potential risks and impacts of disasters in order to promote faster recovery after disasters and, overall, a more resilient state. State Hazard Mitigation Plans are required to meet the Elements outlined in FEMA's State Mitigation Plan Review Guide (revised March 2015, effective March 2016).

OES is responsible for the development and maintenance of the State's plan for hazard mitigation. The State's multi-hazard mitigation plan was last approved by the Federal Emergency Management Agency (FEMA) as an Enhanced State Mitigation Plan in 2018. The plan is designed to reduce the effects of disasters caused by natural, technological, accidental, and adversarial/human-caused hazards. The SHMP sets the mitigation priorities, strategies, and actions for the state. The plan also describes how risk assessment and mitigation strategy information is coordinated and linked from local mitigation plans into the SHMP, and provides a resource for local planners of risk information that may affect their planning area. The State of California is required to review and revise its mitigation plan and resubmit for FEMA approval at least every 5 years to ensure continued funding eligibility for certain federal grant programs.

Lempert-Keene-Seastrand Oil Spill Prevention and Response Act

The Lempert-Keene-Seastrand Oil Spill Prevention and Response Act of 1990 granted the Office of Spill Prevention and Response (OSPR) the authority to direct prevention, removal, abatement, response, containment, and cleanup efforts with regard to all aspects of any oil spill in marine waters of California. OSPR implements the California Oil Spill Contingency Plan, consistent with the National Contingency Plan, which pays special attention to marine oil spills and impacts to environmentally and ecologically sensitive areas. In 2014, the OSPR program was expanded to cover all Statewide surface waters at risk of oil spills from any source, including pipelines and the increasing shipments of oil transported by railroads.

California Public Utilities Code Sections 309.7

The California Public Utilities Commission (CPUC) is the State regulatory agency with legal authority for rail safety within California. The Railroad Operations and Safety Branch is responsible for enforcing State and federal laws, regulations, general orders, and directives relating to the transportation of persons and commodities by rail. Several California Public Utilities Code sections prescribe CPUC responsibilities. In particular, under Section 309.7, CPUC is responsible for inspection, surveillance, and investigation of the rights-of-way, facilities, equipment, and operations of railroads. Public Utilities Code Sections 309.7 and 765.5(d) require CPUC to employ a sufficient number of federally certified inspectors to ensure that all main and branch line tracks are inspected at least every 12 months.

Local Community Rail Security Act

The Local Community Rail Security Act of 2006 (Public Utilities Code Sections 7665–7667) requires all rail operators to provide security risk assessments to CPUC, the director of Homeland Security, and the Catastrophic Event Memorandum Account that describe:

- location and function of each rail facility,
- types of cargo stored at or typically moved through the facility,
- hazardous cargo stored at or moved through the facility,
- frequency of hazardous movements or storage,
- a description of sabotage-terrorism countermeasures,
- employee training programs,
- emergency response procedures, and
- emergency response communication protocols.

California Department of Transportation Emergency Response

Caltrans is the owner and operator of the state highway system. Its emergency response priorities include damage assessment and route recovery on state highways. Caltrans' District 4 office is responsible for state roadways and bridges (with the exception of the Golden Gate Bridge) in its nine-county jurisdiction in the San Francisco Bay Area. During an emergency, Caltrans activates its Emergency Operations Center, which collects information and defines priorities for responding to the emergency. District 4 also operates the region's Transportation Management Center in its Oakland office, in partnership with the California Highway Patrol.

REGIONAL AND LOCAL REGULATIONS

Bay Area Air Quality Management District Asbestos Regulations

Asbestos is a naturally occurring mineral often used in building materials and construction. Because asbestos has been proven to cause serious and fatal diseases, it is strictly regulated in its use as a building material and where it occurs naturally.

Asbestos Demolition and Renovation Program

The Bay Area Air Quality Management District (BAAQMD) regulates the demolition and renovation of buildings and structures that may contain asbestos, and the manufacture of materials known to contain asbestos. The Air District must be notified at least 10 business days before and demolition project or any renovation involving the removal of 100 square. feet or more, 100 linear feet or more, or 35 cubic feet or more of asbestos.

Naturally Occurring Asbestos Program

To reduce public exposure to naturally occurring asbestos, the BAAQMD regulates all construction and mining activities that produce dust potentially containing naturally occurring asbestos. The Airborne Toxic Control Measure places requirements on the following activities in areas where naturally occurring asbestos is likely to be found:

- road construction and maintenance,
- construction and grading, and
- Quarrying and surface mining.

San Francisco Bay Area Regional Emergency Coordination Plan

The Bay Area Regional Emergency Coordination Plan (RECP) was prepared by OES, the nine Bay Area counties (as well as Santa Cruz County), and the cities of Oakland and San Jose to provide a framework for collaboration and coordination during regional events. The RECP defines procedures for regional coordination, collaboration, decision making, and resource sharing among emergency response agencies in the Bay Area. The RECP provides critical linkages to ensure that existing Bay Area emergency response systems work together effectively during the response to an event. In addition, the RECP complies with the requirements of the National Incident Management System and is consistent with the National Preparedness Goal.

San Francisco Bay Area Regional Transportation Emergency Management Plan

MTC's 2018 *San Francisco Bay Area Regional Transportation Emergency Management* (RTEMP) establishes a baseline-operating plan adaptable to a range of emergency recovery scenarios. It reflects existing emergency operating procedures from the regional transportation agencies; and attempts to reconcile conflicts, inconsistencies and gaps among these existing plans. The purpose of the RTEMP is to improve the ability of Bay Area public transportation agencies to recover operations and deliver basic transportation services after a significant regional disaster. The RTEMP provides guidance to MTC, Caltrans, the California Highway Patrol, the San Francisco Bay Area Water Emergency Transportation Authority and the largest Bay Area transit operators for coordinating response and recovery efforts and allocating assets to restore basic regional mobility.

The RTEMP is intended to facilitate the response and recovery of Bay Area transportation agencies in the event of an emergency by enabling them to: assess the condition, safety and operability of Bay Area transportation systems in the immediate aftermath of an emergency; identify needs for emergency transportation services and coordinate responses with Cal OES, prioritize emergency response services above basic transportation services; provide basic transportation services as quickly and completely as possible; facilitate requests for mutual aid from transportation agencies affected by an emergency; and identify and secure assets from other transportation entities or from outside the Bay Area to enable the provision of relief transportation services during response and recovery.

The RTEMP is a counterpart to the RECP developed by OES to coordinate all-hazards emergency response.

Trans Response Plan

MTC developed and maintains the Trans Response Plan to coordinate basic transportation services in the event of major emergencies. During such incidents, the Trans Response Plan provides the means of informing responding agencies and the general public about the changing transportation situation and facilitates the coordination of a transportation response to an emergency. The Trans Response Plan defines MTC's functions during an emergency as the regional transportation information clearinghouse for collecting, summarizing and disseminating information about transportation assets, services and capabilities, and dissemination of information about the availability of regional transportation services to the media and public.

City and County General Plans

Local planning policies related to hazards and hazardous materials are established in each jurisdiction's general plan, generally in the safety element or equivalent chapter. Safety elements are required to address geologic hazards, fire hazards, dam failure, evacuation routes, flooding, and emergency response, among other issues. For emergency services, relevant policies may include coordinating with other agencies that are responsible for planning medical facilities to meet the health care needs of residents in the region, retaining hospitals, evaluating medical facility proposals, providing emergency response services, and participating in mutual-aid agreements.

As of January 1, 2014, Senate Bill 1241 requires that, upon the next revision of the housing element, jurisdictions review and update the safety element as necessary to address the risk of fire in SRAs and Very High Fire Hazard Severity Zones. These revisions must take into account specified considerations, including the provisions outlined in "Fire Hazard Planning" by the Governor's Office of Planning and Research.

Airport Land Use Commissions and Airport Land Use Compatibility Plans

An ALUC is an agency that is required by State law in counties where there is an airport operated for the benefit of the general public. The purpose of the ALUC is to protect public health, safety, and welfare by ensuring the orderly development of airports and the adoption of land use measures that minimize the public's exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses. The ALUC is responsible for developing and maintaining ALUCPs for areas around each airport. A list of the ALUCs in the Plan area is provided in **Table 3.9-4.**

ALUCs may request that all or selected land use actions (e.g., general plan, specific plan, zoning ordinance, building regulation, land acquisition, annexation, large development project) within an airport influence area (AIA) be submitted for review for consistency with the ALUCP. An AIA is the area in which current or future airport-related noise, overflight, safety, and/or airspace protection factors may affect land uses or necessitate restrictions on those uses. The ALUC establishes its jurisdictional authority by designating one or more AIAs. If the ALUC has not designated an AIA, then a boundary 2 miles from a public airport is used (Public Utilities Code Section 21675.1[b]). City and county zoning and planning are required to conform to the ALUCP unless the city or county governing body specifically overrides the ALUCP by supermajority vote.

Table 3.9-4: Airport Land Use Commissions and Adopted Airport Land Use Compatibility Plans in the Plan Area

County	Airport Land Use Commission	Airport Land Use Compatibility Plans (year adopted)
Alameda	Alameda County Planning Department	Oakland International Airport: Airport Land Use Compatibility Plan (2010) Hayward Executive Airport: Airport Land Use Compatibility Plan (2012) Livermore Executive Airport: Airport Land Use Compatibility Plan (2012)
Contra Costa	Contra Costa County Department of Conservation and Development, Community Development Division	Contra Costa County Airport Land Use Compatibility Plan (2000)
Marin	Marin County Community Development Agency, Planning Department	Marin County ALUP (1991)
Napa	Napa County Conservation, Development, and Planning Department	Napa County ALUCP (1999)
San Francisco	No airport	Not applicable
San Mateo	City/County Association of Governments of San Mateo County	Comprehensive Airport Land Use Compatibility Plan for the Environs of San Carlos Airport (2015) Airport Land Use Compatibility Plan for the Environs of Half Moon Bay (2014) Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport (2012)
Santa Clara	Santa Clara County Department of Planning and Development	Comprehensive Land Use Plan Santa Clara County: Norman Y. Mineta San Jose International Airport (2011, last amended 2016)

County	Airport Land Use Commission	Airport Land Use Compatibility Plans (year adopted)
		Comprehensive Land Use Plan Santa Clara County: Reid-Hillview Airport (2007, last amended 2016) Comprehensive Land Use Plan Santa Clara County: Moffett Federal Airfield (2012, last amended 2016) Comprehensive Land Use Plan Santa Clara County: Palo Alto Airport (2008, last amended 2016) Comprehensive Land Use Plan Santa Clara County: South County Airport (2008, last amended 2016) Comprehensive Land Use Plan Santa Clara County: Heliports (2015)
Solano	Solano County Department of Resource Management	Travis Air Force Base Land Use Compatibility Plan (2015) Rio Vista Airport: Airport Land Use Compatibility Plan (2018)
Sonoma	Sonoma County Permit and Resource Management Department	Comprehensive Airport Land Use Plan for Sonoma County (2002)

Sources: Alameda County 2019; Santa Clara County 2020; Solano County 2020; City/County Association of Governments of San Mateo County 2020; Contra Costa Airport Land Use Commission 2000; Marin County Airport Land Use Commission 1991; Napa County Airport Land Use Commission 1991

3.9.3 Impact Analysis

SIGNIFICANCE CRITERIA

Significance criteria are based on CEQA Guidelines Appendix G, thresholds used in the EIR for Plan Bay Area 2040 (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (Criterion HAZ-1);
- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (Criterion HAZ-2);
- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (Criterion HAZ-3);
- be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment (Criterion HAZ-4);
- result in a safety hazard for people residing or working in the planning area for projects located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport (Criterion HAZ-5);
- impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan, including for projects located in or near State Responsibility Areas or lands classified as very high hazard severity zones (Criterion HAZ-6); or
- exacerbate the risk of wildland fires, associated pollutant release, and potential for flooding and landslides due to projected land use patterns and infrastructure in or near State Responsibility Areas or land classified as very high hazard severity zones (Criterion WF-7).

METHOD OF ANALYSIS

This program-level EIR evaluates potential impacts related to hazards, hazardous materials and wildfire, based on the location of the proposed Plan's footprint associated with the forecasted development pattern (i.e., the land use growth footprint), sea level rise adaptation infrastructure (i.e., sea level rise adaptation footprint), and transportation projects (i.e., transportation system footprint) relative to the known distribution of naturally occurring hazardous materials, airports, and fire hazards zones throughout the Bay Area.

Quantitative results are presented for the region (i.e., the entire footprint, often summarized by county) and for the portions of the land use growth footprint specifically within transit priority areas (TPAs). TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county.

The following evaluation is based on a review of documents and publicly available information about hazardous and potentially hazardous conditions in the Plan area to determine the potential for project implementation to result in an increased health or safety hazard to people or the environment. This includes city and county planning documents, and SWRCB and DTSC hazardous materials database information. The baseline for the following analysis is the date of Notice of Preparation release in September of 2020. Due to the large area covered by the proposed Plan, known sites of current or former contamination were not evaluated in detail, and physical surveys were not conducted. Rather, this programmatic analysis is based on hazards typically associated with certain land uses and an overall understanding of the key safety concerns that could result from implementation of the proposed Plan.

For select hazards impact assessments (i.e., presence or potential for NOA and wildland fire hazards), a geographic information system (GIS) was used to digitally overlay the proposed Plan's footprints associated with forecasted land use development, sea level rise adaptation infrastructure, and transportation projects onto resource data related to NOA, airports, and fire hazards zones. The land use growth footprint is derived from the UrbanSim 2.0 land use model and simulates development or redevelopment at the parcel level. Precise building site(s) on the parcels are not known, therefore the land use growth footprint incorporates the entire parcel. Where parcels are large and only partially within hazard areas, potential for development to occur in hazard zones may be reported where growth would actually occur on another portion of the parcel. Because of this assumption, the area of potential effects could be overstated or appear to accommodate future growth in high or very high fire hazard zones. See Section 3.1, "Approach to the Analysis" for additional details on the calculations for the land use growth, sea level rise adaptation infrastructure, and transportation projects.

The evaluation of hazards and hazardous materials impacts assumes that the construction and development under the proposed Plan would adhere to the applicable federal, State, and local regulations, and conform to appropriate standards in the industry, as relevant for individual projects. As explained in Section 3.1, "Approach to the Analysis," of this Draft EIR, where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume they would be implemented, thereby reducing impacts.

IMPACTS AND MITIGATION MEASURES

Impact HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (LTS)

Land Use and Sea Level Rise Adaptation Impacts

Construction and Operation

Implementation of the proposed Plan's forecasted development pattern ("land use growth footprint") would result in the development of a variety of land uses and the sea level rise adaptation infrastructure would address regularly inundated shoreline areas with a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. Development activities associated with implementation of the proposed Plan would temporarily increase the regional transport, use, storage, and disposal of hazardous materials and petroleum products commonly used in construction (e.g., diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals). In the longer term, development would be generally associated with sustained, expanded use of household hazardous materials (e.g., paints, cleaning supplies, solvents, and petroleum products). Many specific land uses (e.g., dry cleaners, gas stations, and certain industrial uses) could also involve routine transport, use, and disposal of certain hazardous materials and wastes unique to

the land use. As explained further below, these activities are subject to a suite of established regulations that address the potential for impacts from the routine transport, use, and disposal use of potentially hazardous materials.

Trucks transporting hazardous materials use many of the same freeways, arterials, and local streets as other traffic. This creates a risk of accidents and associated release of hazardous materials for other drivers and for people along these routes. **Figure 3.9-1** maps the hazardous materials routes established by DOT in the Plan area. Although the transportation of hazardous materials could result in accidental spills, leaks, toxic releases, fire, or explosion, the DOT Office of Hazardous Materials Safety prescribes strict regulations for the safe transportation of hazardous materials, as described in Title 49 of the CFR. These standard accident and hazardous materials recovery training and procedures are enforced by the State and followed by private State-licensed, -certified, and -bonded transportation companies and contractors. Caltrans and other State agencies impose regulation through the Hazardous Waste Control Act (HSC Section 25100 et seq.), which regulates the identification, generation, transportation, storage, and disposal of materials deemed hazardous by the State of California.

In California, any person who transports hazardous waste in a vehicle must have a valid registration issued by DTSC. The California Highway Patrol enforces hazardous material and hazardous waste labeling and packing regulations. These regulations prevent leakage and spills of material in transit and provide detailed information to cleanup crews in the event of an accident.

As noted above, FRA and PHMSA closely regulate the rail transport of crude oil and other hazardous materials. The transport of hazardous materials by rail is subject to requirements for handling, loading, and unloading, and the placement of placards to alert emergency response teams as to the contents of each car. FRA routinely inspects the facilities of shippers and railroads to ensure that all regulatory requirements are being met. These regulations minimize the potential for accidental releases during transport of hazardous materials and wastes.

Rupture of train cars carrying crude oil is a safety hazard because the spilled material could explode if exposed to an ignition source. Future development associated with the proposed Plan would include development in existing urban locations and near existing rail infrastructure and would most likely add people to the initial evacuation zone adjacent to operating rail lines. Standard safety procedures would result in evacuation of these individuals immediately following derailment of a railcar carrying flammable liquid or gas, while standard response to release of other potentially hazardous materials (e.g., organophosphates, fertilizers) is to shelter in place. Contemporary building standards require construction of residences that are sufficiently contained (e.g., with doors and windows that seal) to allow sheltering in place to occur without substantial potential for harm to residents. For a discussion of the impacts on emergency services response times and service ratios, see also Section 3.13, “Public Services and Recreation.” Regulations are in place through which the railroads would address the potential hazards associated with unauthorized use or pedestrian crossing of the track, any changes to volume of train transport that may indirectly result from the Plan, and any necessary changes to the speed of travel on segments of track adjacent to areas where changes in land use occur.

Proposed Plan implementation could result in increased urbanization along other transportation corridors. Construction and operation of land use projects adjacent to new roadway segments, including in growth geographies that encourage development near this infrastructure, would not increase the hazard associated with operation of highways and railroads but could increase the number of people potentially exposed to hazardous conditions. To be declared a sustainable communities project under PRC Section 21155.1, projects in TPAs must demonstrate that there would not be an “unusually high” risk of fire or explosion from materials stored or used on or near the property and the project would not result in a risk of exposure to a potentially hazardous material at levels that exceed State and federal standards.

The Cal EMA administers the Emergency Response Plan to respond to hazardous materials incidents that may occur. CalARP, established by EPA, applies to a wide variety of facilities that contain regulated substances and aims to prevent accidental releases of hazardous materials into the environment through adoption of proper storing, containing, and handling procedures. Implementation of federal, State, and local requirements, such as CalARP, RECP, DOT, and DTSC regulations, would minimize potential exposure to the public and the environment from accidental releases.

During construction of land use and sea level rise adaptation infrastructure projects, all hazardous materials would be stored, handled, and disposed of according to the manufacturers’ recommendations and in compliance with federal, State, and local regulations. Small fuel or oil spills would have a negligible impact on public health due to the properties of these materials and because they would be discrete, localized releases. Spills would be resolved in accordance with applicable regulations so that there would not be long-term exposure or potential for contaminant migration. Hazardous materials spills or releases, including petroleum products, such as gasoline, diesel, and hydraulic fluid, regardless of quantity spilled, must be immediately reported if the spill has entered or threatens to enter a water of the State, including a stream, lake, wetland, or storm drain, or has caused

injury to a person or threatens injury to public health. Immediate notification must be made to the local emergency response agency, or 911, and the Governor's Office of Emergency Services Warning Center. For nonpetroleum products, additional reporting may be required if the release exceeds federal reportable quantity thresholds over a release period of 24 hours as detailed in HSC Section 25359.4 and Title 40, Section 302.4 of the CFR.

Pursuant to Occupational Safety and Health Administration regulations (29 CFR Section 1910.120), standard accident training for cleaning small spills would be provided to all individuals prior to their work with hazardous substances, and the appropriate types and amounts of spill cleanup materials and personal protective equipment would be immediately available. Additional requirements regarding hazardous materials labeling, containment, and covering set forth by the SWRCB Construction General Permit (2009-009-DWQ) would also be implemented during construction.

During operation, businesses that store hazardous materials could potentially experience accidents or upset conditions that result from their routine use. These businesses are required to prepare spill prevention, containment, and countermeasures plans (pursuant to 40 CFR 112) or, for smaller quantities, spill prevention and response plans, that identify best management practices for spill and release prevention and provide procedures and responsibilities for rapidly, effectively, and safely cleaning and disposing of any spills or releases. Oversight is provided by the CUPA. As discussed above, the severity of potential effects varies with the activity conducted and the concentration and type of hazardous materials involved; however, most minor spills would be remediated immediately pursuant to the requirements and liabilities of applicable regulations and would not pose a substantial hazard to the public or the environment. The possible adverse effects on the public or environment from these and other activities would more likely be acute (immediate, or of short-term severity) as a result of short-term exposure. The operation of businesses that use, create, or dispose of hazardous materials is regulated and monitored by federal, State, and local regulations that provide a high level of protection to the public and the environment from the hazardous materials manufactured within, transported to, and disposed of within the region.

The proposed sea level rise adaptation infrastructure would not involve use of hazardous materials during operation. As a result, no increase in the routine transport, use, or disposal of hazardous materials and no associated hazards to the public or the environment is anticipated. Additionally, as a function of protecting critical transportation infrastructure from sea level rise, the adaptation infrastructure could reduce the inherent hazards of transporting hazardous materials that could occur in the future because of sea level rise.

RCRA, Title 22 of the CCR, and the Hazardous Waste Control Law regulate the generation, transport, treatment, storage, and disposal of hazardous waste. These laws impose regulatory systems for handling hazardous waste in a manner that protects human health and the environment, including requirements for the classification of materials, packaging, and hazard communication. CalEPA oversees the regulation and management of hazardous materials on a Statewide level through DTSC. Use of hazardous materials requires permits and monitoring to avoid hazardous waste release through the local CUPA. DTSC is responsible for the enforcement and implementation of hazardous waste laws and regulations, codified in Title 22 of the CCR. Additionally, businesses that generate hazardous waste are required to have an EPA identification number to monitor and track hazardous waste activities.

It is assumed that land use development within the growth footprint and sea level rise adaptation infrastructure would comply with RCRA; CCR Title 22; California Hazardous Waste Control Law; Cal/EPA requirements; hazardous materials training requirements; and any local regulations, such as city or county Hazardous Materials Management Plans regulating the generation, transportation, treatment, storage, and disposal of hazardous materials and waste. Because these regulations are law and binding on responsible agencies and project sponsors, it is reasonable to expect they would be implemented. Therefore, impacts related to implementation of the proposed Plan at the regional and local level would be less than significant (LTS).

Transportation System Impacts

Construction and Operation

Transportation projects in the proposed Plan include a variety of transportation modifications, such as new express lanes, roadway widening and interchange modification, increased transit service and expansion, and other maintenance and rehabilitation projects. A new Transbay rail crossing between Oakland and San Francisco is also proposed that could involve in-water construction activities associated with construction of a tunnel. Construction activities associated with implementation of the proposed Plan would involve the short-term transport, use and storage of hazardous materials (e.g., asphalt, fuel, lubricants, paint) typical of transportation projects and similar to those identified above for land use projects.

The proposed transportation projects involve the expansion or extension of the transportation system, which may increase the capacity of roadways to transport hazardous materials. Transportation projects that expand the transportation system and extend it to new areas may expose more adjoining land uses to risks associated with upset on the roadway, highway, or railroad. As discussed above, implementation of federal, State, and local requirements, such as CalARP, the RECP, DOT, and Caltrans regulations, would minimize potential exposure to the public and the environment from accidental releases.

The Plan also includes transportation investments that would result in improvements to rail crossing safety. Any new or improved rail crossings would be subject to review by the affected railroads. Roadway projects in the proposed Plan would also improve road safety, as well as pedestrian and bicycle safety, thereby potentially reducing transportation-related hazardous materials risks because fewer accidents would occur on safer roads. Based on the requirements of 49 CFR Parts 171–180, construction and operation of transportation projects would provide for the safe transport and disposal of hazardous waste. Because there are existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with these activities to an acceptable level, impacts related to accident or upset of hazardous materials from anticipated modifications to the transportation system would be less than significant (LTS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects could increase the routine transport, use, storage, and disposal of hazardous wastes in the region. As discussed above, all projects would comply with federal, State, and local regulations that are designed to reduce the potential for the release of large quantities of hazardous materials and wastes into the environment to an acceptable level. Because of the existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with these activities, the impact would be a **less than significant (LTS)**.

Mitigation Measures

None required.

Impact HAZ-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (LTS)

Land Use Impacts

Construction

There are several reasonably foreseeable situations that could result in the release of hazardous materials into the environment. Accidents during transport of potentially hazardous materials used in construction or operation of land uses assumed in the Plan, the routine use of hazardous substances, and generation of hazardous waste during construction and operation are discussed in Impact HAZ-1. As discussed above, this routine use is unlikely to result in a substantial hazard to the public or the environment with adherence to established regulations. Other reasonably foreseeable events that could result in exposure to potentially hazardous materials include disturbance of hazardous wastes in soil or groundwater, hazards associated with structure demolition, and grading and construction in areas with NOA. The following discussion focuses on potential hazards associated with grading and demolition activities. The potential for construction to encounter contaminated soil or groundwater associated with documented or undocumented sites of historical contamination is addressed below in the discussion of Impact HAZ-4.

The land use growth footprint consists of the areas forecasted for redevelopment or new development under the proposed Plan. In areas where redevelopment occurs, existing structures could be demolished. Demolition of existing structures could result in exposure of construction personnel and the public to hazardous substances. Construction workers and nearby employees and/or residents could potentially be exposed to airborne lead-based paint dust, asbestos fibers, and/or other contaminants because of demolition activities associated with redevelopment. Demolition of structures could result in inadvertent release or improper disposal of debris containing potentially hazardous materials; however, federal, State, and local regulations have been developed to address potential impacts related to the handling and disposal of hazardous materials during demolition. Potential impacts would be minimized through adherence to regulatory standards that prescribe specific methods of material characterization and handling.

Asbestos and lead abatement must be performed and monitored by contractors with appropriate certifications from the California Department of Public Health. Demolition that could result in the release of lead and/or asbestos must be conducted according to Division of Occupational Safety and Health (Cal/OSHA) standards. Prior to demolition, all structures would be

tested for the presence of lead and asbestos-containing materials, in accordance with 15 U.S. Code Section 2601 et seq. and 40 CFR Part 763, Subpart G. Any asbestos would be removed and disposed of by an accredited contractor in compliance with federal, State, and local regulations (including the Toxic Substances Control Act and the National Emission Standard for Hazardous Air Pollutants). For the purposes of compliance with Cal/OSHA regulations, all coated surfaces would be assumed to potentially contain lead. Spent fluorescent light bulbs and ballasts, thermostats, and other electrical equipment may contain heavy metals, such as mercury, or polychlorinated biphenyls. If concentrations of these materials exceed regulatory standards, they would be handled as hazardous waste in accordance with hazardous waste regulations.

In addition, Cal/OSHA has regulations concerning the use of hazardous materials, including requirements for safety training, availability of safety equipment, hazardous materials exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces the hazard communication program regulations, which include provisions for identifying and labeling hazardous materials, describing the hazards of chemicals, and documenting employee-training programs.

Construction related to planned development could also occur in areas where asbestos occurs naturally. As described above, NOA is a carcinogen that is associated with rock formations found throughout the Plan area. The California Geological Survey has prepared reports on the relative likelihood for the presence of NOA in California. As shown in **Figure 3.9-2**, NOA occurs throughout the Plan area, but is most prominent in Napa, Sonoma, and Santa Clara Counties. With the amount and general location of regional growth, implementation of the Plan could disturb the NOA in the Plan area and release asbestos into the environment.

The acreage of the land use growth footprint that could be located on ultramafic rocks is provided in **Table 3.9-5**. People exposed to low levels of asbestos may be at elevated risk of lung cancer and mesothelioma. Airborne exposure to soil dust containing asbestos can occur under a variety of scenarios, including grading and earth disturbance associated with construction activity, rock blasting, and quarrying. The Asbestos ATCM requires preparation and implementation of an asbestos dust mitigation plan for construction or grading activities on sites greater than 1 acre in size with known NOA soils, as determined through the geotechnical investigations discussed in Section 3.8, "Geology, Seismicity, and Mineral Resources." The asbestos dust mitigation plan would incorporate the recommendations of the geotechnical investigation to avoid effects on nearby populations. Typical aspects of the mitigation plan would include provisions for sampling soils exported to the project site during construction, prohibition of rock crushing where materials may contain asbestos, standard track-out control measures, and limits on fugitive dust. In addition, HSC Section 19827.5 requires that local agencies not issue demolition or alteration permits until an applicant has demonstrated compliance with notification requirements under applicable federal regulations regarding hazardous air pollutants, including asbestos. The impact would be less than significant (LTS).

Table 3.9-5: Acreage of Land Use Growth Footprint within Ultramafic Rock

County		Total (acres)
Alameda	County Total	10
	Within TPAs	< 1
Contra Costa	County Total	< 1
	Within TPAs	0
Marin	County Total	3
	Within TPAs	3
Napa	County Total	0
	Within TPAs	0
San Francisco	County Total	570
	Within TPAs	170
San Mateo	County Total	20
	Within TPAs	0
Santa Clara	County Total	50
	Within TPAs	30
Solano	County Total	0
	Within TPAs	0
Sonoma	County Total	0

County		Total (acres)
	Within TPAs	0
Regional Total	County Total	660
	Within TPAs	200

Notes: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; Whole numbers have been rounded (between 0 and 10 to the nearest whole number and between 11 and 999 to the nearest 10). Figures may not sum due to independent rounding.
Sources: MTC/ABAG 2021; Ultramafic Rock, U.S. Geological Survey 2010

Operation

If not addressed during construction, operational effects could include prolonged exposure to soil dust containing asbestos from children playing in the dirt, dust raised from unpaved roads and driveways covered with crushed serpentine, gardening, and other activities. However, established regulations prohibit use of soil with asbestos for surfacing in California. Further, soils containing 1 percent or more asbestos are considered to be asbestos-containing material and, if disposed of offsite, must be managed as a hazardous waste with transport subject to Caltrans regulations. Compliance with ARB regulations and local policies for control of NOA would reduce the exposure of sensitive receptors during operation.

The proposed Plan identifies strategies to accommodate forecasted growth within existing communities. Such development would not create a hazard to the public or the environment due to structure demolition or grading in areas with NOA because these activities would be subject to binding regulations that address the hazards inherent with these activities. The impact would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

Construction and Operation

Site preparation activities associated with the sea level rise adaptation infrastructure could require demolition of structures and roadways that contain asbestos, lead, or other hazardous materials. As explained above, these activities would be subject to regulations that are law and binding on responsible agencies and project sponsors. These regulations would address the potential for significant hazard to the public and the environment due to reasonably foreseeable upset and accident conditions. There is no ultramafic rock mapped within the sea level rise adaptation footprint. Implementation of sea level rise adaptation infrastructure would not be expected to result in the use of hazardous materials during operation, and exposure to hazardous materials would not be reasonably anticipated. Impacts related to implementation of the resiliency projects proposed in the Plan would be less than significant (LTS).

Transportation System Impacts

Construction and Operation

The potential for construction of transportation projects to create a hazard to the public and the environment due to reasonably foreseeable upset and accident conditions would be similar to the potential described above for land use impacts in the growth geographies. In addition, the same regulatory mechanisms would address the risk.

Approximately 110 acres associated with the transportation projects identified in the proposed Plan would be located in areas with ultramafic rock, primarily in Santa Clara County (**Table 3.9-6**). As discussed above, existing regulations address potential hazards associated with construction on ultramafic soils. During operation, improved road and rail systems would not create a significant hazard to the public because there would be limited soil disturbance and few opportunities for the public to inhale any airborne fibers.

Table 3.9-6: Acreage of Transportation Projects Footprint within Ultramafic Rock

County	Total (acres)
Alameda	0
Contra Costa	< 1
Marin	0
Napa	0
San Francisco	40
San Mateo	0
Santa Clara	70
Solano	0
Sonoma	0
Regional Total	110

Notes: Whole numbers have been rounded. Numbers less than 1 are shown as "<1"; Whole numbers have been rounded (between 11 and 999 to the nearest 10). Figures may not sum due to independent rounding.
Sources: MTC/ABAG 2021; Ultramafic Rock, U.S. Geological Survey 2010

Conclusion

Construction related to the land use development pattern, sea level rise adaptation infrastructure, and transportation projects anticipated in the proposed Plan would require grading and demolition in areas where existing structures and infrastructure could contain hazardous materials, as well as areas where asbestos is naturally occurring. As described above, existing regulations establish procedures for activities potentially involving these materials that would address the potential for upset and accident conditions and the associated potential for hazard to the public or the environment. The proposed Plan would have a **less-than-significant (LTS)** impact because there are existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with these activities to an acceptable level.

Mitigation Measures

None required.

Impact HAZ-3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (LTS)

Land Use Impacts

Construction

Construction associated with implementation of the proposed Plan would temporarily increase the regional transport, use, storage, and disposal of hazardous materials and petroleum products commonly used in construction (e.g., diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals. This transport, use, and storage could occur within 0.25 mile of an existing or proposed school. As explained above, construction activities are subject to legally binding regulations that address the potential for impacts from the routine transport, use, storage and disposal of potentially hazardous materials.

For new schools that may be developed to accommodate the forecasted population growth identified in the proposed Plan, the California Education Code, including Education Code Section 17213(b), establishes requirements for assessments and approvals that address the potential for existing contamination on the site, and whether nearby land uses might reasonably be anticipated to emit hazardous air emissions or handle hazardous materials. Assessment of existing contamination is conducted in coordination with DTSC's School Property Evaluation and Cleanup Division, which is responsible for assessing, investigating, and cleaning up proposed school sites. This division ensures that selected properties are free of contamination or, if the properties were previously contaminated, that they have been cleaned up to a level that protects the students and staff who will occupy a new school. All proposed school sites that receive State funding for acquisition or construction are required to go through a rigorous environmental review and cleanup process under DTSC's oversight. The impact would be less than significant (LTS).

Operation

The land use growth footprint accommodates the forecasted growth in population, jobs, and housing throughout the region. This growth could result in an increase in hazardous materials use, which in turn increases the potential for accidental release of hazardous materials within 0.25 mile of an existing or proposed school. Further, population growth would result in a corresponding demand for public services, including schools. As noted in **Table 3.13-1** in Section 3.13, "Public Services and Recreation," there were 1,764 public and charter schools in the Plan area during the 2018-2019 school year. Children are particularly susceptible to long-term impacts from emissions of hazardous materials, including those from high-volume motor vehicle travel on roadways near schools. The potential effects on sensitive land uses, including schools, associated with potentially hazardous emissions from stationary sources and exposure to air contamination related to roadways is addressed in Section 3.4, "Air Quality."

Any new commercial or industrial operations in proximity to existing schools would be required to comply with regulations related to the routine use, storage, and transport of hazardous materials. As discussed in detail above, compliance with existing regulations would reduce the exposure to potential hazards associated with these land uses. Further, any future projects that would generate emissions or involve the handling of extremely hazardous materials, substances, or waste within 0.25 mile of an existing school would notify the affected school district (pursuant to PRC Section 21151.4).

Therefore, impacts related to use of hazardous materials near schools as a result of land use changes from the projected development would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

Construction and Operation

Sea level rise adaptation infrastructure could require use of hazardous materials during construction. As explained above, the use and transport of potentially hazardous materials for construction is subject to regulations that are law and binding on responsible agencies and project sponsors. These regulations would address the potential for significant hazard to the public and the environment due to reasonably foreseeable upset and accident conditions. After construction, the sea level rise adaptation infrastructure would not be expected to result in hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Impacts related to implementation of the proposed Plan's sea level rise adaptation infrastructure would be less than significant (LTS).

Transportation System Impacts

Construction

Risks associated with construction of transportation projects within 0.25 mile of an existing or proposed school would be similar to those for land use impacts in the growth geographies. In addition, the same regulatory mechanisms would address the risk. This impact would be less than significant (LTS).

Operation

Implementation of the proposed Plan could include transportation system expansions or other improvements near schools. These transportation projects may increase the capacity to transport hazardous materials. However, all materials must be transported, used, stored, and disposed of in accordance with applicable federal, State, and local laws, which would effectively reduce the potential impacts associated with hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Roadway projects in the proposed Plan may also improve road safety, thereby reducing the potential for accidents in proximity of schools related to hazardous materials. Therefore, the impacts on existing and proposed schools from implementation of the proposed transportation projects would be less than significant (LTS).

Conclusion

During construction, demolition, and excavation activities, the land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the proposed Plan could produce hazardous air emissions or involve the handling of extremely hazardous wastes within 0.25 mile of an existing or proposed school. During operation, land use development projects could use and produce hazardous materials that may be transported on roadways in the Plan area. As discussed above, all projects would comply with federal, State, and local regulations that are designed to reduce the potential for the release of large quantities of hazardous materials and wastes into the

environment to an acceptable level, and in particular to protect schools. Existing federal, State, and local regulations and oversight would be sufficient to ensure that hazardous materials stored, used, transported, and disposed of under the proposed Plan would not pose a substantial hazard to the public or the environment, including children at schools. Therefore, the proposed Plan would have a **less-than-significant (LTS)** impact.

Mitigation Measures

None required.

Impact HAZ-4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment (PS)

Land Use and Sea Level Rise Adaptation Impacts

Construction

Throughout the Plan area, there are many sites where historical releases of hazardous materials or wastes have occurred; these are listed in environmental databases pursuant to Government Code Section 65962.5. As indicated in **Table 3.9-1**, above, there are an estimated 17,898 documented sites of contamination in some stage of DTSC or SWRCB oversight in the Plan area. These sites range from small releases that have had localized effects on private property and have already been remediated to large-scale releases from long-term historical industrial practices that have had wider ranging effects on groundwater. Specific sites of documented contamination are not evaluated in this analysis because this is a program-level document. Further, because the precise locations of future land use and sea level rise adaptation infrastructure projects are unknown, an evaluation of the potential for specific sites of known contamination within the Plan area to be affected by project activities cannot be conducted at this time. However, the land use development pattern can be used to generally characterize the potential for release of hazardous materials (i.e., hazardous materials releases are more likely to have occurred in areas that currently or historically supported industrial uses).

Grading and excavation activities may expose construction workers and the public to hazardous substances present in the soil or groundwater that are not anticipated based on information about existing site conditions. These construction activities could inadvertently disperse contaminated material into the environment and expose construction personnel to potentially hazardous conditions. For example, dewatering activities during project construction could accelerate the migration of contaminated groundwater or could discharge contaminated groundwater to surface waters. Potential hazards to human health include ignition of flammable liquids or vapors; inhalation of toxic vapors in confined spaces, such as trenches; and skin contact with contaminated soil or water. These risks would be greatest for construction workers; however, it is possible that the nearby public could be affected if the contaminated materials are of a sufficient volume.

Unless construction activities are coordinated with site remediation activities, there could be a temporary increased risk of damaging or interfering with remediation site controls, such as soil containment areas. Temporary effects could include potential localized spread of contamination; exposure of construction workers or the public to chemical compounds in soils, soil gases, and groundwater; exposure of workers, the public, and the environment to airborne chemical compounds migrating from the demolition or construction areas; potential accidents during remediation as a result of operational failure of treatment systems; and potential interference with ongoing remediation activities. Similarly, development near active or abandoned oil and gas wells would be considered by the permitting agency, in conjunction with the property owner and/or developer, on a parcel-by-parcel or well-by-well basis.

A common practice that is typically required by lending institutions when properties change hands is for a Phase I ESA to be prepared to research and disclose the prior uses of the site and the likelihood that residual hazardous materials and/or waste might be present in underlying soil and/or groundwater. Also, in many instances implementing agencies require submittal of a Phase I ESA prior to approval or implementation of a project. These studies include research in a variety of government databases to determine whether the site has had prior underground tanks or other industrial uses that could result in hazardous materials on or below the ground surface. As described above, if a Phase I ESA indicates the presence or potential presence of contamination, a site-specific Phase II ESA is generally conducted to test soil and/or groundwater. Based on the outcome of a Phase II ESA, remediation of contaminated sites under federal and State regulations may be required prior to development. Any transport of hazardous wastes required during remediation would occur in accordance with the regulations described in Impact HAZ-1.

To be declared a sustainable communities project under PRC Section 21155.1(a)(3), projects in TPAs must demonstrate that they are not located on any list of facilities and sites compiled pursuant to Section 65962.5 of the Government Code, and the site must be subject to a PEA, which is a type of environmental document typically prepared for sites with DTSC oversight. Overall, PEA requirements are more comprehensive than the requirements for Phase I ESAs. Although they require similar background information, they also include site-specific human health and ecological screening evaluations, public participation requirements, data collection, and scoping activities. The PEA requirement is applicable only to potential exemptions under the sustainable communities strategy provisions of CEQA and does not apply to the other streamlining strategies under Senate Bill 375.

With the notable exceptions for streamlining projects in TPAs and siting public schools, as discussed above, there are no general regulatory requirements to conduct a Phase I ESA or PEA or a subsequent investigation of potential contamination. Therefore, because it cannot be assumed these practices would regularly occur, the impacts related to changes in land use from implementation of the proposed Plan would be potentially significant (PS).

Operation

Proposed Plan implementation would result in the placement and operation of land use development and sea level rise adaptation infrastructure. Once developed, it is not expected that additional grading and excavation activities would occur that could expose construction workers and the public to hazardous substances present in the soil or groundwater. Because this impact is primarily construction-related, this would be less than significant (LTS).

Transportation System Impacts

Construction

As discussed above, there are many known sites of contamination in the Plan area. Specific sites of documented contamination are not evaluated in this analysis because it is a program-level document. In addition to the hazards described above, land adjacent to roadways may also contain elevated concentrations of lead in exposed surface soils, which could pose a health hazard to construction workers and users of the properties. Lead is a State-recognized carcinogen and reproductive toxicant. Exposure to lead in soil could result in adverse health effects, depending on the duration and extent of exposure. Substantial quantities of aerially deposited lead are understood to be generally confined to within 30 feet of a roadway. Other potential contaminants, including herbicides associated with weed abatement and contaminated ballast rock, are generally confined to the immediate transportation right-of-way. As with land use projects and development, exposure to these hazardous materials and wastes from construction of transportation projects could cause adverse effects on construction workers, the public, or the environment.

The hazards associated with construction of transportation projects on known sites of contamination at the regional level would be potentially significant (PS) for the same reasons identified above for land use projects.

Operation

Once developed, it is not expected that additional grading and excavation activities would occur that could expose construction workers and the public to hazardous substances. Because this impact is primarily construction-related, operational impacts would be less than significant (LTS).

Conclusion

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the proposed Plan could result in hazards from construction on known sites of contamination. The potential for encountering hazardous materials or wastes would be dependent on site-specific conditions. The impact would be **potentially significant (PS)**. Mitigation Measure HAZ-4 addresses this impact and is discussed below.

Mitigation Measures

Mitigation Measure HAZ-4 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- The project proponent shall perform a records review to determine whether there is existing permitted use of hazardous materials or documented evidence of hazardous waste contamination on the project site and provide the results of this investigation to the implementing agency.

- For any project located on or near a hazardous materials and/or waste site pursuant to Government Code Section 65962.5 or sites that have the potential for residual hazardous materials as a result of historic land uses, project proponents shall prepare a Phase I ESA in accordance with the American Society for Testing and Materials' E-1527-05 standard.

- For any project located on or near sites that are not listed and do not have the potential for residual hazardous materials as a result of historic land uses, no action is required unless unknown hazards are discovered during development. In that case, the implementing agency shall discontinue development until DTSC, RWQCB, the local air district, and/or other responsible agency issues a determination, which would likely require a Phase I ESA as part of the assessment.

- Develop, train, and implement worker awareness and protective measures to minimize worker and public exposure to an acceptable level and to prevent environmental contamination as a result of construction.

- Projects preparing a Phase I ESA, where required, shall fully implement the recommendations contained in the report. If a Phase I ESA indicates the presence or likely presence of contamination, the project proponent shall prepare a Phase II ESA, and recommendations of the Phase II ESA shall be fully implemented.

- Consult with the appropriate local, state, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps.

Significance after Mitigation

Site evaluation, sampling, and remediation through the Phase I/II ESA process is widely accepted as the appropriate standard for the preliminary evaluation of site hazards. Preparation of, and compliance with, a Phase I ESA for properties at risk of potential hazardous materials and/or waste contamination would avoid adverse impacts associated with buildout because the ASTM procedures establish prescriptive procedures that fully evaluate the potential for risks and appropriate next steps if potential for contamination is identified. Soil management plans or soil contingency plans required by Mitigation Measure HAZ-4 would include procedural measures to protect and isolate suspected contaminated materials to avoid adverse effects on the workers or public. Therefore, the Phase I/II ESA process would adequately mitigate the potential for future development to create a significant hazard to the public or the environment because it is located on a site that is included on a list of hazardous materials sites. To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

Projects taking advantage of CEQA streamlining provisions of Senate Bill 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact HAZ-5: Result in a safety hazard for people residing or working in the planning area for projects located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport (LTS)

Land Use Impacts

There are 25 public use airports in the Bay Area that serve commercial and general aviation users (shown in **Table 3.9-2** and **Figure 3.9-3**). As indicated in **Table 3.9-7**, most (20) of these public use airports are within 2 miles of the proposed Plan's growth footprint. The proposed Plan's land use development pattern would predominately occur in existing communities and may result in the development of residential and nonresidential land uses in and near airport flight corridors and within areas subject to policies contained in an ALUCP. Development that is not compatible with aviation activity (e.g., tall structures, land uses that produce light/glare, land uses that attract wildlife that can be hazardous to aircraft, noise-sensitive land uses) may lead to conflict between an airport operator and surrounding communities, as well as create long-term operational problems for the airport.

Table 3.9-7: Number of Public/Public Use Airports within 2 Miles of Project Footprint

County	Land Use Growth Footprint	Sea Level Rise Adaptation Footprint	Transportation Projects Footprint
Alameda	3	2	3
Contra Costa	1	0	2
Marin	1	1	1
Napa	1	0	1
San Francisco	0	0	0
San Mateo	4	3	3
Santa Clara	4	1	4
Solano	2	0	1
Sonoma	5	0	1
Regional Total	20	6	15

Sources: MTC/ABAG 2021; Public Use Airports, California Department of Transportation 2020

To prevent incompatible uses in areas of higher aircraft hazard potential, the ALUC has adopted ALUCPs with land use policies and criteria. The policies identify what types of land uses are allowed around airports and are intended to protect the safety of people, property, and aircraft on the ground and in the air in the vicinity of the airport. The policies also protect airports from encroachment by new incompatible land uses that could restrict their operations. Structure replacement and infill development are generally permitted under ALUCPs.

Public Utilities Code Section 21001 outlines the statutory requirements for ALUCPs, including referencing the Division of Aeronautics ALUP Handbook. The 1994 ALUP Handbook requires that when preparing an EIR for any project situated within an AIA as defined in an ALUC compatibility plan (or, if a compatibility plan has not been adopted, a boundary within 2 miles of a public use airport is used), lead agencies shall utilize the California ALUP Handbook as a technical resource with respect to airport noise and safety compatibility issues. The California ALUP Handbook was most recently updated in 2011.

There are also several military airfields in the Bay Area. The U.S. Department of Defense requires military airfields to adopt Air Installation Compatibility Use Zone studies, which assess compatible land uses in the vicinity of a military air station in a way equivalent to ALUCPs. PRC Section 21098 reduces hazards associated with development near military airports by requiring lead agencies to submit a notice to the military service that would be affected by a proposed general plan amendment or significant project located within specific boundaries of a low-level flight path, military impact zone, or special use airspace.

City and county zoning and planning are required to conform to the ALUCP unless the city or county governing body specifically overrides the ALUCP by supermajority vote. Additionally, California statutes (Business and Professions Code Section 11010; Civil Code Sections 1103 and 1353) now require disclosure for most residential real estate transactions, including new subdivisions, within 2 miles of an airport or within an ALUCP-defined AIA. The Caltrans Division of Aeronautics is also required to review proposals for acquisition of a school site by school districts that are situated within 2 miles of an existing or planned airport runway (Education Code Sections 17215 and 81033). Implementing agencies are responsible for analyzing compliance with ALUCPs as a part of their land use approval authority.

The FAA requires notice of proposed construction for projects located within 20,000 feet (less for runways under 3,200 feet in length) of a public use airport, and other projects that may pose a potential hazard for people residing or working in the project area, due to height, visual hazard, or the attraction of wildlife. Development projects associated with the Plan would be subject to FAA evaluation, and the FAA would be notified of proposed development pursuant to Section 77.11 of the FAA regulations. The notification provides the basis for the FAA to evaluate the proposed development projects for obstruction hazards and potential hazards to air safety.

Implementing agencies would require project sponsors to comply with any applicable ALUCP requirements, as well as any FAA requirements (14 CFR Part 77). Projects within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport would not be approved by local agencies until project design plans have been reviewed and approved by the appropriate ALUC. Because existing regulations and laws related to development near a public airport prohibit the approval of incompatible projects, these existing regulations and permitting requirements of the

independent regulatory agencies can be relied upon to address potential project effects. Aviation hazard impacts related to land use changes from implementation of the proposed Plan would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

There are six public use airports located within 2 miles of sea level rise adaptation infrastructure (see **Table 3.9-7**). Generally, sea level rise adaptation infrastructure would not result in the construction of tall structures that directly impede upon the navigable air space. Sea level rise adaptation infrastructure would be anticipated to benefit the region's two largest airports (SFO and OAK) by protecting these areas from flooding inundation anticipated to occur because of sea level rise. Any project that creates wetland areas, however, could influence changes in the behavior of waterfowl in a manner that could increase the potential for bird strikes and associated hazards. As described above, implementing agencies would require project sponsors to comply with any applicable ALUCP requirements, as well as any FAA requirements (14 CFR Part 77). Projects within an airport land use plan or within 2 miles of a public airport or public use airport where such a plan has not been adopted would be reviewed by the appropriate ALUC. Because existing regulations and laws related to development near a public airport prohibit the approval of incompatible projects, these existing regulations and permitting requirements of the independent regulatory agencies can be relied upon to address potential project effects. This impact would be less than significant (LTS).

Transportation System Impacts

There are 15 public or public use airports within 2 miles of major transportation projects (see **Table 3.9-7**). The transportation projects would be subject to the regulations described above for land use projects. Implementing agencies would require project sponsors to comply with any applicable ALUCP requirements, as well as any FAA requirements (14 CFR Part 77). Projects within an airport land use plan or within 2 miles of a public airport or public use airport where such a plan has not been adopted would not be approved by local agencies until project design plans have been reviewed and approved by the appropriate ALUC. These existing regulations and permitting requirements of independent regulatory agencies would address potential project effects. Safety hazards due to development of the transportation projects anticipated in the proposed Plan near public use airports would be less than significant (LTS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would have a **less-than-significant (LTS)** impact because there are existing federal, State, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with development near airports to an acceptable level.

Mitigation Measures

None required.

Impact HAZ-6: Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan (PS)

Land Use Impacts

Local government jurisdictions are required to adopt emergency plans (e.g., the 2008 City and County of San Francisco Emergency Response Plan and various emergency operations plans [Alameda County 2012, Solano County 2007, San Mateo County 2015, Santa Clara County 2017, Solano County 2007)], which are considered to be extensions of the California Emergency Plan, established in accordance with the Emergency Services Act. Implementation of these plans could be impaired if multiple projects are constructed at the same time and therefore could result in concurrent blockage of multiple roadways used for emergency routes. Failure to provide reasonable access for emergency equipment and evacuation of civilians can result in the loss of life, property, and natural resources.

Construction

Construction associated with implementation of the proposed Plan would not likely hinder emergency response activities or physically interfere with established evacuation routes. Although construction activities could temporarily impair roadways used for emergency response and evacuation, standard construction procedures for development of a construction management plan would address these conditions and would develop alternative routes. Projects requiring encroachment permits for temporary construction activities in public roadways that could be used for emergency response or evacuation

are generally required to prepare traffic mitigation plans that address traffic control during the period when project construction is occurring within public right-of-way. Standard construction procedures provided in traffic mitigation plans to address temporary road closures that would be required during construction, include notification of emergency responders. Although implementation of construction traffic management plans and associated coordination with service providers would typically address potential interference with emergency response or evacuation plans, there is a potential that temporary impairment could occur at the project level. This would be potentially significant (PS).

Operation

The proposed Plan includes housing and economic strategies to accommodate 2.7 million new persons, 1.4 million new households, 1.5 new forecasted housing units, and 1.4 million new jobs by 2050 (compared to the 2015 baseline). Implementation of the proposed Plan would focus growth in existing urbanized areas, which would result in more dense and intense development compared to existing conditions. Moreover, the development pattern encouraged by the proposed Plan could result in lower rates of automobile ownership. However, development that proposes large concentrations of people (such as a job center) or that would site individuals who require special assistance (such as a hospital or senior facility) in an area with identified hazards could cause adverse effects related to the implementation of countywide and jurisdictional emergency plans because there would be more individuals potentially subject to these hazards. High density development could, in the event of an emergency such as a wildfire, result in more people using the same evacuation routes. Implementation of emergency plans could be impaired if emergency plans are not properly updated to reflect changes in land use. While transportation projects may result in a more efficient transportation system, it cannot be assured that, during an emergency, they would be adequate for sufficiently quick evacuation. As shown in Table 2-9 (project description), roadway capacity would be increased, but the increase in population and employment will result in an increase in the average trip time of 10 percent (see Table 2-14), suggesting an overall increase in congestion.

Emergency response and emergency evacuation plans are designed by the Office of Emergency Services for each county in the region to respond to a possible emergency situation (e.g., fires, floods, earthquakes). These plans cover all of the land within the region, including both incorporated and unincorporated areas, and provide a process for evacuating people from danger and preventing or minimizing loss of life and property. In addition, the Bay Area RECP provides a framework for collaboration and coordination during regional events, as well as critical linkages to ensure that existing Bay Area emergency response systems work together.

The RTEMP, as a counterpart to the RECP, is designed to enable regional transportation response to the entire spectrum of regional contingencies, ranging from relatively modest incidents that affect one or two counties to large-scale disasters that affect the entire nine-county Bay Area. MTC developed the RTEMP in coordination with State agencies, the office of emergency services for each of the nine counties in the region (referred to as “operational areas”), and 14 transit operators. The plan, which is characterized as a “living document,” is reviewed annually, and updated as appropriate.

An assumption of the RTEMP is that decisions regarding planning for, responding to, and recovering from an emergency should be made at the most local level possible. The operational areas are responsible for emergency response within a county and all political subdivisions within the county area (e.g., cities, special districts). These are often coordinated with the agency’s general plan, as discussed above. Transportation agencies have also developed their own emergency operations plans that address internal procedures, operations, and response protocols to be implemented during an emergency. The management of emergency response and emergency evacuation plans includes regular updates to these plans that incorporate new or proposed developments. The RTEMP does not supersede or override any of these plans or any other locally created emergency management plans or procedures.

In the event of a major disaster, particularly an earthquake, it is assumed that bridges and tunnels serving transbay corridors could be damaged or closed for assessment. Ferries and other maritime assets may play vital roles in providing both emergency response and basic transportation services. Ferries may also be resources for providing both basic and emergency regional transportation, via expanded services on existing routes and via temporary services in relief of other damaged or otherwise closed transportation facilities. (MTC 2018). MTC would facilitate public transportation through the Trans Response Plan.

In summary, there are a variety of adopted emergency response and evacuation plans in the Plan area. In addition to the plans maintained at the county-level, coordinated plans have been adopted for the nine-county Plan area to facilitate emergency response and evacuation. These plans anticipate the necessity of regional transit and ferry service to facilitate response and evacuation. Using transit systems, including buses, train, and ferries, is an additional means of evacuating people during a less rapid but urgent evacuation in addition to highway evacuation via personal automobile. The proposed

Plan includes investments in transit systems along with the emphasis on growth near transit that could serve as vital resources. However, increased population and employment anticipated in the Plan could increase congestion on evacuation routes and slow evacuation. This could impair implementation of emergency response or evacuation plans, particularly if local plans rely on evacuation via personal vehicle. While changes in land use would be reflected in updated emergency and evacuation plans, it is not known if the changes would be sufficient to ensure adequate evacuation. The proposed Plan's impact on adopted emergency response or evacuation plans would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

Construction

Construction associated with sea level rise adaptation infrastructure would not likely hinder emergency response activities or physically interfere with established evacuation routes. Projects requiring encroachment permits for temporary construction activities along public roadways that could be used for emergency response or evacuation are generally required to prepare traffic mitigation plans that address traffic control during the period when project construction is occurring within public right-of-way. To address any temporary road closures that would be required during construction, standard construction procedures include notification of emergency responders. Although implementation of traffic mitigation plans and associated coordination with service providers would typically address potential interference with emergency response or evacuation plans, there is potential that temporary impairment could occur at the project level. This would be potentially significant (PS).

Operation

Once implemented, the sea level rise adaptation infrastructure would not be expected to impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. Rather, the infrastructure would be anticipated to benefit these programs by protecting areas from potential hazards, including flooding, in a manner that facilitates implementation of established plans. Projects like elevating highways could improve future access and evacuation routes that may otherwise be inundated and unusable in the future. Following construction, the sea level rise adaptation infrastructure would facilitate implementation of emergency response and evacuation plans by modifying and protecting key roadways used for evacuations. The potential for development to impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan would be less than significant (LTS).

Transportation System Impacts

Construction

As discussed above, temporary road closures required during construction would not likely hinder implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. However, standard construction mitigation includes notification of emergency responders where road closures are required. Road closures would be temporary and would be coordinated with emergency responders so that alternative evacuation routes could be developed and employed. Projects requiring encroachment permits for temporary construction activities in public roadways that could be used for emergency response or evacuation are generally required to prepare traffic mitigation plans that address traffic control during the period when project construction is occurring within public right-of-way. Although implementation of traffic mitigation plans and associated coordination with service providers would typically address potential interference with emergency response or evacuation plans, there is potential that temporary impairment could occur at the project level. This would be potentially significant (PS).

Operation

Although the proposed Plan, overall, is predicted to increase trip time, the proposed transportation projects would generally increase mobility and circulation capacity and thereby would have the potential to improve response times for police, fire, and emergency service providers, especially in heavily congested areas. Also, with implementation of the proposed transportation projects that include improved transit opportunities, more people would be able to move through the regional transportation system, and implementation of the proposed transportation projects would result in the construction of roadway projects that coincide with new housing and employment developments, thereby facilitating efficient access to these developments by public service providers. In addition, as described above, emergency plans and programs are in place on a State, regional, countywide, individual jurisdiction, and special district level that contain measures to reduce impacts associated with conflicts with emergency response and evacuation plans. These existing measures ensure that transportation

network improvement projects would not impair implementation of or physically interfere with an emergency response or evacuation plan. This would be less than significant (LS).

Conclusion

Temporary impairment of emergency response and evacuation plans could occur due to the land use development pattern, sea level rise adaptation infrastructure, and transportation projects. The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the proposed Plan would be subject to implementation of applicable State and federal regulations, as well as local/regional requirements for adequate emergency response and emergency evacuation plans, such as those required by the California Emergency Services Act and Cal EMA. Emergency and evacuation plans are periodically updated to accommodate growth and would continue to be updated for growth and changes in projected development associated with the proposed Plan.

Using transit systems, including buses, train, and ferries, is an additional means of evacuating people during a less rapid but urgent evacuation in addition to highway evacuation via personal automobile. The proposed Plan includes investments in transit systems along with the emphasis on growth near transit that could serve as vital resources to facilitate evacuation. However, increased population and employment anticipated in the Plan could increase congestion on evacuation routes and slow evacuation. This could impair implementation of emergency response or evacuation plans. While changes in land use would be reflected in updated emergency and evacuation plans, it is not known if the changes would be sufficient to ensure adequate evacuation. Therefore, while the improved transportation system efficiency may facilitate emergency response and evacuation plans, due to the uncertainty with respect to the ability to accommodate forecasted growth, potential impacts related to interference with emergency response and evacuation plans would be **potentially significant (PS)**.

Mitigation Measures

Mitigation Measure HAZ-6 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Continue to participate in the San Francisco Bay Area Regional Transportation Emergency Management (RTEMP), review the plan annually, and update as appropriate.
- Develop new methods of conveying projected and real time evacuation information to citizens using emerging electronic communication tools including social media and cellular networks.
- Adopt and/or revise, as appropriate, local emergency response and evacuation plans that address growth and potential for congestion on evacuation routes. Include contingencies for lower private automobile ownership and reliance on public transit for evacuation, consistent with the RTEMP.
- Require specific projects to demonstrate consistency with all applicable emergency response and evacuation plans. Where temporary road closures would be required during construction, prepare traffic mitigation plans that address traffic control and establish alternate emergency response and evacuation routes in coordination with emergency service providers.

Significance after Mitigation

The mitigation described above would address the need for adequate emergency access through continued participation in the RTEMP. It would also require that emergency plans account for shifting transportation modes. The mitigation would also require individual projects to ensure that future development would not impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LS-M).

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact HAZ-7: Exacerbate the risk of wildland fires, associated pollutant release, and potential for flooding and landslides due to projected land use patterns and infrastructure in or near State Responsibility Areas or land classified as very high hazard severity zones (PS)

Land Use Impacts

Construction and Operation

As a result of climate change, wildfires are burning more landscape at higher intensities across the globe, on the West Coast, and in the San Francisco Bay Area. Damage to homes, infrastructure, and ecosystems can result, and associated air and water quality effects may extend far beyond the fire footprint. As described in Section 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.7 million residents and 1.4 million jobs, resulting in 1.4 million new households. As the population of the Plan area is forecasted to increase, there could be increased wildfire hazards if development expands into the wildland-urban interface (WUI). The proposed Plan's growth geographies—designated areas prioritized to accommodate future household and job growth—exclude areas defined as "Very High" and "High" fire hazard severity areas identified by the California Department of Forestry and Fire Protection or locations within a county-adopted wildland-urban interface area (see Section 2.3.4). The proposed Plan also addresses wildfire with many land use (i.e., housing and economy) and environmental strategies, relying on core adaptation principles: land use, land management, and structural hardening. The proposed Plan would accommodate forecasted population growth in a manner that reduces potential contributions to climate change, encourages concentrated growth in urbanized areas and land management in open space, and includes structural hardening efforts where existing structures are vulnerable to fire.

Wildfire prevention is a shared responsibility among federal, State, and local agencies, including local city and county fire departments, as well as landowners and residents. Federal lands fall under Federal Responsibility Areas. The National Fire Plan provides the necessary coordination between agencies in areas of federal lands. Most of the unincorporated areas of the Bay Area are SRAs where fire prevention is the responsibility of CAL FIRE. Incorporated areas, and some unincorporated lands, are classified as LRAs. Fire prevention and response in these areas are typically addressed by city and county fire departments. CAL FIRE identifies Fire Hazard Severity Zones at the local, State, and federal level that cover all fire-prone areas in the State, regardless of land ownership or responsibility.

The land use growth footprint was used to quantify the acreage of the Plan area within fire hazard zones that could develop between 2015 and 2050. As previously noted, the proposed Plan prioritizes growth in the designated growth geographies which exclude areas defined as "Very High" and "High" fire hazard severity areas, but does not avoid areas defined as "Moderate". The proposed Plan's strategies focus 67 percent of the land use growth footprint into the designated growth geographies; however, the remainder (33%) of the land use growth footprint is outside designated growth geographies but consistent with existing local land use plans (see Table 2-4). In total, the land use growth footprint includes approximately 1,800 acres of land classified as having a moderate, high, or very high fire hazard. This is approximately 5 percent of the growth footprint(see **Table 3.9-8**).

Table 3.9-8: Acreage of Land Use Growth Footprint within Fire Hazard Zones

County		Moderate (acres)	High (acres)	Very High (acres)
Alameda	County Total	280	< 1	40
	Within TPAs	10	< 1	< 1
Contra Costa	County Total	240	720	60
	Within TPAs	-	< 1	10
Marin	County Total	3	3	10
	Within TPAs	-	3	4
Napa	County Total	130	-	< 1
	Within TPAs	-	-	-
San Francisco	County Total	-	-	-
	Within TPAs	-	-	-
San Mateo	County Total	-	20	70
	Within TPAs	-	-	-

County		Moderate (acres)	High (acres)	Very High (acres)
Santa Clara	County Total	-	< 1	5
	Within TPAs	-	-	-
Solano	County Total	40	80	-
	Within TPAs	-	-	-
Sonoma	County Total	140	< 1	< 1
	Within TPAs	-	-	-
Regional Total	County Total	830	830	190
	Within TPAs	10	3	20

Notes: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; Whole numbers have been rounded (between 0 and 10 to the nearest whole number and between 11 and 999 to the nearest 10). Figures may not sum due to independent rounding.
Sources: MTC/ABAG 2021; CAL FIRE 2007

In addition to potentially exposing people to loss, injury, or death and damage to property, fire can result in indirect hazards. These may include release of hazardous materials and air quality implications, as well as flooding and landslides following loss of vegetation. Excessive rainfall in fire-damaged areas can generate runoff that causes flooding because the top layer of soil can form a moisture barrier when exposed to high heat that repels water and generates higher runoff rates. In addition, the loss of vegetation to provide stability can increase susceptibility to erosion. In areas with steep slopes, debris flows can result from these conditions that may result in hazards to life and physical property, destroy or strip vegetation, block existing drainage patterns, and affect roadways and other infrastructure. If this were to occur within existing floodplains, existing flow conditions may be altered, or new sources of flooding may be created.

Development of areas susceptible to wildfire could exacerbate the fire risk by introducing anthropogenic influence into fire-prone open space. Human-caused wildfires tend to be generated by activities such as debris and brush-clearing fires, electrical equipment malfunctions, campfire escapes, smoking, fire play (e.g., fireworks), vehicles, and arson. Power lines also pose a risk of spark as a result of downed lines, direct contact with vegetation, and line faults and equipment failures. Power lines would continue to be constructed and operated by utility companies, subject to the oversight of the California Public Utilities Commission. These companies are obligated to manage and maintain the lines to reduce the potential for wildfire. This includes clearing vegetation near the power lines and may include operating provisions to temporarily stop power during high winds where the fire danger is high. Construction and operation of utilities to serve the growth areas is not anticipated to substantially exacerbate fire hazards outside of the immediate growth geographies.

Wildfire is also addressed through the Plan's core adaptation principles related to land use, land management, and structural hardening efforts focused on buildings constructed in very high fire hazard severity zones before 2009. Features of the Plan that would reduce the potential to exacerbate the risk of wildfire include maintaining the urban growth boundaries, directing growth away from areas with the highest fire hazard severity potential, and supporting vegetation management on conservation lands. Specifically, the proposed Plan includes Strategy EN04, Maintain Urban Growth Boundaries, which does not enable growth beyond current boundaries and locates growth geographies (Priority Development Areas, Priority Production Areas, TRAs, High-Resource Areas) outside of the worst fire hazard severity zones (as defined by CAL FIRE's Very High Fire Hazard Severity Zones in incorporated areas and by High or Very High Fire Hazard Severity Zones in unincorporated areas). These restrictions would be augmented by WUI zones, where they have been adopted at the county level. Together, these strategies limit further growth in the areas most at risk of wildfire. Open space and working lands management is included in the proposed Plan to reduce the intensity of future fires. Specifically, Strategy EN05, Protect and Manage High-Value Conservation Land, includes expanded new revenues beyond what already exist to support wildfire management. Structural hardening combats the risk in communities already built in the highest fire risk zones. Strategy EN02, Retrofit Existing Residential Buildings is designed to reduce risk in all existing residential buildings (roughly 75,000 units) in the very-high fire hazard zone built before the 2009 WUI building code. The strategy would require proven structural hardening strategies, such as roofing and vent replacements, and support homeowners with difficult defensible space work. Together, these strategies would focus future growth away from the highest fire risk zones, support increased wildland management programs, and support residential building upgrades that reduce the likelihood for damage when fires occur in the WUI. Another component of the proposed Plan's environmental strategy would provide means-based financial support to retrofit existing residential buildings. This could reduce the potential for these structures to cause fires due to damage caused by a seismic event.

Throughout the Plan area, new construction would be subject to Title 24 of the CCR, which includes safety measures to minimize the threat of fire. The provisions of the fire code would apply to all construction, alteration, replacement, removal, and demolition. The risk of accidental ignition of a wildland fire during construction in forested areas would be addressed through standard construction practices, which address the potential for sparks generated by construction equipment, the potential for spills of ignitable materials, and emergency procedures to immediately respond to these conditions. In addition, Title 14 of the CCR sets forth the minimum development standards for emergency access, fuel modification, setback, signage, and water supply, which help prevent damage to structures or people by reducing wildfire hazards within SRAs. Local jurisdictions' general plan policies and building codes enforce and expand on these requirements at the local level. All jurisdictions are required to review and update their safety element in conjunction with the next housing element revision to address the risk of fire in SRAs and Very High Fire Hazard Severity Zones. and the provisions outlined in "Fire Hazard Planning" by the Governor's Office of Planning and Research. Projects would not be approved by local agencies until project design plans demonstrate compliance with applicable fire safety requirements. The proposed Plan would not conflict with the ongoing efforts of CAL FIRE and others to create natural environments that are more resilient to fire through fire plans that include prefire planning and fuel treatment. Potential conflicts with existing emergency response and evacuation plans are addressed in Impact HAZ-6, above.

Of the acreage of fire hazard areas within the land use growth footprint, development specific to the TPAs could occur in three of the nine counties (**Table 3.9-8**). These include approximately 10 acres in Alameda County, 10 acres in Contra Costa County, and 7 acres in Marin County. As noted above, the estimated area of potential effects could be overstated. Projects located on land identified by CAL FIRE as subject to wildland fire hazard would not qualify as sustainable communities projects under PRC Section 21155.1 unless the applicable general plan or zoning code contains provisions to mitigate the risk of a wildland fire hazards (PRC Section 21155.1[a][6][A]). (Note, however, that this is applicable only to potential exemptions under the sustainable communities strategy provisions of CEQA and does not apply to the other streamlining strategies under the Sustainable Communities Act.)

As an example, the Alameda County General Plan includes a series of 13 policies and 22 associated implementation actions to address wildfire hazards and require adherence to the provisions of the Alameda County Fire Protection Master Plan and Fire Hazard Mitigation Plan (Alameda County 2018).The City of Oakland's Safety Element has policies and related actions addressing reduction and prevention of wildfire hazards, including implementation of the 2004 wildfire prevention assessment district for the Oakland Hills and participation in multi-jurisdictional programs and task forces that work to reduce the threat of wildfires. Similarly, other incorporated cities in Alameda County include safety elements, environmental hazards elements, Disaster Preparedness and Safety Element, or similar General Plan elements that include policies to address wildfire risk. Policies that address wildland fire risk are contained in the "Fire Services" section of the Public Facilities Element in the general plan for Contra Costa County. In addition, the Safety Element includes implementation measures designed to result in building practices that reduce the hazard to new construction within fire hazard areas (Contra Costa County 2005). The Marin Countywide Plan includes Policies EH 4.3 through EH4.5, which have provisions to adopt and implement a fire management plan, ensure adequate emergency response, and implement land use regulations as a means of protecting people and property from wildfire hazards (Marin County 2007).

As discussed above, California is trending toward an increase in the severity and frequency of wildfires over time as a result of climate change, modified vegetation regimes, and increasing human influence. Such trends are expected to continue and will pose an increasing threat to wildland areas and nearby urban environments. The proposed Plan, however, is designed to accommodate anticipated population growth in a manner that reduces potential contributions to climate change, encourages concentrated growth in developed areas and land management in open space, and includes structural hardening efforts where existing structures are vulnerable to fire. Nonetheless, because development could occur near land classified as very high hazard severity zones and could indirectly result in extension or expansion of infrastructure through these areas, there is potential for the proposed Plan to exacerbate the risk of wildland fires, associated pollutant release, and potential for flooding and landslides. This impact would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

Construction and Operation

Sea level rise adaptation infrastructure would protect communities and infrastructure from the adverse effects of anticipated sea level rise. As shown in **Figure 2-3** of Chapter 2, "Project Description," key sea level rise adaptation infrastructure has been identified primarily along the shores of the San Francisco Bay. These areas are generally outside of areas mapped as prone to

wildfire by CAL FIRE (see **Figure 3.9-4**). As shown in **Table 3.9-9**, the resilience footprint includes 30 acres of lands located in each of the fire hazard zones, with nearly all of this within Marin County.

Table 3.9-9: Acreage of Sea Level Rise/Resiliency Footprint within Fire Hazard Zones

County	Moderate (acres)	High (acres)	Very High (acres)
Alameda	0	0	0
Contra Costa	0	0	0
Marin	10	30	30
Napa	0	0	0
San Francisco	0	0	0
San Mateo	0	0	0
Santa Clara	0	0	0
Solano	0	0	0
Sonoma	20	0	0
Regional Total	30	30	30

Notes: Whole numbers have been rounded. Figures may not sum due to independent rounding.
Sources: MTC/ABAG (2021); CAL FIRE (2007)

Sea level rise adaptation infrastructure includes elevating roadways, as well as installing and improving sea walls, levees, and tidal gates. These projects are not anticipated to result in an increased fire risk and would, therefore, not exacerbate the potential for associated pollutant releases or flooding and landslides. This impact would be less than significant (LTS).

Transportation System Impacts

Construction and Operation

There are 900 acres of transportation projects proposed in moderate fire hazard areas and 570 acres of projects proposed in high fire hazard areas. An additional 20 acres, primarily in Contra Costa County, are located within a very high fire hazard area (see **Table 3.9-10**). As discussed above for land use projects, implementing agencies would require project sponsors to comply with safety measures that minimize the threat of fire as stated in the Title 24 of the CCR, as well as comply with CCR Title 14, Division 1.5 to minimize exposing people and structures to loss, injury, or death and damage. Therefore, although there could be an elevated risk of accidental ignition of a wildland fire during construction in forested areas, the potential for standard construction practices to result in wildland fire would not be substantially increased because of the transportation investments identified in the Plan.

Table 3.9-10: Acreage of Transportation Projects Footprint within Fire Hazard Zones

County	Moderate (acres)	High (acres)	Very High (acres)
Alameda	350	240	< 1
Contra Costa	250	50	20
Marin	110	-	-
Napa	20	-	-
San Francisco	-	-	-
San Mateo	-	1	-
Santa Clara	160	210	-
Solano	3	80	-
Sonoma	10	-	-
Regional Total	900	570	20

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number and between 11 and 999 to the nearest 10). Numbers less than 1 are shown as "<1." Figures may not sum due to independent rounding.
Sources: MTCABAG (2021); CAL FIRE (2007)

As described above, projects that involve the expansion or extension of the transportation system may also expose more land uses to risks associated with wildland fires, particularly at the urban edge. Providing increased access into wildfire-prone open space increases the potential for human-caused wildfires both as a result of direct access and due to introduction of potential ignition sources (e.g., vehicles, cigarettes) along the transportation corridor. However, transportation improvements, especially capacity improvements, also generally improve the transportation network to move people more efficiently. This is beneficial for emergency access and evacuation due to a wildfire. The potential for wildfire hazard impacts related to transportation projects in the proposed Plan would be potentially significant (PS) due to the potential for the infrastructure to exacerbate fire risk.

Conclusion

Implementation of the proposed Plan's land use development pattern and transportation projects could exacerbate the risks of wildfire in or near State Responsibility Areas or land classified as very high hazard severity zones. Extension of development along the WUI can result in loss of property and structures, as has been observed in several fires within the Plan area including the 2017 Tubbs fire and 1991 Tunnel fire. In 2020, large fires burned over 700,000 acres within and adjacent to the Plan area during the SNU Lightening Complex fires and LNU Lightening Complex fires. This would be a **potentially significant (PS)** impact. Mitigation Measure HAZ-7 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure HAZ-7 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Restrict development of areas mapped by CAL FIRE as high and very high fire hazard zones.
- Improve and educate residents and businesses regarding local emergency communications and notifications.
- Enforce defensible space regulations to keep overgrown and unmanaged vegetation, accumulations of trash and other flammable material away from structures.
- Provide public education about wildfire risk and fire prevention measures, and safety procedures and practices to allow for safe evacuation and/or options to shelter-in-place.
- Plan for and promote rapid revegetation of burned areas to help prevent erosion and protect bare soils.
- Develop a regulatory mechanism for permitting an aggressive hazardous fuels management program.
- Establish standards for fuel breaks that can slow or stop a wildfire advancing into a community or into the wildlands. Fuel breaks shall be strategically located to protect a community, structures, or routes of access and egress. Strategic locations may include ridgelines, greenbelts, or other locations to manage embers or support community-level fire suppression tactics.
- MTC shall facilitate minimizing future impacts to fire protection services through information sharing regarding fire-wise land management (vegetation data, fire-resistant building materials, locations where development is vulnerable to wildfire, and best practices for safe land management) with county and city planning departments.
- MTC, in partnership with technical experts and stakeholders, shall launch or continue existing initiatives to help local cities and counties to protect Bay Area communities and economies from the disruption of wildfire occurrences. Initiatives could include but not be limited to seminars that review the risk of wildfire and approaches for preparation, including strengthening of infrastructure, emergency services, emergency evacuation plans and reviewing building safety codes.

Significance after Mitigation

Curtailing development in areas mapped by CalFire as high and very high fire hazard zones, in conjunction with the mitigation measures and elements of the Plan that would promote land management in open space to reduce fire hazards, would substantially reduce the potential for the Plan to exacerbate wildland fire risks. However, because development could occur in and near SRAs and lands classified as very high hazard severity zones, and because the potential for people or structure to be exposed to significant risk of loss, injury, or death involving wildfire cannot be avoided, this impact would be **significant and unavoidable (SU).**

Projects taking advantage of CEQA streamlining provisions of Senate Bill 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

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3.10 HYDROLOGY AND WATER QUALITY

This section analyzes the surface water and groundwater resources of the Bay Area. Stormwater runoff, flooding, and inundation hazards are also addressed in this section. For a discussion of water supply impacts, including drought, see Section 3.14, "Public Utilities and Facilities."

Comments received in response to the Notice of Preparation (NOP) for this EIR expressed concerns about the effect of additional impervious surfaces on groundwater recharge areas and groundwater availability. These issues are addressed in the impact discussions below. Comments were also received regarding the effects of flooding related to sea level rise. For a discussion of sea (and bay) level rise impacts, see Section 3.6, "Climate Change, Greenhouse Gases, and Energy."

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important" (CEQA Guidelines Section 15083). Neither the CEQA Guidelines nor the statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.10.1 Environmental Setting

CLIMATE

Climatic conditions in the Bay Area are generally characterized as Mediterranean with moist, mild winters and hot, dry summers. However, the region's varied topography creates several microclimates dependent upon elevation, proximity to the San Francisco Bay or coast, and orientation. As a result, stark climatic differences in temperature, rainfall amounts, and evapotranspiration can occur over relatively short distances. The Bay Area is largely governed by weather patterns originating in the Pacific Ocean, primarily by the southern descent of the Polar Jet Stream, which brings midlatitude cyclonic storms in winter. More than 90 percent of precipitation in the Bay Area falls between November and April. Bay Area lowlands (i.e., valley bottoms) receive an annual rainfall of about 15–20 inches in the South Bay and about 20–25 inches in the North Bay. Higher elevations in the region, particularly along the north- or west-facing slopes of the North Bay, may receive over 40 inches of rain per year. In the summer, the Hawaiian High Pressure cell over the northern Pacific creates mild and dry weather for the region. However, summer in the Bay Area is also known for its thick marine fog layer, which is brought into the bay by a diurnal westerly breeze formed by the strong pressure gradient between the hot Central Valley and the cooler coastal areas. This moist air is cooled to dewpoint when it crosses the cooler waters of the California Current near the coast. This advection process results in a thick fog forming just offshore, which is pulled eastward through gaps and passes into the Bay Area. Fog diminishes with distance inland from the bay (MTC and ABAG 2013). **Table 3.10-1** summarizes monthly and annual average precipitation for select sites throughout the Bay Area.

Table 3.10-1: Average Monthly Precipitation, Selected Bay Area Sites

Site	Inches[1]												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Fairfield (1950–2016)	4.8	4.0	3.1	1.4	0.6	0.2	0.0	0.1	0.2	1.3	2.8	4.3	22.7
Los Gatos (1983–2016)	6.1	5.2	4.3	1.7	0.6	0.1	0.0	0.1	0.3	1.2	2.5	4.9	26.9
Napa, State Hospital (1893–2016)	5.1	4.4	3.4	1.7	0.7	0.2	0.0	0.1	0.3	1.4	3.0	4.5	24.7
Oakland, Airport (1948–2016)	3.7	2.7	2.6	1.4	0.4	0.2	0.0	0.1	0.2	1.1	2.5	3.1	18.0
Redwood City (1906–2016)	4.4	3.5	2.7	1.2	0.4	0.1	0.0	0.1	0.2	1.0	2.1	3.5	19.2
Richmond (1950–2016)	4.8	3.8	3.3	1.7	0.5	0.2	0.0	0.1	0.2	1.3	2.9	4.4	23.2
San Francisco Oceanside (1948–2016)	4.0	3.6	2.8	1.2	0.5	0.2	0.0	0.1	0.2	1.1	2.7	3.8	20.0
San Rafael, Civic Center (1894–2016)	8.1	6.5	4.7	2.0	0.7	0.2	0.0	0.1	0.4	1.9	4.1	6.8	35.6
Santa Rosa/Sonoma (1998–2016)	5.5	6.2	4.4	2.1	1.2	0.3	0.0	0.0	0.1	1.9	3.5	7.1	32.2

[1] Rounded to the nearest one-tenth of an inch.

Source: Western Regional Climate Center 2016

REGIONAL HYDROLOGY

San Francisco Bay encompasses approximately 1,600 square miles and is surrounded by the nine Bay Area counties, of which seven border the bay. The San Francisco Bay is partially enclosed and is relatively shallow (USGS 2007). Median depth, based on mean sea level, varies from roughly 8 feet in San Pablo Bay to 36 feet in the central area of the bay near the Golden Gate Bridge. Much of the perimeter of the bay is shallow tidal mud flats, tidal marshes, diked or leveed agricultural areas, and salt ponds. The north lobe of San Francisco Bay is brackish and is known as San Pablo Bay. It is surrounded by Marin, Sonoma, Napa, and Solano Counties. Suisun Marsh is between San Pablo Bay and the Sacramento–San Joaquin Delta (Delta) and is the largest contiguous brackish marsh on the west coast of North America, providing more than 10 percent of California's remaining natural wetlands. The south and central lobes of San Francisco Bay are saltier than San Pablo Bay, as the marine influence dominates (DWR 2013).

The San Francisco Bay estuary system is one of the largest in the country and drains approximately 40 percent of California. Water from the Sacramento and San Joaquin Rivers of the Central Valley flows into what is known as the Delta region, then into the subbays, Suisun Bay and San Pablo Bay, and finally into the central area of the bay and out the Golden Gate strait. The Delta is a large triangle of interconnected sloughs and agricultural "islands" that form a key link in California's water delivery system. Some of the fresh water flows through the Delta and into the bay, but much is diverted from the bay for agricultural, residential, and industrial purposes, as well as delivery to distant cities of southern California as part of State and federal water projects.

The two major drainages, the Sacramento and San Joaquin Rivers, receive more than 90 percent of runoff during the winter and spring months from rainstorms and snowmelt. Other surface waters flow either directly to the bay or Pacific Ocean. The drainage basin that contributes surface water flows directly to the bay covers a total area of 3,464 square miles. The largest watersheds include the Alameda Creek (695 square miles), the Napa River (417 square miles), and the Coyote Creek (353

square miles) watersheds. The San Francisco Bay estuary includes deep-water channels, tidelands, and marshlands that provide a variety of habitats for plants and animals.

The interaction between Delta outflow and Pacific Ocean tides determines how far salt water intrudes into the Delta. The salinity of the water varies widely as the landward flows of saline water and the seaward flows of fresh water converge near the Benicia Bridge. The salinity levels in the central area of the bay can vary from near oceanic levels to one-quarter as much, depending on the volume of freshwater runoff, which depends on precipitation, reservoir releases, and upstream diversions. An average of 18.4 million acre-feet of fresh water flows out of the Delta annually into the bay (DWR 2013:SFB-11).

Surface Waters

Surface waters in the Bay Area include freshwater rivers and streams, coastal waters, and estuarine waters. Many of the original drainages toward the San Francisco Bay have been channelized and put underground through urbanization of the area. Estuarine waters include the Delta from the Golden Gate Bridge to the Sacramento and San Joaquin Rivers, as well as the lower reaches of various streams that flow directly into the bay, such as the Napa and Petaluma Rivers in the North Bay and the Coyote and San Francisquito Creeks in the South Bay. Major water bodies, including creeks and rivers, in the Bay Area are presented in **Figure 3.10-1**. The following major rivers and streams, listed by county, are located in the Bay Area:

- Alameda County: Alameda Creek, San Leandro Creek, and San Lorenzo Creek;
- Contra Costa County: San Pablo Creek;
- Marin County: Corte Madera Creek, Lagunitas Creek, Gallinas Creek, Miller Creek, and Novato Creek;
- Napa County: Huichica Creek and Napa River;
- San Francisco County: none;
- San Mateo County: Cordilleras Creek, San Mateo Creek, and Sanchez Creek;
- Santa Clara County: Adobe Creek, Coyote Creek, Guadalupe River, Llagas Creek (drains to the Pacific Ocean via the Pajaro River), Los Gatos Creek, Permanente Creek, San Francisquito Creek, and Stevens Creek;
- Solano County: Green Valley Creek, Napa River, Putah Creek, and Suisun Creek; and
- Sonoma County: Petaluma River, Russian River, Santa Rosa Creek, and Sonoma Creek.

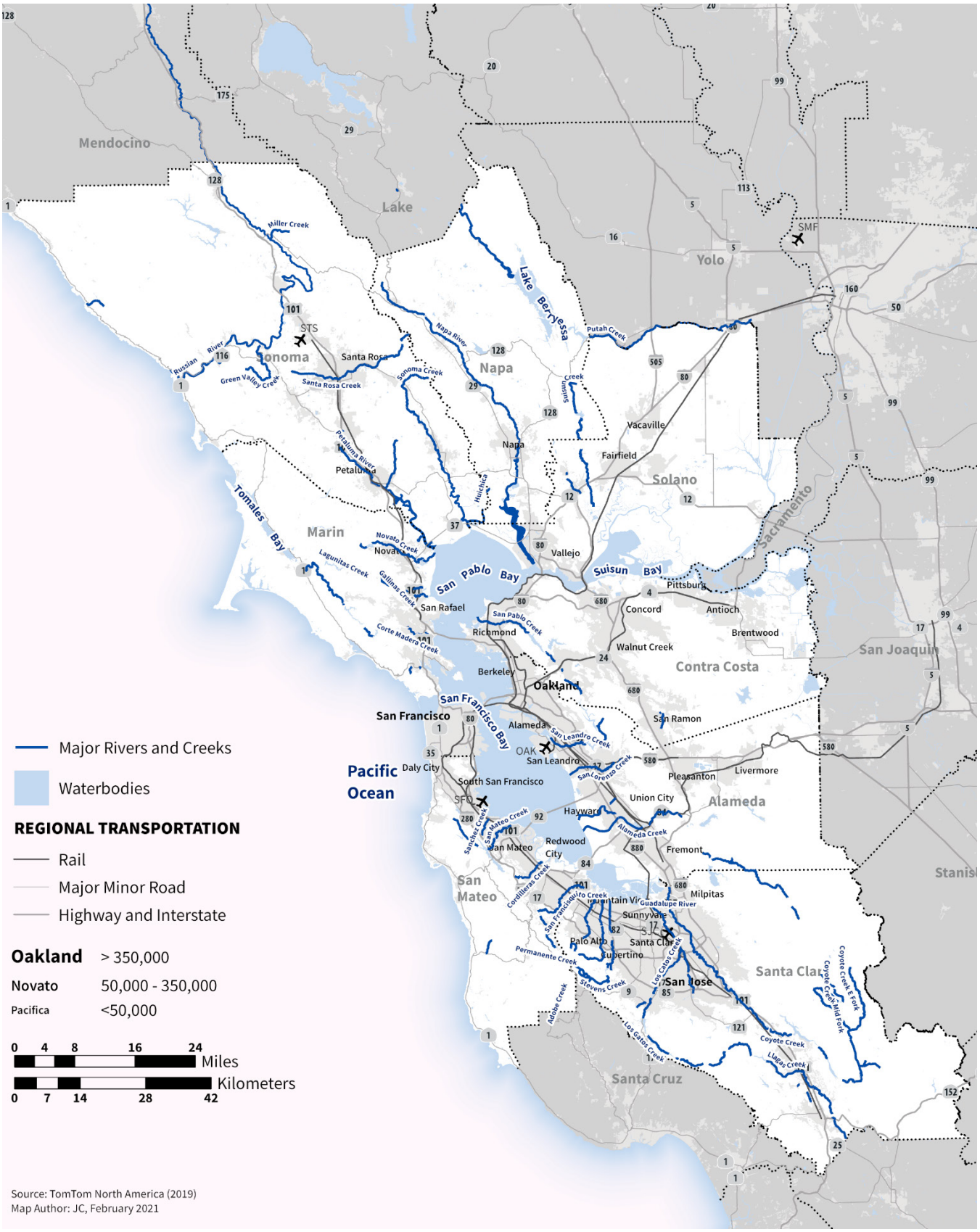

Figure 3.10-1: Major Rivers, Creeks, and Other Water Bodies

Groundwater

A groundwater basin is an area underlain by permeable materials capable of storing a significant amount of water. Groundwater basins are closely linked to local surface waters. As water flows from the hills toward San Francisco Bay, it percolates through permeable soils into the groundwater basins. The entire Bay Area region is divided into a total of 28 groundwater basins, and two of those basins (Napa-Sonoma Valley and Santa Clara Valley) are further divided into subbasins. **Table 3.10-2** includes groundwater basin sizes, by acres.

Table 3.10-2: Groundwater Basin Sizes

Groundwater Basin	Basin Size (Acres)
Alexander Valley	51,000
Castro Valley	2,900
Clayton Valley	2,300
Downtown	12,200
Gilroy-Hollister Valley	288,200
Half Moon Bay Terrace	14,500
Islais Valley	9,500
Kenwood Valley	8,400
Livermore Valley	111,200
Lobos	3,800
Marina	3,500
Napa-Sonoma Valley	213,100
Novato Valley	33,200
Petaluma Valley	74,800
Pittsburg Plain	18,700
Sacramento Valley	6,291,800
San Joaquin Valley	13,792,900
San Pedro Valley	1,100
San Ramon Valley	11,300
San Rafael Valley	1,400
Santa Clara Valley	578,000
Santa Rosa Valley	170,500
South San Francisco	3,500
Suisun-Fairfield Valley	216,600
Sunol Valley	26,500
Visitacion Valley	9,300
Westside	40,600
Wilson Grove Formation Highlands	140,700
Ygnacio Valley	24,900

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100).

Source: Data compiled by MTC/ABAG in 2017

Groundwater is used for numerous purposes, including municipal and industrial water supply, in the Bay Area; however, it accounts for only about 5 percent of total water consumption. Although some of the larger basins (such as Santa Clara Valley, Napa-Sonoma Valley, and Petaluma Valley) can

produce large volumes of groundwater and generally have good water quality, many of the groundwater basins in the Bay Area are relatively thin and yield less water. Further, portions of the Bay Area have poor water quality as a result of past industrial uses or intrusion of brackish bay water. Because of water quality and available resources, water supply for much of the Bay Area is provided by imported water supplies through water conveyance facilities, such as the Hetch Hetchy Aqueduct, the Mokelumne Aqueduct, and the North and South Bay Aqueduct. A detailed discussion of water supply is included in Section 3.14, "Public Utilities and Facilities."

SURFACE WATER QUALITY

The quality of surface water resources in the Bay Area varies considerably and is locally affected by point-source (i.e., emitted from a single point) and nonpoint-source (i.e., diffuse) discharges. Point sources, such as wastewater treatment effluent and industrial waste discharges, are often regulated and monitored to avoid adverse effects on water quality.

Nonpoint-source pollutants are transported into surface waters through rainfall, air, and other pathways. Nonpoint-source pollutants are the leading cause of water quality degradation in the region's waterways. Stormwater runoff is estimated to contribute more heavy metals to San Francisco Bay than direct municipal and industrial dischargers, as well as significant amounts of motor oil, paints, chemicals, debris, grease, and detergents. Runoff in storm drains may also include pesticides and herbicides from landscaping products and bacteria from animal waste. Most urban runoff flows untreated into creeks, lakes, and San Francisco Bay. This nonpoint-source runoff often carries pollutants, including copper from brake linings and lead from counterweights, that contribute heavy metals to local waters.

In addition, many of the region's creeks are channelized, culverted, or otherwise geomorphically altered, and the adverse effects on aquatic and riparian habitats, sediment transfer, and hydrology associated with these modifications can impair water quality. Water quality in the more rural areas of the region has also been affected by grazing and agriculture, confined animal facilities, on-site sewage systems, and land conversions. Coastal watersheds have been impaired because of sedimentation and habitat degradation. Other pollutant sources include upstream historic and current mining discharges and legacy pollutants that were historically emitted by industry or other human activities that are currently banned or have been substantially restricted. Examples include mercury, lead, polychlorinated biphenyls (PCBs), and dichlorodiphenyltrichloroethane.

The San Francisco Bay Regional Water Quality Control Board (RWQCB), the main agency charged with protecting and enhancing surface water and groundwater quality in the Bay Area, has classified the San Francisco Bay and many of its tributaries as impaired for various water quality constituents, as required by the Clean Water Act (CWA) (see Section 3.10.2, "Regulatory Setting," below). The San Francisco Bay RWQCB implements the Total Maximum Daily Load (TMDL) Program for impaired water bodies, which involves determining a safe level of loading for each problem pollutant, determining the pollutant sources, allocating loads to all of the sources, and implementing the load allocations. Within the Bay Area region, the 2018 303(d) list (applied to impaired water bodies, as defined below in the "Regulatory Setting" discussion) includes nearly 350 listings for approximately 130 water bodies. Nearly 120 of these listings have an associated TMDL established. Primary pollutants for which a TMDL has been established on Bay Area surface waters include diazinon (a pesticide), PCBs, the metals mercury and selenium, pathogens, and indicator bacteria. RWQCB staff are currently developing TMDL projects or studies to address more than 190 additional listings. The remaining listings are being addressed through another action (San Francisco Bay RWQCB 2020).

The following TMDL projects have been completed in the Bay Area (the managed pollutant follows name of water body):

- Guadalupe River Watershed – Mercury
- Lagunitas Creek – Sediment
- Muir beach – Bacteria
- Napa River – Nutrients, Sediment, and Pathogens
- North San Francisco Bay – Selenium
- Pescadero/Butano Creeks – Sediment
- Richardson Bay – Pathogens
- San Francisco Bay Beaches – Bacteria
- San Francisco Bay – Mercury and PCBs
- San Vicente Creek and Fitzgerald Marine Reserve – Bacteria
- San Pedro Creek and Pacifica State Beach – Bacteria
- Sonoma Creek – Nutrients, Pathogens, and Sediment
- Tomales Bay – Mercury and Pathogens
- Urban Creeks – Pesticide Toxicity
- Walker Creek – Mercury

The following TMDL projects are in development in the Bay Area (the managed pollutant follows name of water body):

- Kiteboard Beach and Oyster Point Beach – Bacteria
- Permanente Creek – Selenium
- Petaluma River – Bacteria
- Pillar Point Harbor and Venice Beach – Bacteria
- San Francisquito Creek – Sediment
- San Gregorio Creek - Sediment
- Stevens Creek – Toxicity

TMDLs account for all pollutant sources, including discharges from wastewater treatment facilities; runoff from homes, agriculture, and streets or highways; “toxic hot spots”; and deposition from the air. The specific urban runoff best management practices (BMPs) and levels of implementation are determined through TMDL development. Note that one TMDL may address multiple listings. For example, the Diazinon/Pesticide Toxicity TMDL for urban creeks addressed more than 30 impaired creeks or creek segments in the Bay Area (San Francisco Bay RWQCB 2020).

FLOOD HAZARDS

The San Francisco Bay contains many flat, low-lying marginal areas and highly developed valleys with surrounding steep terrain that are conducive to flooding, especially during intense storms. Urban areas can flood when storm drains and small channels become blocked or surcharged during intense short-duration storms. Valley flooding tends to occur when large, widespread storms fall on previously saturated watersheds that drain into the valley. The greatest flood damages occur in the lower reaches of streams when floodwaters spill onto the floodplain and spread through urban neighborhoods (DWR 2013). Because of the topography of alluvial plains, floodwaters escaping some stream channels may flow away from the flooding stream, crossing open areas or flowing through city streets until they reach an adjacent watercourse. This type of flooding compounds and exacerbates local flooding that occurs when storm drains and small channels become blocked or surcharged during storms. In addition, hillsides denuded by wildfires can exacerbate flood damages by intercepting less precipitation and generating more runoff containing massive sediment loads.

Storm surges coincident with high tides can also create severe flooding in low-lying areas by the mouths of rivers (DWR 2013).

Major floods occur regularly in the Bay Area, and local structural flood damage reduction measures, such as reservoirs, levees, and channel improvements, have been implemented. Two reservoirs in the region have a designated flood protection function: Lake Del Valle and Cull Canyon Reservoir with 38,000 and 310 acre-feet of flood control capacity, respectively. Lake Del Valle is a State Water Project facility that protects Pleasanton, Fremont, Niles, and Union City. Alameda County Flood Control and Water Conservation District constructed Cull Canyon Reservoir to protect Castro Valley. Channel improvement projects designed to reduce stream flooding include channel construction, enlargement, realignment, lining, stabilization, and bank protection (DWR 2013). Flood protection agencies have constructed infrastructure projects along the following waterways to reduce the impacts of flooding (Alameda County Water District et al. 2019):

- Alameda Creek,
- Corte Madera Creek,
- Guadalupe River,
- Napa River,
- Novato Creek,
- Petaluma River, and
- San Francisquito Creek.

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP). The program provides subsidized flood insurance to communities that comply with FEMA regulations to limit development in floodplains. FEMA issues Flood Insurance Rate Maps for communities participating in the NFIP. **Figure 3.10-2** identifies federally designated 100-year and 500-year storm event flood hazard zones in the Bay Area.

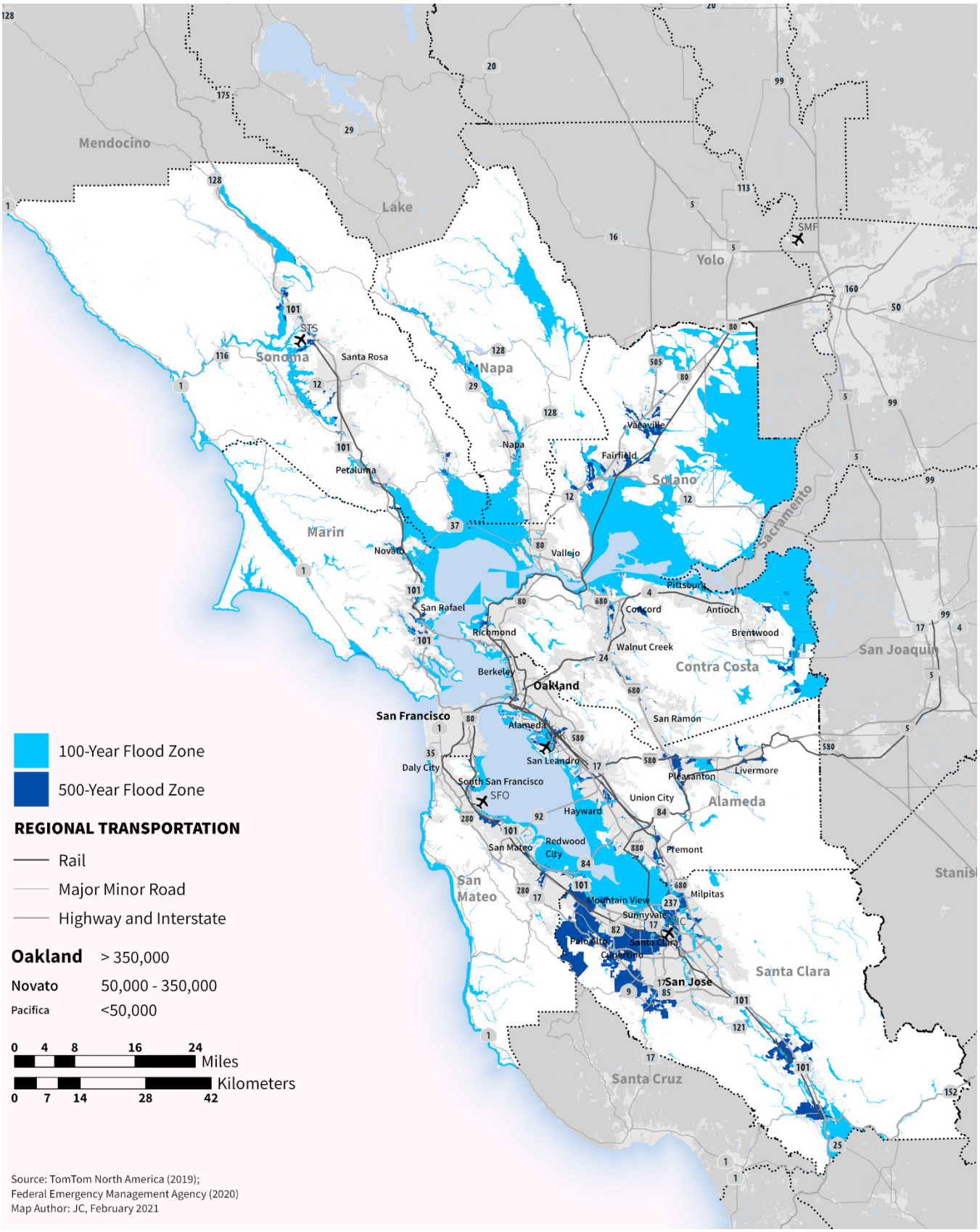

Figure 3.10-2: Flood Hazard Areas

FEMA further classifies high-risk flood hazard zones for communities that participate in the NFIP where mandatory flood insurance purchase requirements apply, as shown in **Table 3.10-3**.

Table 3.10-3: Flood Hazard Zone Classification

Zone	Description
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
AR	Areas with a temporarily increased flood risk because of the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.
High Risk Coastal Areas	
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE, V1–V30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Notes: BFE = base flood elevation; FIRM = Flood Insurance Rate Map.

Dam Failure

The California Department of Water Resources (DWR) Division of Safety of Dams (DSOD) oversees the design, construction, and annual inspection of dams Statewide. DSOD imposes strict standards for the design, maintenance, and monitoring of dams under its jurisdiction to ensure that they meet static and seismic standards to prevent catastrophic failure. Periodically, some of these dams will receive modifications, such as the San Pablo Dam, which has undergone a seismic upgrade to increase its stability and minimize the potential for liquefaction to cause any slump or failure of the embankment. Since 1916 there have been seven dam failures Statewide. The most recent was in 1971 with the failure of the San Fernando dam near Los Angeles (ASDSO 2021). A partial failure of a spillway gate at Folsom Lake Dam occurred in 1995, and a partial failure of a spillway gate at Oroville Dam occurred in 2017. Based on these statistics, dam failure is a relatively low likelihood event.

Seiches and Tsunamis

A tsunami is a series of waves generated in a body of water by a rapid disturbance (e.g., submarine seismic, volcanic, or landslide event) that vertically displaces water. Tsunamis affecting the Bay Area can result from offshore earthquakes within the Bay Area or from distant events. While it is most common for tsunamis to be generated by subduction faults, such as those in Washington and Alaska, local tsunamis can be generated from strike-slip faults (such as the small one that was triggered by the 1906 San Andreas earthquake). In general, a tsunami can move hundreds of miles per hour in the open ocean and reach land with waves as high as 100 feet or more. A total of 51 tsunamis have been recorded or observed within the San Francisco Bay since 1850 (City and County of San Francisco 2019). Of these, the 1964 Alaska earthquake triggered by a 9.2 magnitude earthquake caused the most damage in San Francisco Bay. That wave was just under 4 feet in height and damage was limited to marinas and private boats in Marin County. The geography of the bay reduces the risk of a large tsunami event. A seismic event on the Cascadia subduction zone, which runs roughly from Mendocino County to Vancouver Island and is considered a worst-case scenario for tsunami in the bay, is estimated take several hours to reach the City of San Francisco, providing time to mobilize a response (Varner and Allen-Price 2017). ABAG has mapped portions of the Plan area as within tsunami inundation areas for emergency planning (see **Figure 3.10-3**).

Seiches are oscillations of enclosed and semienclosed bodies of water, such as bays, lakes, or reservoirs, caused by strong ground motion from seismic events, wind stress, volcanic eruptions, large landslides, and local basin reflection of tsunamis. Seiches can result in creation of long-period waves that can cause water to overtop containment features or run-up on adjacent landmasses (City and County of San Francisco 2019).

3.10.2 Regulatory Setting

FEDERAL REGULATIONS

Clean Water Act

The CWA establishes the basic structure for regulating discharges of pollutants into "waters of the United States." It specifies a variety of regulatory and nonregulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. Some of these tools include:

- Section 303(d) – TMDLs
- Section 401 – Water Quality Certification
- Section 402 – National Pollutant Discharge Elimination System (NPDES) Program
- Section 404 – Discharge of Dredged or Fill Material

In 2000, the U.S. Environmental Protection Agency (EPA) established the California Toxics Rule, which sets water quality criteria for priority toxic pollutants and other provisions for water quality standards to be applied to inland surface waters, enclosed bays, and estuaries for all purposes and programs under the CWA.

Section 303(d) requires states, territories, and authorized tribes to develop a list of water quality–limited segments of rivers and other water bodies under their jurisdiction. The waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for waters on the list and develop action plans to improve water quality. These are

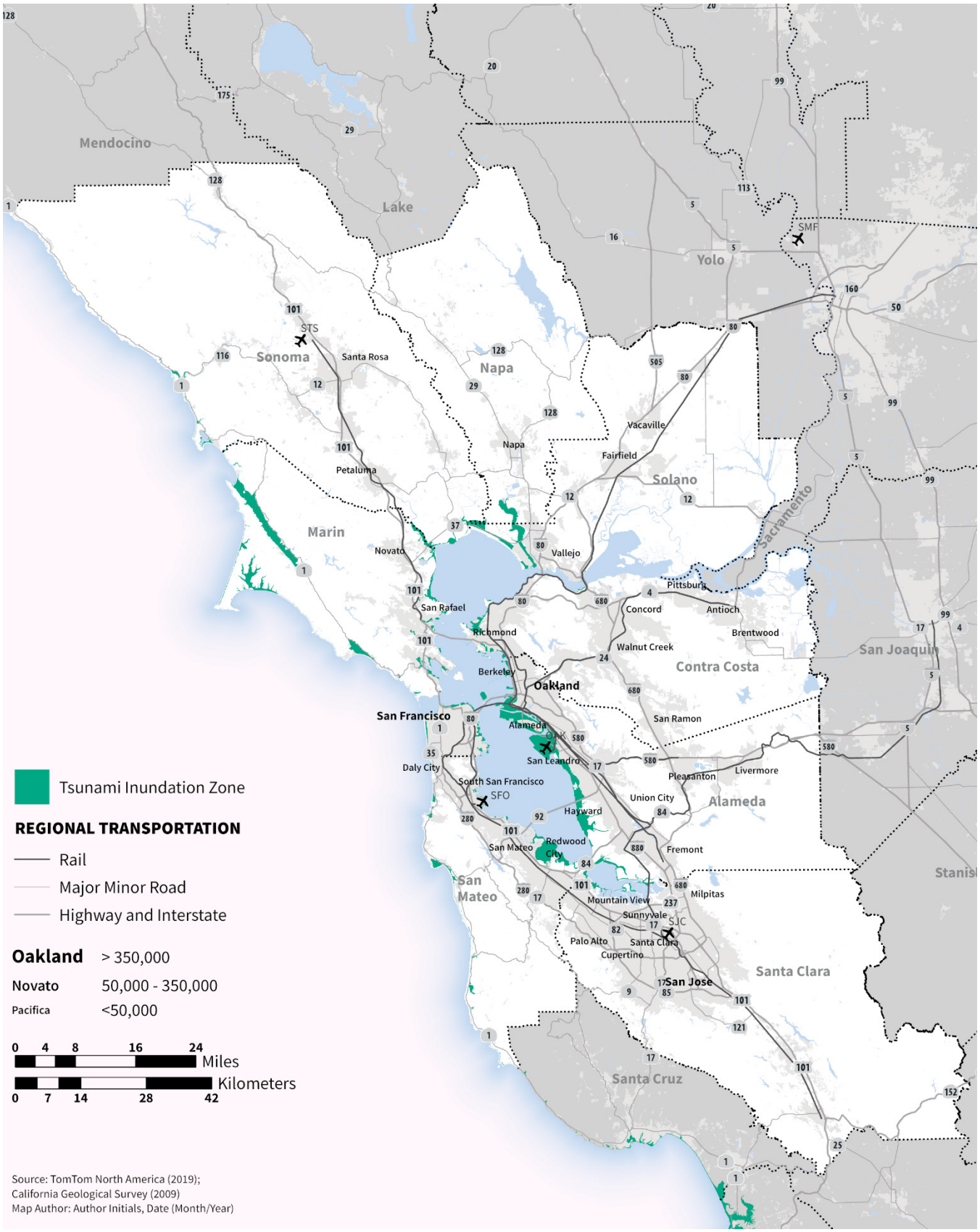

Figure 3.10-3: Tsunami Inundation Zones

action plans designed to improve the quality of water resources. As part of the TMDL process, municipalities must examine the water quality problems and identify sources of pollutants to create specific actions designed to improve water quality.

Section 401 requires every applicant for a federal permit or license for any activity that may result in a discharge to a water body to obtain a water quality certification that the proposed activity will comply with applicable water quality standards.

Section 402 regulates point-source discharges to surface waters through the NPDES program. In California, the State Water Resources Control Board (SWRCB) oversees the NPDES program, which is administered by the RWQCBs. The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. It covers municipalities, industrial activities, and construction activities. The NPDES program includes an industrial stormwater permitting component that covers 10 categories of industrial activity that require authorization under an NPDES industrial stormwater permit for stormwater discharges. For further discussion of the NPDES program's regulation of municipal separate storm sewer systems, refer to Section 3.14, "Public Utilities and Facilities." Permits for construction activities, also administered by SWRCB, are discussed below.

Section 402(p) of the federal CWA, as amended by the Water Quality Act of 1987, requires NPDES permits for stormwater discharges from municipal separate storm sewer systems (MS4s), stormwater discharges associated with industrial activity (including construction activities), and designated stormwater discharges, which are considered significant contributors of pollutants to waters of the United States. On November 16, 1990, EPA published regulations (CFR Title 40, Part 122) that prescribe permit application requirements for MS4s pursuant to CWA Section 402(p). On May 17, 1996, EPA published an Interpretive Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems, which provided guidance on permit application requirements for regulated MS4s. MS4 permits include requirements for postconstruction control of stormwater runoff in what is known as Provision C.3. The goal of Provision C.3 is for the permittees to use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects. This goal is to be accomplished primarily through the implementation of low-impact development (LID) techniques.

Section 404 establishes a permit program, administered by the U.S. Army Corps of Engineers (USACE), to regulate the discharge of dredged or fill materials into waters of the United States, including wetlands. Activities in waters of the United States that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. CWA Section 404 permits are issued by USACE.

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act, administered by USACE, requires permits for all structures (such as riprap) and activities (such as dredging) in navigable waters of the United States.

Coastal Zone Act Reauthorization Amendments

The Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) require coastal states to have a Coastal Nonpoint Pollution Control Program. CZARA provides state coastal management agencies regulatory control (federal consistency review authority) over all federal activities and federally

licensed, permitted, or assisted activities. Additionally, CZARA requires implementation of 56 management measures to achieve and maintain water quality standards, enforceable policies and mechanisms, and monitoring and tracking of management measure implementation.

National Flood Insurance Act

The U.S. Congress passed the National Flood Insurance Act in 1968 and the Flood Disaster Protection Act in 1973 to restrict certain types of development on floodplains and to provide for the NFIP. The purpose of these acts is to reduce the need for large, publicly funded flood control structures and disaster relief. The NFIP is a federal program administered by the Flood Insurance Administration of FEMA. It enables individuals who have property (a building or its contents) within the 100-year floodplain to purchase insurance against flood losses. FEMA works with the states and local communities to identify flood hazard areas and publishes a flood hazard boundary map of those areas. Floodplain mapping is an ongoing process in the Bay Area, and flood maps must be regularly updated for both major rivers and tributaries as land uses and development patterns change.

Executive Order 11988 - Floodplain Management

Executive Order 11988 directs federal agencies to avoid, to the extent practicable and feasible, short- and long-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Further, this executive order requires the prevention of uneconomic, hazardous, or incompatible use of floodplains; protection and preservation of the natural and beneficial floodplain values; and consistency with the standards and criteria of the NFIP.

STATE REGULATIONS

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) was enacted in September of 2014. Pursuant to SGMA, sustainable groundwater management is the management and use of groundwater in a manner that can be maintained during a 50-year planning and implementation horizon without causing undesirable results. The SGMA establishes a new structure for locally managing California's groundwater and includes the following key elements:

- provides for the establishment of a Groundwater Sustainability Agency (GSA) by one or more local agencies overlying a designated groundwater basin or subbasin, as established by DWR Bulletin 118-03;
- requires all groundwater basins found to be of "high" or "medium" priority to prepare Groundwater Sustainability Plans (GSPs). Sonoma, Napa, Solano, Contra Costa, Alameda, and Santa Clara Counties include basins designated as high or medium priority (see **Figure 3.10-4**);
- provides for the proposed revisions, by local agencies, to the boundaries of a DWR Bulletin 118 basin, including the establishment of new subbasins;
- provides authority for DWR to adopt regulations to evaluate GSPs and review the GSPs for compliance every 5 years;
- requires DWR to establish BMPs and technical measures for GSAs to develop and implement GSPs; and

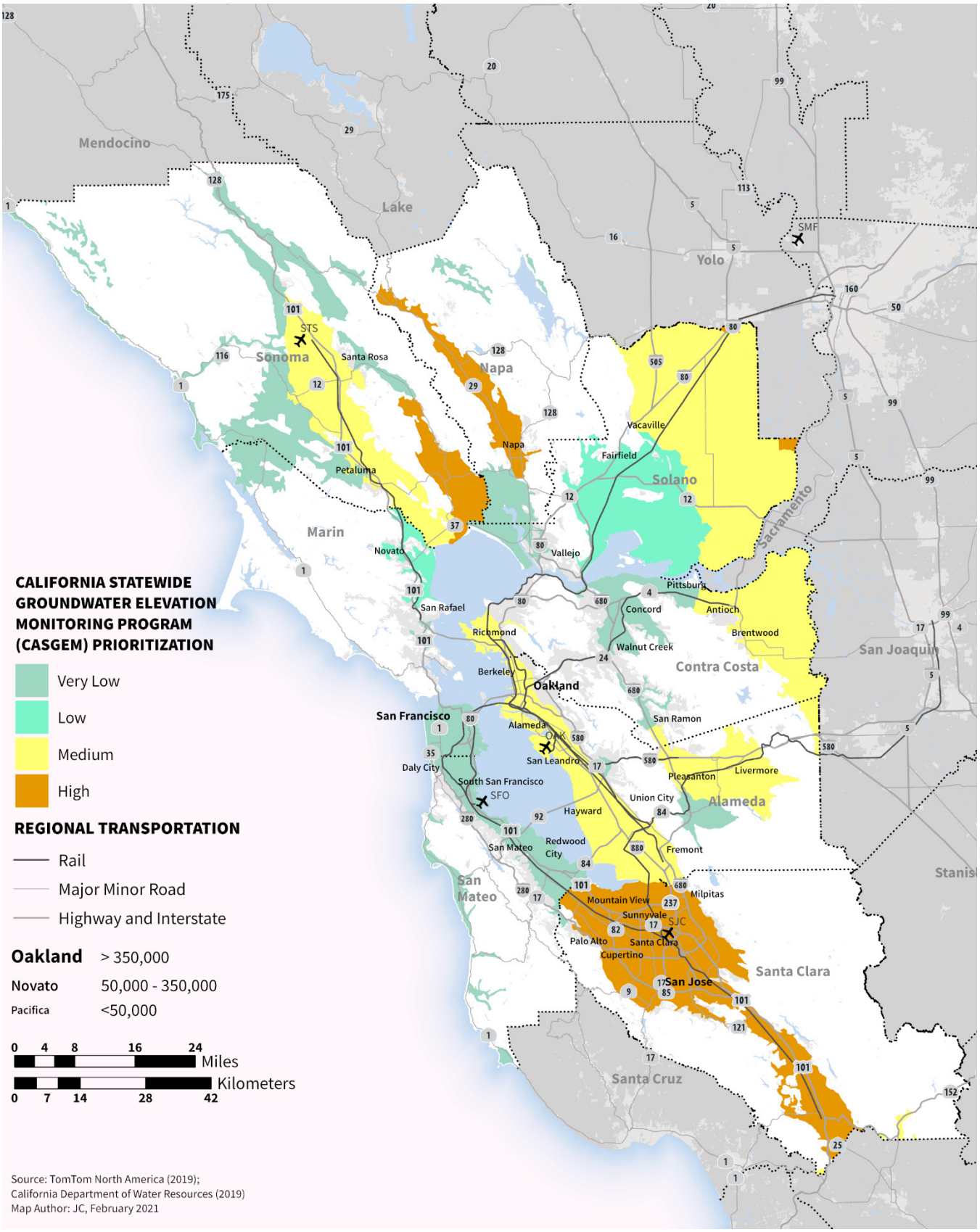

Figure 3.10-4: Groundwater Basin Prioritization

- provides regulatory authorities for SWRCB for developing and implementing interim groundwater monitoring programs under certain circumstances (such as lack of compliance with development of GSPs by GSAs).

- The medium and high priority basins in the Plan area are developing GSPs or have submitted alternative plans to comply with SGMA (**Table 3.10-4**).

Table 3.10-4: Groundwater Sustainability Plan Status of High and Medium Priority Basins in the Plan Area

Groundwater Basin Name (Basin Number)	County	SGMA Basin Prioritization	Groundwater Sustainability Plan Status
Santa Rosa Valley - Santa Rosa Plain (1-055.01)	Sonoma	Medium	Under development. Draft anticipated Fall 2021.
Petaluma Valley (2-001)	Sonoma	Medium	Under development. Draft anticipated Fall 2021.
Napa-Sonoma Valley - Sonoma Valley (2-002.02)	Sonoma	High	Under development. Draft anticipated Summer/Fall 2021.
Napa-Sonoma Valley - Napa Valley (2-002.01)	Napa	High	Under development. Draft published for public review.
Sacramento Valley - Solano (5-021.66)	Solano	Medium	Under development. Draft published for public review.
Sacramento Valley - Yolo (5-021.67)	Solano	High	Under development.
San Joaquin Valley - East Contra Costa (5-022.19)	Contra Costa	Medium	Under development. Draft anticipated Fall 2021.
Santa Clara Valley - East Bay Plain (2-009.04)	Contra Costa/Alameda	Medium	Under development.
Santa Clara Valley - Niles Cone (2-009.01)	Alameda	Medium	Existing plan approved as an alternative in July 2019.
Livermore Valley (2-010)	Alameda	Medium	Alternative based on an analysis of basin conditions that demonstrates the basin has operated within its sustainable yield over a period of at least 10 years approved in July 2019.
Gilroy-Hollister Valley - North San Benito (3-003.05)	Santa Clara	Medium	Under development.
Gilroy-Hollister Valley - Llagas Area (3-003.01)	Santa Clara	High	2016 Groundwater Management Plan for the Santa Clara and Llagas Subbasins approved on July 17, 2019 as an Alternative for both the Santa Clara and Llagas Subbasins.
Santa Clara Valley - Santa Clara (2-009.02)	Santa Clara	High	2016 Groundwater Management Plan for the Santa Clara and Llagas Subbasins approved on July 17, 2019 as an Alternative for both the Santa Clara and Llagas Subbasins.

Sources: Data compiled by MTC/ABAG in 2021 based on data from DWR 2019a, 2019b, and 2021; Santa Rosa Plain GSA 2021; Petaluma Valley GSA 2021; Sonoma County GSA 2021; Napa County 2021; Solano County Water Agency 2021; Yolo Subbasin Groundwater Agency 2021; East Contra Costa County Integrated Regional Water Management 2021; East Bay Municipal Utility District 2021; Santa Clara Valley Water District 2021

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) established SWRCB and divided the State into nine regions, each overseen by an RWQCB. The nine regional boards have the primary responsibility for the coordination and control of water quality within their respective jurisdictional boundaries. Under the Porter-Cologne Act, water quality objectives are limits or levels of water quality constituents or characteristics established for the purpose of protecting beneficial uses. The act requires the RWQCBs to establish water quality objectives while acknowledging that water quality

may be changed to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, also constitute water quality standards under the federal CWA. Therefore, the water quality objectives form the regulatory references for meeting State and federal requirements for water quality control.

Each RWQCB is required to prepare and update a Basin Plan for its jurisdictional area. The Porter-Cologne Act authorizes the State to develop approaches to address nonpoint source pollution and requires preparation of plans that identify approaches to achieve water quality targets (e.g., TMDL load allocations). Pursuant to the CWA NPDES program, the RWQCB also issues permits for point-source discharges that must meet the water quality objectives and must protect the beneficial uses defined in the Basin Plan.

Antidegradation Policy

California's antidegradation policy, formally known as the Statement of Policy with Respect to Maintaining High Quality Waters in California (SWRCB Resolution No. 68-16), restricts degradation of surface water and groundwater. It protects waters where existing quality is higher than necessary for the protection of beneficial uses. Any actions with the potential to adversely affect water quality must (1) be consistent with maximum benefit to the people of the State, (2) not unreasonably affect present and anticipated beneficial use of the water, and (3) not result in water quality less than that prescribed in water quality plans and policies. Any actions that can adversely affect surface waters are also subject to the federal antidegradation policy (40 CFR Section 131.12) developed under the CWA.

Construction General Permit

The California Construction Stormwater Permit (Construction General Permit)[1], adopted by SWRCB, regulates construction activities that include clearing, grading, and excavation resulting in soil disturbance of at least 1 acre of total land area. The Construction General Permit authorizes the discharge of stormwater to surface waters from construction activities. It prohibits the discharge of materials other than stormwater and all discharges that contain a hazardous substance in excess of reportable quantities established in Title 40, Section 117.3 or 302.4 of the CFR, unless a separate NPDES permit has been issued to regulate those discharges.

The Construction General Permit requires that all developers of land where construction activities will occur over more than 1 acre do the following:

- complete a risk assessment to determine pollution prevention requirements pursuant to the three risk levels established in the General Permit,
- eliminate or reduce nonstormwater discharges to storm sewer systems and other waters of the nation,
- develop and implement a stormwater pollution prevention plan (SWPPP) that specifies BMPs that will reduce pollution in stormwater discharges to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology standards, and
- perform inspections and maintenance of all BMPs.

[1] *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities,* Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ, National Pollutant Discharge Elimination System No. CAS000002.

To obtain coverage under the NPDES Construction General Permit, the legally responsible person must electronically file all permit registration documents with SWRCB before the start of construction. Permit registration documents must include:

- Notice of Intent,
- risk assessment,
- site map,
- SWPPP,
- annual fee, and
- signed certification statement.

Typical BMPs contained in SWPPPs are designed to minimize erosion during construction, stabilize construction areas, control sediment, control pollutants from construction materials, and address postconstruction runoff quantity (volume) and quality (treatment). The SWPPP must also include a discussion of the program to inspect and maintain all BMPs.

California's Nonpoint Source Pollution Control Program

The *2020–2025 Nonpoint Source Program Implementation Plan* was prepared by SWRCB, the RWQCBs, and the California Coastal Commission, collectively, the colead agencies. The goal of this 5-year plan is to present, in one place, the general goals and objectives of the colead agencies for addressing nonpoint source pollution over the timeframe of January 2021 to June 2025. This plan was also prepared to meet CWA Section 319 requirements and to implement Section 6217 of CZARA.

California Coastal Commission goals set in the plan include ensuring that coastal development projects for which the commission is the permitting authority, and local governments' coastal planning documents (e.g., new or updated Local Coastal Programs, Long Range Development Plans, and Port Master Plans), implement appropriate management measures and BMPs to protect and restore coastal waters.

California Green Building Standards Code

Chapters 4 and 5 of the California Green Building Standards Code (CALGreen) include mandatory measures for residential and nonresidential development, respectively. Section 4.106.2 requires residential projects that disturb less than 1 acre and are not part of a larger common plan of development to manage stormwater drainage during construction through use of on-site retention basins, filtration systems where stormwater is conveyed to a public drainage system, and/or compliance with a stormwater management ordinance. Section 5.106.1 requires newly constructed nonresidential projects and additions of less than 1 acre to prevent the pollution of stormwater runoff because of construction through compliance with a local ordinance or by implementing BMPs that address soil loss and good housekeeping to manage equipment, materials, and wastes.

California Department of Transportation NPDES Permit

The California Department of Transportation (Caltrans) was originally issued a Statewide NPDES permit (Order 99-06-DWQ) in 1999, which requires Caltrans to regulate nonpoint-source discharge from its properties, facilities, and activities. The Caltrans permit requires development of a program for communication with local agencies, and coordination with other MS4 programs where those programs overlap geographically with Caltrans facilities. As part of the permit, Caltrans is required to create and annually update a Stormwater Management Plan (SWMP) that is used to outline the regulation of pollutant discharge caused by current and future construction and maintenance activities. SWMP requirements apply to discharges from Caltrans stormwater conveyances, including

catch basins and drain inlets, curbs, gutters, ditches, channels, and storm drains. The SWMP applies to discharges consisting of stormwater and nonstormwater resulting from:

- maintenance and operation of State-owned highways, freeways, and roads;
- maintenance facilities;
- other facilities with activities that have the potential for discharging pollutants;
- permanent discharges from subsurface dewatering;
- temporary dewatering; and
- construction activities.

The discharges addressed by the SWMP flow through municipal stormwater conveyance systems or flow directly to surface water bodies in the State. These surface water bodies include creeks, rivers, reservoirs, lakes, wetlands, lagoons, estuaries, bays, and the Pacific Ocean and tributaries.

This SWMP applies to the oversight of activities performed by outside agencies or non-Caltrans entities (third parties) within Caltrans' MS4 to ensure compliance with stormwater regulations. Non-Caltrans activities include highway construction and road improvement projects, as well as residential use and business operations on leased property.

The SWMP must be approved by SWRCB, and as specified in the permit, it is an enforceable document. Compliance with the permit is measured by implementation of the SWMP. Caltrans' policies, manuals, and other guidance related to stormwater are intended to facilitate implementation of the SWMP. Caltrans also requires all contractors to prepare and implement a program to control water pollution effectively during the construction of all projects., Caltrans continues to modify its policies and procedures to be consistent with the SWRCB's General Construction Permit, described above.

California Department of Transportation Highway Design Manual

The Highway Design Manual was prepared for use on the California State highway system. The manual establishes uniform policies and procedures to inform and guide Caltrans employees. Chapter 870 includes standards for bank protection and erosion control, Chapter 880 provides shore protection standards, and Chapter 890 relates to stormwater management.

California Department of Transportation Project Planning and Design Guide

The Project Planning and Design Guide provides guidance on the process and procedures for evaluating project scope and site conditions to determine the need for and feasibility of incorporating BMPs into projects within Caltrans right-of-way. It provides design guidance for incorporating those stormwater quality controls into projects during the planning and project development process. The Project Planning and Design Guide was prepared in support of the Statewide Stormwater Management Plan. The document addresses key regulatory, policy, and technical requirements by providing direction on the procedures to incorporate stormwater BMPs into the design of all Caltrans projects.

California Stormwater Quality Association Best Management Practices Handbooks

The California Stormwater Quality Association (CASQA) is a professional member association dedicated to the advancement of stormwater quality management through collaboration, education, implementation guidance, regulatory review, and scientific assessment. CASQA's membership is composed of a diverse range of stormwater quality management organizations and individuals, including cities, counties, special districts, industries, and consulting firms throughout the State. CASQA develops and publishes four BMP handbooks. The New Development and Redevelopment Handbook provides guidance on developing

project-specific SWMPs, including selection and implementation of BMPs, for a particular development or redevelopment project.

Cobey-Alquist Floodplain Management Act

The Cobey-Alquist Floodplain Management Act (California Water Code 8400–8415) and Executive Order B-39-77 give support to the NFIP. The act encourages local governments to plan, adopt, and enforce land use regulations for floodplain management in order to protect people and property from flooding hazards. It also identifies requirements that jurisdictions must meet to receive State financial assistance for flood control. Executive Order B-39-77 requires State agency compliance with good floodplain management practices.

California Fish and Game Code

The California Department of Fish and Wildlife is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the Fish and Game Code (Section 1602) requires an entity to notify the agency of any proposed activity that may substantially modify a river, stream, or lake. Notification is required by any person, business, State or local government agency, or public utility that proposes an activity that would:

- substantially divert or obstruct the natural flow of any river, stream, or lake;
- substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or
- deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

The notification requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the floodplain of a body of water.

Ocean Standards

SWRCB's ocean standards protect the beneficial uses of California's marine waters through establishing water quality objectives and implementation provisions in Statewide water quality control plans and policies. Ocean standards plans and policies include the Water Quality Control Plan for Ocean Waters of California, the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California, and the Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling.

California Ocean Plan

To protect the quality of ocean waters for use and enjoyment by the people of the State, SWRCB requires control of the discharge of waste to ocean waters and control of intake of seawater through the California Ocean Plan. The plan is reviewed at least every 3 years to guarantee that the current standards are adequate and are not allowing degradation to marine species or posing a threat to public health. This plan is applicable, in its entirety, to point source discharges to the ocean. This plan is not applicable to discharges to enclosed bays and estuaries or inland waters or the control of dredged material.

California Coastal Act

The California Coastal Act is intended to protect California's coastal resources. The California Coastal Commission works to ensure that all nonexempt development along the California coast undergoes the act's independent permit review process and secures the required Coastal Development Permit. The Coastal Commission's Water Quality Program works to integrate effective nonpoint source water quality protection measures into coastal development projects and local governments' land use planning documents, in accordance with Coastal Act requirements. In coordination with other agencies, staff also provide educational and technical assistance to address development activities that may affect coastal resources by generating polluted runoff or changes in runoff flows.

Section 30231 of the act provides for protection of coastal watersheds through implementation of management measures and BMPs, including minimizing adverse effects of discharges, controlling runoff, minimizing hydromodification and stream alterations, and maintaining natural vegetation buffers. Section 30253 provides the commission with the authority to control development that contributes to flooding, erosion, and surface alterations in and around the development site. It also gives the commission the ability to limit development activities that are sited in highly erodible areas with steep slopes and unstable soils or that accelerate the volume or rate of runoff from a site, thus affecting downstream habitats and structures.

REGIONAL AND LOCAL REGULATIONS

McAteer-Petris Act/San Francisco Bay Conservation and Development Commission

The McAteer-Petris Act is a provision under California law that preserves San Francisco Bay from indiscriminate filling. It established the San Francisco Bay Conservation and Development Commission (BCDC) as the agency charged with preparing a plan for the long-term use of the bay and regulating development in and around the bay while the plan was being prepared. The San Francisco Bay Plan, completed in January 1969, includes policies on 18 issues critical to the wise use of the bay, ranging from ports and public access to design considerations and weather. The McAteer-Petris Act authorizes BCDC to incorporate the policies of the bay plan into State law. The bay plan has two features: policies to guide future uses of the bay and shoreline, and maps that apply these policies to the bay and shoreline.

Bay Area Stormwater Management Agencies Association

The Bay Area Stormwater Management Agencies Association (BASMAA) is a consortium of the following nine San Francisco Bay Area municipal stormwater programs: Alameda Countywide Clean Water Program, Contra Costa Clean Water Program, Fairfield-Suisun Urban Runoff Management Program, Marin County Stormwater Pollution Prevention Program, Napa Countywide Stormwater Pollution Prevention Program, San Mateo Countywide Water Pollution Prevention Program, Santa Clara Valley Urban Runoff Pollution Prevention Program, Sonoma County Water Agency, and Vallejo Sanitation and Flood Control District. BASMAA was started in an effort to promote regional consistency and to facilitate efficient use of public resources. BASMAA has prepared *BASMAA Post-Construction Manual Design Guidance for Stormwater Treatment and Control for Projects in Marin, Sonoma, Napa, and Solano Counties* (BASMAA 2014), which is a LID approach to implementing Provision E.12 of the Phase II Small MS4 General Permit.

Flood Planning

Many agencies in the region have performed some level of flood planning. The city of Napa has a system of road closures based on the stage of the Napa River that reduces the risk to individuals and property in the event of flooding. The Contra Costa Resource Conservation District has a watershed

management plan for Alhambra Creek that discusses a myriad of options to reduce the risk of flooding in Martinez and surrounding areas. The Bay Area Flood Protection Agencies Association is a consortium of flood control and water agencies in the region that provides a forum for discussing flood issues, collaborating on multiagency projects, and sharing resources.

All local jurisdictions regulate development within floodplains. Construction standards are established within local ordinances and planning elements to reduce flood impedance, safety risks, and property damage.

Dam Inundation

Counties are required by State regulation to map potential dam inundation areas and prepare emergency plans and procedures for preparing for and responding to a dam breach as part of their multihazard mitigation plans (Title 19 CCR Section 2575). Additionally, the Federal Energy Regulatory Commission is required to approve local emergency action plans for dams with the potential to cause massive damage. Emergency action plans outline notification procedures for people and property owners within a potential inundation area. Because of the large number of dams within the Plan area, many of the proposed development areas would likely be located within one or more inundation areas. There is no policy or regulatory requirement restricting development within potential dam inundation areas largely because of the continued maintenance and oversight, which results in a relatively low risk for damage or injury.

City and County General Plans

Of the seven required general plan elements, the conservation, open space, and safety elements are the most relevant to hydrology and water quality. The conservation element typically addresses watershed protection; land or water reclamation; prevention or control of the pollution of streams and other coastal waters; and regulation of land uses along stream channels and in other areas required to implement the conservation plan (e.g., buffer areas), control or correct soil erosion, and provide flood control. The open space element applies to the preservation of natural resources, including fish and wildlife habitat, rivers, streams, bays and estuaries, and open space. The safety element applies to the potential risk of death, injuries, property damage, and economic and social dislocation resulting from floods and other hazards.

Government Code Section 65302, as amended, requires that on or after January 1, 2009, the updated safety elements of general plans must incorporate significantly enhanced geographic data, goals, and policies related to flood hazards. This enhanced assessment of flood hazards must include flood mapping information from multiple agencies including FEMA, USACE the Office of Emergency Services, DWR, and any applicable regional dam, levee, or flood protection agencies; historical data on flooding; an inventory of existing and planned development (including transportation infrastructure) in flood zones; and new policies that comprehensively address existing and future flood risk in the planning area.

3.10.3 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the Plan Bay Area 2040 EIR (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality (Criterion HYDRO-1);
- substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin (Criterion HYDRO-2);
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or off-site, or provide substantial additional sources of polluted runoff (Criterion HYDRO-3);
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site (Criterion HYDRO-4);
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows (Criterion HYDRO-5); or
- in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation (Criterion HYDRO-6).

METHOD OF ANALYSIS

This program-level EIR evaluates potential impacts on water resources based on the location of the proposed Plan's footprint associated with the forecasted development pattern (i.e., the land use growth footprint), sea level rise adaptation infrastructure (i.e., sea level rise adaptation footprint), and transportation projects (i.e., transportation system footprint) relative to the known distribution of water resources throughout the Bay Area. Quantitative results are presented for the region (i.e., the entire footprint, often summarized by county) and for the portions of the land use growth footprint specifically within transit priority areas (TPAs). TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county.

The baseline for the following analysis is the NOP, released in September 2020. The analysis compares the general location of the projected land use development pattern, sea level rise adaptation infrastructure, and transportation project to existing resources, such as 303(d)-listed water bodies, groundwater basins, flood hazard areas, levees, dam inundation areas, and seiche zones, and describes how the subsequent projects would be subject to existing federal, State, and local laws, regulations, and plans that are in place to avoid adverse changes in existing hydrology and avoid or substantially lessen contaminants within stormwater and nonstormwater flows and within surface waters and groundwaters in the Plan area.

For this impact assessment, a geographic information system (GIS) was used to digitally overlay the proposed Plan's footprints associated with forecasted land use development, sea level rise adaptation infrastructure, and transportation projects over resource-related data. See Section 3.1, "Approach to the Analysis," for additional details regarding the GIS modeling for this analysis.

Effects on area hydrology could occur where projects substantially alter stormwater drainage, groundwater recharge, or potential for flooding. Effects on water quality could result from increases in erosion and other non-point-source pollutants at levels exceeding established regulatory thresholds. This evaluation of hydrology and water quality impacts assumes that construction and development under the proposed Plan would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts. For additional information on analysis methodology, refer to Section 3.1.3, "General Methodology and Assumptions."

IMPACTS AND MITIGATION MEASURES

Impact HYDRO-1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality (LTS)

As described in Chapter 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.7 million residents and 1.4 million jobs, resulting in 1.4 million new households. The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that would result in focused housing and job growth concentrated primarily in or adjacent to already developed areas and along existing transit corridors. Implementation of the proposed Plan would include transportation projects that would maintain and optimize the existing transportation system, create healthy and safe streets, and build a next-generation transit network. Sea level rise adaptation infrastructure could result in the construction of levees, seawalls, elevated roadways, marsh restoration projects, and tidal gates.

Land Use Impacts

Construction

Accommodation of anticipated growth in the Plan area would require construction and operation of new residential units and employment centers. Construction would result in ground disturbance that can result in erosion and sedimentation with potential to adversely affect water quality. Development activities associated with implementation of the proposed Plan would also temporarily increase the use of potentially hazardous materials and petroleum products commonly used in construction (e.g., diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals), as evaluated in Section 3.9, "Hazards and Wildfire." Following construction, common urban pollutants associated with sustained, expanded use of household hazardous materials, herbicides and pesticides, and erosion from soil disturbance could be transported in runoff and potentially adversely affect the quality of receiving surface waters or groundwater.

The following provides an analysis of the potential for implementation of the Plan to result in degradation of surface water and groundwater quality, including the potential to conflict with or obstruct implementation of a water quality control plan. The discussion is focused on potential adverse effects on surface water quality associated with discharge to waters listed under Section 303(d) of the CWA. The potential water quality implications of drainage pattern alterations and construction activities are also analyzed in Impacts HYDRO-3 (with respect to erosion) and HYDRO-4 (with respect to rates and amounts of urban runoff caused by an increase in the extent of impervious surfaces).

The Section 402 NPDES MS4 Phase I and Phase II permits required under the CWA, which cover all jurisdictions, as well as large institutional users (as further described in the State regulatory setting discussion, above), require agencies and developments to implement SWMPs, which in turn require the implementation of source and treatment control measures. Section 402 NPDES Construction General permits require project proponents to incorporate general site design control measures into project design. These control measures may include conserving natural areas, protecting slopes and channels, and minimizing impervious areas. Treatment control measures may include use of vegetated swales and buffers, grass median strips, detention basins, wet ponds, or constructed wetlands, infiltration basins, and other measures. Filtration systems may be either mechanical (e.g., oil/water separators) or natural (e.g., bioswales and settlement ponds). Selection and implementation of these measures would occur on a project-by-project basis depending on project size and stormwater treatment needs. NPDES MS4 permittees are also required to develop and enforce ordinances and regulations to reduce the discharge of sediments and other pollutants in runoff and must verify compliance. NPDES Construction General permittees are also required to develop a SWPPP for each site that identifies BMPs to reduce potential construction impacts.

The construction contractor's Qualified SWPPP Developer would prepare the SWPPP, which would identify stormwater BMPs that minimize erosion and sedimentation that may result from temporary changes in drainage patterns, including BMPs for temporary drainage systems and temporary stream diversion and dewatering. All Qualified SWPPP Developers must be trained to ensure that SWPPPs are prepared according to the requirements of the permit. The construction contractor's Qualified SWPPP Practitioner would be responsible for implementing the SWPPP. As part of that responsibility, the effectiveness of construction BMPs would be monitored before, during, and after storm events. Records of these inspections and monitoring results would be submitted to the RWQCBs as part of the annual report required by the permit.

In addition, all projects, including those that would disturb less than 1 acre, would be subject to the CALGreen requirements related to stormwater drainage that have been designed to prevent or reduce discharges of sediments, chemicals, and wastes through BMPs that include on-site retention and filtration. Smaller projects may also be subject to additional requirements, which vary by local jurisdiction. In many cases, stormwater drainage measures and compliance with RWQCB Municipal Regional Stormwater Permit Order No. 2011-0083 Provision C.3 may be required by local jurisdictions as standard conditions of approval for building permit applications.

Typical BMPs used to meet regulatory standards, as required by CALGreen, are described below. These measures protect surface water and groundwater quality by removing or substantially lessening the amount of pollutants that flow off-site and into surface water or groundwater.

As noted under Mitigation Measure AQ-2 in in Section 3.4, "Air Quality," there are several construction best practices for addressing entrained dust. Some of these include the following (see Section 3.4 for a full list):

- Water all exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) two times per day. For projects over 5 acres in size, soil moisture should be maintained at a minimum of 12 percent. Moisture content can be verified by lab samples or a moisture probe.
- Cover all haul trucks transporting soil, sand, or other loose material off-site.
- Cover on-site dirt piles or other stockpiled particulate matter, install wind breaks, and employ water and/or soil stabilizers to reduce wind-blown dust emissions. The use of approved nontoxic

soil stabilizers shall be incorporated according to manufacturers' specifications to all inactive construction areas.

- Limit all vehicle speeds on unpaved roads and surfaces to 15 mph.
- Complete all roadway, driveway, and sidewalk paving as soon as possible. Building pads shall be paved as soon as possible after grading.
- Limit the simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- Operate all transfer processes involving a free fall of soil or other particulate matter in such a manner as to minimize the free fall distance and fugitive dust emissions.
- Wash off all trucks and equipment, including their tires, before they leave the site.
- Plant vegetative ground cover (e.g., fast-germinating native grass seed) in disturbed areas as soon as possible, and water it appropriately until vegetation is established.
- Store hazardous materials used on the construction sites, such as fuels and solvents, in covered containers that are protected from rainfall, runoff, and vandalism.

Construction activities associated with the proposed Plan would not substantially degrade water quality in violation of water quality standards. The impact would be less than significant (LTS) because future construction associated with land use development would adhere to existing regulations and would operate under the oversight of applicable regulatory agencies. Through these actions, it is anticipated that growth would occur without resulting in a violation of water quality standards.

Operation

As noted above, implementation of the proposed Plan would result in the operation of new residential units and employment opportunities. Following construction, common urban pollutants associated with sustained, expanded use of household hazardous materials, herbicides and pesticides, and erosion from soil disturbance could be transported in runoff and potentially adversely affect the quality of receiving surface waters or groundwater.

The following BMPs typically are used during operation:

- Design roadway and parking lot drainage to run through grass median strips that are contoured to provide adequate storage capacity and to provide overland flow, detention, and infiltration before runoff reaches culverts or detention basins. Oil and sediment separators or absorbent filter systems may also be installed within the storm drainage system to provide filtration of stormwater before discharge to reduce the potential for water quality impacts.
- Use integrated pest management techniques (i.e., methods that minimize the use of potentially hazardous chemicals) in landscaped areas.
- Handle, store, and apply potentially hazardous chemicals in accordance with all applicable laws and regulations.
- Implement an erosion control and revegetation program designed to allow reestablishment of native vegetation on slopes in undeveloped areas as part of the long-term sediment control plan.

- Use alternative discharge options (e.g., constructed wetland, infiltration basin, bioretention) to protect sensitive fish and wildlife populations in areas where habitat for fish and other wildlife would be threatened by facility discharge.

Under Section 303(d) of the CWA, states evaluate water quality–related data and information to develop a list of waters that do not meet established water quality standards (referred to as "impaired") and develop a TMDL for every pollutant/water body combination on the list. This includes the development of a loading capacity that is allocated among various point sources and nonpoint sources. As discussed above, the San Francisco Bay RWQCB has identified nearly 350 listings for approximately 130 water bodies that are classified as impaired under Section 303(d) of the CWA. Standards have been developed for approximately 120 of these listings. Water quality constituents addressed through existing TMDLs include mercury and sediment loading.

Permits for discharge from point sources are issued through the NPDES program. In addition, several jurisdictions in the Plan area have adopted BMPs and ordinances that address runoff resulting from new development. Where TMDLs have been established, compliance with the standards (which is required through the NPDES permitting process) would substantially address the potential to contribute to existing pollution. Therefore, projects associated with forecasted land use development would not be expected to contribute to violations of water quality standards.

As noted above under "Method of Analysis," this evaluation assumes that construction and development under the proposed Plan would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist to protect water quality that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, including adopted regulatory provisions of Basin Plans. As described above, consistency with these plans would be determined at the project level and enforced through the permitting process. There is no attribute of the proposed Plan that would obstruct the implementation of this process. The proposed Plan would provide a guiding vision and strategy for the manner in which the region could accommodate growth but would not supplant established regional plans for the protection of water quality and water supply. Individual projects would be required to demonstrate compliance with the applicable water quality or groundwater management plan in place at the time of the application through the permitting process.

Regional growth and land use changes associated with the proposed Plan would not substantially degrade water quality in violation of water quality standards. The impact would be less than significant (LTS) because future projects associated with land use development would adhere to existing regulations and would operate under the oversight of applicable regulatory agencies. Through these actions, it is anticipated that growth would occur without resulting in a violation of water quality standards.

Sea Level Rise Adaptation Impacts

Construction

The proposed Plan includes sea level rise adaptation infrastructure to protect communities that are in regularly inundated shoreline areas that may be affected by sea level rise. The implementation of this adaptation infrastructure would result in construction of a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. Similar to the construction effects described above for the land use impacts, this adaptation infrastructure could result in temporary construction that could result in release of sediment and other pollutants that can degrade water quality.

These potential impacts would be addressed through compliance with NPDES Construction General Permits and implementation of a SWPPP that identifies BMPs to reduce potential construction impacts, as described above. In addition to the standard erosion control measures listed above, in-water work could include excavation during low tide and use of floating containment berms to limit the potential for sediment entrainment and transport. Because the NPDES permitting process requires compliance with TMDLs for 303(d)-listed waters, construction of infrastructure in accordance with these permits would not be expected to contribute to violations of water quality standards. Further, individual projects would be required to demonstrate compliance with the applicable water quality or groundwater management plan in place at the time of the application through the permitting process. Therefore, although these types of projects are more frequently in proximity of, or in direct contact with, surface water than other projects included in the Plan, potential effects on water quality would be addressed through compliance with applicable regulations described above.

In addition, Section 404 of the CWA establishes a permit program, administered by USACE, to regulate discharge of dredged or fill materials into waters of the United States. Levees, road modifications, and other sea level rise adaptation infrastructure projects would be subject to this permit. Projects within the San Francisco Bay would be completed under the oversight of BCDC and the requirement of Section 66605 of the McAteer-Petris Act that Bay fill for a project be the minimum necessary to achieve the purpose of the fill. These regulations, which are related to dredging and fill of waterways, provide additional regulatory framework to address the potential for construction to disturb the sediments in a manner that substantially degrades water quality. Therefore, construction of sea level rise adaptation infrastructure associated with the proposed Plan would be less than significant (LTS).

Operation

Once constructed, the adaptation infrastructure would not substantially degrade water quality, such as by violating water quality standards or waste discharge requirements. Levees, sea walls, and wetland restoration projects would not be expected to release pollutants or cause erosion that would contribute to degradation of surface water or groundwater quality. Further, levees with native plants and wetland restoration projects could increase filtration of polluted or contaminated waters. Elevation of roadways and bridges to adapt to sea level rise also would not be expected to adversely alter the quality of runoff and its potential for effects on surface water or groundwater quality. The impact would be less than significant (LTS) because the sea level rise adaptation infrastructure would adhere to existing regulations.

Transportation System Impacts

Construction and Operation

Transportation projects would include a variety of improvements, such as new express lanes, auxiliary lanes, roadway widening, increased transit service, and other maintenance and rehabilitation projects, as well as new rail projects that would increase the amount of impervious surface in the region. Transportation projects would require drainage control measures similar to those described above for land use projects. New impervious surfaces required for roadways or rail infrastructure could have minor effects on the receiving waters, water that filters into the ground, and groundwater basins, all of which could be affected by pollutants in the runoff from proposed future projects.

As discussed above for land use and growth under the Plan, specific regulations, such as the statewide Construction General Permit, are in place to substantially reduce the effects of construction activities on receiving waters. Transportation projects that fall under Caltrans jurisdiction would be covered by the Caltrans NPDES Stormwater Program. As described in Section 3.10.2, “Regulatory Setting,” above,

this NPDES permit regulates all stormwater discharges from Caltrans-owned conveyances, maintenance facilities, and construction activities. Caltrans also has a Statewide SWMP (Caltrans 2016) that describes the procedures and practices used to reduce or eliminate the discharge of pollutants to storm drainage systems and receiving waters. Guidance documents have also been developed by Caltrans to implement stormwater BMPs in the design, construction, and maintenance of highway facilities. The need for, and design of, BMPs would be dictated by the project-level SWPPP and the presence of surrounding sensitive resources. During the SWPPP development process, BMPs intended to reduce erosion and subsequent sediment transport, such as silt fencing, fiber rolls, sandbag barriers, and slope stabilization, would be identified to substantially reduce or eliminate the discharge of pollutants into receiving waters, including 303(d)-listed water bodies. During operations and maintenance of planned transportation improvements, operational BMPs would prevent substantial water quality degradation in compliance with applicable stormwater runoff discharge permits. Operation-phase BMPs would be evaluated during the development of drainage designs and would consider factors such as permanent stabilization of disturbed soil and natural stormwater quality treatment. Planned transportation improvements where local agencies are the lead agency would be subject to local and State regulations for runoff prevention.

Additionally, Attachment G of the Phase II MS4 permit requires all permittees in the jurisdiction of the San Francisco Bay RWQCB to develop and implement integrated pest management (IPM) policies to prevent the impairment of streams by pesticide-related toxicity from vegetation management conducted in or near aquatic resources. The IPM policies would regulate the use of the following pesticides of concern: organophosphorous pesticides (chlorpyrifos, diazinon, and malathion), pyrethroid pesticides (bifenthrin, cyfluthrin, betacyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambdacyhalothrin, permethrin, and tralomethrin), carbamates (e.g., carbaryl), and fipronil. The IPM policies would require all employees and landscape contractors involved in the application or use of pesticides to be trained in IPM practices. The implementing agencies would be required to track the use of pesticides of concern by employees and contractors and report use information to the San Francisco Bay RWQCB when requested.

The regulatory requirements outlined above would require treatment of runoff to substantially reduce or eliminate the discharge of pollutants to storm drain systems and receiving waters. For projects that discharge to 303(d)-listed impaired water bodies, compliance with established TMDLs that target the removal of the pollutants causing the impairment would be required. Impacts would be less than significant (LTS) because construction and operation of transportation projects would require adherence to existing regulations and would be operated under the oversight of applicable regulatory agencies. Implementation of transportation network improvements and programs associated with the proposed Plan would not substantially degrade water quality in violation of applicable water quality standards.

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would have a **less-than-significant (LTS)** impact because existing federal, State, and local regulations and oversight are in place to specify mandatory actions that must occur during project development, which would adequately address potential for construction or operation of projects to result in violation of water quality standards or waste or stormwater discharge requirements. No mitigation is required.

Mitigation Measures

None required.

Impact HYDRO-2: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin (LTS)

Land Use Impacts

Construction and Operation

As described in Chapter 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.7 million residents and 1.4 million jobs, resulting in 1.4 million new households. The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that result in focused housing and job growth concentrated primarily in or adjacent to already developed areas and along existing transit corridors. The forecasted growth pattern is a result of existing zoning and other land use policies, the regional growth forecast, and the proposed Plan's growth geographies and land use strategies. As summarized in **Table 2-5**, urbanization—growth on land not designated as urban built-up land as defined by the California Department of Conservation through the Farmland Mapping and Monitoring Program (FMMP)—is forecasted to occur on approximately 12,300 acres, or 31 percent of the land use growth footprint. The remaining 69 percent of the land use growth footprint would be within land designated as urban built-up—which the FMMP defines as "land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel"—reflective of the proposed Plan's core-focused growth strategy to leverage existing infrastructure.

The following analysis addresses the potential for the proposed Plan to draw groundwater at a rate that outpaces recharge or results in development that would inhibit recharge such that the project would be in conflict with plans to manage groundwater in a sustainable fashion. The capacity for water purveyors to provide adequate water supply to meet water demand associated with anticipated development is analyzed in Section 3.14, "Public Utilities and Facilities."

Urbanized portions of the Plan area depend upon a combination of surface water, groundwater, recycled water, and water conservation to provide water supplies for existing and planned residents and businesses. Groundwater pumping typically increases during dry years and is less in wet years, when surface water supplies are more available. Groundwater supplies are decreased when use outpaces recharge. SGMA provides a regulatory framework for the management and use of groundwater in a manner that can be maintained without causing undesirable results. Under this act, undesirable results are defined as the chronic lowering of the groundwater table, reduction of storage capacity, intrusion of seawater, degradation of groundwater quality, subsidence of land, and depletions of interconnected surface water; these conditions must be both significant and unreasonable to be considered an undesirable result.

As discussed above, SGMA requires the formation of GSAs to manage local groundwater basins; this includes the development of GSPs by 2022. Groundwater basins throughout much of the Plan area, including TPAs where development could occur, have been classified as high- or medium-priority basins under SGMA (see **Figure 3.10-4**). Under SGMA, agencies high- and medium-priority basins are required to be managed to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. As noted above, GSPs have not been submitted to DWR for most of these basins (see **Table 3.10-4**).

Urban development could interfere with groundwater recharge by creating additional impervious surfaces that interfere with infiltration of precipitation, which can result in decreased groundwater supplies. Most (69 percent) of the forecast growth would occur in areas that are already developed.

Concentrating development within urban cores, as proposed by the Plan, could reduce the groundwater recharge effects.

Infiltration rates can vary and largely depend on the characteristics of the exposed overlying soils and vegetation. In general, sandy soils have higher infiltration rates and can contribute to groundwater recharge; clay soils tend to have lower percolation potentials; and impervious surfaces, such as pavement, substantially reduce infiltration capacity. Regional development associated with implementation of the proposed Plan may result in the addition of new impervious surface areas, which may interfere with infiltration of precipitation. This can result in localized lowering of the groundwater table.

Table 3.10-5 summarizes the acreage of the land use growth footprint within groundwater basins, by county. The proposed Plan would guide the forecasted land use development pattern away from undeveloped locations that may be well suited to facilitating groundwater recharge, and this total acreage of potential development is largely within developed areas that may currently include impervious surfaces. In addition, extensive storm drainage systems present in these areas currently intercept rainfall and runoff waters, thus limiting the amount of groundwater recharge that occurs. These basins are generally large (see **Table 3.10-2**), and the land use growth footprint where development is expected to increase the extent of impervious surfaces is generally a small portion of the basin.

Table 3.10-5: Acreage of Land Use Growth Footprint within Groundwater Basins

County		Total (acres)
Alameda	County Total	6,500
	Within TPAs	3,300
Contra Costa	County Total	6,300
	Within TPAs	1,100
Marin	County Total	570
	Within TPAs	190
Napa	County Total	730
	Within TPAs	60
San Francisco	County Total	3,300
	Within TPAs	2,700
San Mateo	County Total	2,400
	Within TPAs	1,300
Santa Clara	County Total	8,500
	Within TPAs	5,300
Solano	County Total	3,700
	Within TPAs	140
Sonoma	County Total	1,800
	Within TPAs	260
Regional Total	County Total	33,800
	Within TPAs	14,200

Notes: TPA acreages are a subset of county acreages. Whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: MTC/ABAG 2021; DWR 2019c

As new development and redevelopment occurs, on-site drainage plans would be designed to retain, capture, and convey increased runoff in accordance with the city or county design standards (e.g., Alameda Countywide Clean Water Program, Contra Costa Clean Water Program, Santa Clara Clean Water Program) and State requirements, such as Provision C.3 site control features. These standards and regulations generally require or encourage the use of LID features, such as vegetated swales, permeable paving, landscaping used for infiltration, and other measures that would retain runoff as much as possible and allow for on-site infiltration.

Land development projects could increase the total amount of impervious surfaces in the region by as much as 12,300 acres and, as a result, redirect precipitation that might otherwise recharge groundwater. However, existing regulatory requirements at the local, State, and federal level include measures to minimize any increases in off-site stormwater runoff by encouraging on-site infiltration, which should effectively minimize the potential reduction in groundwater recharge to an acceptable level. Activities would be implemented under California regulations governing use of groundwater, including the SGMA, as well as groundwater provisions of applicable local general plans. Taken as a whole, these regulations are intended to reduce groundwater use and subsequent overdraft of groundwater basins. Further, as discussed above under Impact HYDRO-1, Provision C.3 of the NPDES program and CALGreen require new development to incorporate LID strategies, including on-site infiltration, as initial stormwater management strategies.

The land use strategy described in the proposed Plan would accommodate growth forecasted in the Plan area and would not directly increase the potential for growth, associated development, and groundwater demand. Further, by promoting infill development, the proposed Plan would minimize the potential for new impervious surfaces that could impede groundwater recharge. The type of development envisioned under this plan would be served by water purveyors that manage water supplies and generally would not use individual groundwater wells. Any “water demand project,” as defined by Section 15155 of the State CEQA Guidelines, requires preparation of a water supply assessment that must be prepared by the governing body of a public water system, or the city or county lead agency, pursuant to and in compliance with Sections 10910–10915 of the Water Code. Further, as described above, the medium- and high-priority basins in the Plan area are developing GSPs or have submitted alternative plans to comply with SGMA and manage groundwater to conserve supplies. The GSPs are required to provide mechanisms that allow the sustainable use of groundwater, with growth projections considered. Therefore, the regional impacts of implementation of the Plan on sustainable groundwater management would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

Construction

The proposed Plan includes environmental strategy EN1, “Adapt to Sea Level Rise,” to protect shoreline communities affected by sea level rise. This would be achieved through a series of adaptation archetypes. Sea level rise adaptation infrastructure is primarily planned in Alameda, Marin, Santa Clara, San Mateo, and Solano Counties. In total, the sea level rise adaptation footprint is 5,500 acres.

The Plan would address sea level rise adaptation through construction of structural barriers, such as levees and sea walls; restoration projects; and elevation of key infrastructure. Levees and wetland restoration projects would not impair groundwater recharge. Where projects would result in impermeable surfaces, they would be relatively small footprints and may largely replace existing structures (e.g., elevation of existing roadways). Therefore, these modifications would not substantially decrease groundwater supplies or interfere with groundwater recharge in a manner that may impede sustainable groundwater management. The impact would be less than significant (LTS).

Operation

Implementation of sea level rise adaptation infrastructure is not anticipated to result in new impervious surfaces that impede infiltration and would be unlikely to require groundwater pumping during operation. Installation of sea walls and other barriers can alter the hydrogeology and potential exchange of surface water and groundwater, particularly in areas that are underlain with Bay mud, a thick and impermeable clay that underlies the San Francisco Bay. This could restrict intermixing of the Bay water and groundwater at the local scale, potentially improving groundwater quality in the vicinity of the barrier, but would not be expected to alter groundwater quality of the basin overall. Therefore, these modifications would not substantially decrease groundwater supplies or interfere with groundwater recharge in a manner that may impede sustainable groundwater management. The impact would be less than significant (LTS).

Transportation System Impacts

Construction and Operation

As stated in Impact HYDRO-1, the proposed transportation projects may result in some increases in the extent of impervious surfaces. **Table 3.10-6** provides the total acreage of groundwater basins potentially affected by the proposed transportation projects, by county. Many of the proposed transportation facilities would be located on or adjacent to existing highways, streets, and roads. Extensive storm drainage systems present in these areas currently intercept rainfall and runoff waters, thus limiting the amount of groundwater recharge that occurs. Local agency standards (e.g., Alameda Countywide Clean Water Program, Contra Costa Clean Water Program, Santa Clara Clean Water Program, as well as any City drainage control requirements) and Caltrans standards, combined with State and federal regulations and BMPs, require drainage studies for transportation projects. These studies address drainage issues, including incorporation of infiltration systems where appropriate to limit off-site runoff volumes. New impervious surfaces required for roadways or rail infrastructure would have limited potential to interfere with groundwater recharge. As discussed above for land use impacts, established regulations encourage the use of design features that manage increased runoff in a manner that does not impair basin recharge. As a result, transportation projects, which are often linear, generally do not result in a substantial effect on any one groundwater basin.

Table 3.10-6: Acreage of Transportation Projects Footprint within Groundwater Basins

County	Total (acres)
Alameda	2,500
Contra Costa	1,100
Marin	100
Napa	90
San Francisco	550
San Mateo	1,600
Santa Clara	4,500
Solano	1,100
Sonoma	120
Regional Total	11,700

Notes: Whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: MTC/ABAG 2021; DWR 2019c

Many of the planned transportation projects, such as the addition of new lanes to a roadway or highway, would result in relatively small increases in the extent of impervious surfaces in areas that already include extensive storm drainage systems that intercept rainfall and runoff waters. On-site drainage plans for new features would be designed to retain, capture, and convey runoff in accordance with the city or county design standards, where applicable, and federal and State requirements. Depending on site features, BMPs that improve stormwater quality and promote groundwater recharge, such as stormwater collection basins and vegetated swales that promote on-site infiltration, may be incorporated into project designs. These projects would also be unlikely to require groundwater pumping during operation. The impacts of the planned transportation improvements would be less than significant (LTS).

Conclusion

Implementation of the proposed Plan's forecasted land use development pattern, sea level rise adaptation infrastructure, and transportation projects could increase the total amount of impervious surfaces in the region and, as a result, redirect precipitation that might otherwise recharge groundwater. However, existing regulatory requirements at the local, State, and federal level include measures to minimize any increases in off-site stormwater runoff by encouraging on-site infiltration, which would effectively minimize the potential reduction in groundwater recharge to an acceptable level. Therefore, the proposed Plan would have a **less–than-significant (LTS)** impact.

Mitigation Measures

None required.

Impact HYDRO-3: Substantially alter existing drainage patterns, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion, siltation, or additional sources of polluted runoff (LTS)

Land Use Impacts

Construction

Land development that occurs to accommodate forecast population in the Plan area would have the potential to alter existing drainage patterns. Existing regulations establish permitting and oversight responsibilities for federal, State, and local agencies that are intended to ensure that such alteration does not substantially alter the existing drainage pattern of the site or area in a manner that would result in substantial erosion, siltation, or polluted runoff. State and federal agencies (including EPA, SWRCB, and RWQCBs) have established basin plans, water quality standards, and waste discharge requirements to prevent the degradation of water quality pursuant to the CWA.

Construction and grading activities associated with development of the proposed Plan could require temporary disturbance of underlying soils through excavation, soil stockpiling, boring, and grading activities that strip existing vegetation or pavement before commencing with construction of proposed improvements. These activities could result in exposure of soil to runoff, potentially causing erosion and entrainment of sediment and contaminants in the runoff. The extent of the impacts is dependent on soil erosion potential, type of construction practice, extent of disturbed area, timing of precipitation events, and topography and proximity to drainage channels. If precautions are not taken to contain sediments, construction activities could produce substantial pollutants in stormwater runoff.

Erosion and sedimentation in the watershed as a result of urban development generally are controlled through compliance with applicable NPDES permits and local drainage and erosion design and standards. All development within the region that would disturb 1 acre or more would be required to prepare and implement a SWPPP, in accordance with the NPDES Construction General Permit. The SWPPP would include BMP erosion control measures, such as those listed in the discussion of HYDRO-1, above. Projects that would disturb less than 1 acre would be subject to the CALGreen requirements related to stormwater drainage that have been designed to prevent or reduce discharges of sediments through BMPs that include on-site retention and filtration. Generally, earthwork and ground-disturbing activities also require a grading permit, compliance with which minimizes erosion, and local grading ordinances ensure that construction practices include measures to protect exposed soils. Additional reports, such as a soil engineering report, engineering geology report, or plans and specifications for grading, may be required by local building or engineering departments, depending on the proposal. The application, plans, and specifications (if any) would be checked by the appropriate building official or engineer and may be reviewed by other departments of the county or city to ensure compliance with the laws and ordinances under their jurisdiction. Earthwork recommendations for improved erosion controls, based on site conditions, would be incorporated into the project construction documents. For further discussion of the potential for direct impacts related to erosion, refer to Section 3.8, "Geology, Seismicity, and Mineral Resources."

Development near the coast would be subject to the California Coastal Commission's Coastal Development Permit under the California Coastal Act. This permitting process would impose specific management measures and BMPs for protection of coastal watersheds and provides the commission with authority to control development that contributes to erosion. It also gives the commission the ability to limit development activities that are sited in highly erodible areas with steep slopes and unstable soils or that accelerate the volume or rate of runoff from a site in a manner that would affect downstream habitats and structures. Future development would be required to incorporate BMPs and LID stormwater management principles. In accordance with federal, State, and local stormwater management regulations, new construction must maintain preproject hydrology, incorporate proper pollutant source controls, and treat stormwater runoff through BMPs when source control or exposure protection are insufficient for reducing runoff pollutant loads. Therefore, construction impacts associated with the implementation of the proposed Plan's forecasted land use development pattern that could result in additional runoff would be less than significant (LTS).

Operation

Common urban pollutants (e.g., petroleum hydrocarbons, lubricants, herbicides and pesticides, sediments, and metals [generated by the wear of automobile parts]) could be transported in runoff and washed by rainwater from rooftops and landscaped areas into local drainage networks, potentially adversely affecting the quality of receiving surface waters or groundwater. Managed landscaping areas in the region could provide a source of nutrients, weed abatement herbicides, and irrigation runoff. Contributions of these contaminants and other common urban pollutants to stormwater and nonstormwater runoff could degrade the quality of receiving waters (surface water and groundwater) if they are not properly managed. During the dry season, vehicle use and other urban activities release contaminants on impervious surfaces and in landscaped areas, where they can accumulate until the first storm event. During this initial storm event, or first flush, the concentrated pollutants can be transported via runoff to stormwater drainage systems. Contaminants can also be released during the dry season as a result of overirrigation and other urban water uses (e.g., car washing, hosing down paved surfaces). Runoff during storm events and nonstormwater flows (e.g., overirrigation) can transport contaminants into stormwater drainage systems that discharge into rivers, agricultural ditches, sloughs, and channels and ultimately could

degrade the water quality of any of these water bodies. Contaminated runoff can also infiltrate into groundwater basins and negatively affect groundwater quality.

Local and State regulations would require developments to apply BMPs, implement control measures, adhere to NPDES permit requirements, and comply with local drainage standards. Drainage plans would be consistent with the San Francisco Bay RWQCB MS4 NPDES permit or any applicable local drainage control requirements that exceed or reasonably replace any of these measures to protect receiving waters from pollutants. In addition, NPDES Provision C.3 requirements include postconstruction drainage control requirements that address the volume of off-site flows, which can be effective in reducing sedimentation effects on downstream receiving waters. Project proponents are required to plan, design, and develop sites to (1) protect areas that provide important water quality benefits necessary to maintain riparian and aquatic biota and/or are particularly susceptible to erosion and sediment loss; (2) limit increases in the extent of impervious areas; (3) limit land disturbance activities, such as clearing and grading, and cut-and-fill to reduce erosion and sediment loss; (4) limit disturbance of natural drainage features and vegetation; and (5) reduce erosion and, to the extent practicable, retain sediment on-site during and after construction.

Under Provision C.3, the San Francisco Bay RWQCB requires appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges. In some cases, adherence to NPDES Provision C.3 requirements may result in improved retention of stormwater rates and volumes, compared to existing conditions, through implementation of LID drainage control measures. LID features include creating bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. These features result in a corresponding reduction of the potential for stormwater pollution. The LID approach to stormwater management overlaps with NPDES site control measures that include conserving natural areas, protecting slopes and channels, and minimizing impervious areas. Projects would also generally comply with the design guidelines established in the *Stormwater Best Management Practice Handbook: New Development and Redevelopment* (CASQA 2003) to minimize increases in the amount of pollutants entering the storm drain system.

The proposed Plan would result in new development and redevelopment that would have the potential to disturb underlying soils and result in changes to existing drainage patterns. Although there is potential for the forecasted land use development pattern to cause or contribute to a long-term increase in discharges of urban contaminants into the stormwater drainage system compared to existing conditions, subsequent projects would be required to incorporate BMPs and LID stormwater management principles. In accordance with federal, State, and local stormwater management regulations, new development must maintain preproject hydrology, incorporate proper pollutant source controls, and treat stormwater runoff through BMPs when source control or exposure protection are insufficient for reducing runoff pollutant loads. Therefore, impacts associated with the implementation of the proposed Plan's forecasted land use development pattern that could result in additional runoff would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

Construction

As described above, the sea level rise adaptation infrastructure would protect communities and infrastructure from sea level rise through a strategy that employs a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. Construction of the sea level rise infrastructure could result in short-term hydromodification and expose soils to erosion. As described above for the land

use development, existing permitting requirements for land disturbance would address the potential for erosion and siltation during construction. As described in Section 3.9, "Hazards and Wildfire," use of hazardous materials during construction of the sea level rise adaptation infrastructure is not expected to require use of potentially hazardous materials that would create a substantial hazard or potential for substantial additional sources of polluted runoff.

Sea level rise adaptation infrastructure within the bay and other waterways would require permits that would impose requirements to study the potential effects of any hydromodification and protect against undesirable impacts, including erosion. The design of in-water structures, such as sea walls and levees, would be subject to permitting from agencies, including the California Coastal Commission, BCDC, USACE, the San Francisco Bay RWQCB, and EPA. Projects that would discharge dredged or fill materials into waters of the United States would be subject to permitting under Section 404 of the CWA. Construction sites disturbing 1 or more acres would be required to comply with the State's General Stormwater Permit for Construction Activities. These established oversight mechanisms would address construction methods and project design of specific future projects to minimize the potential for hydromodification that could generate substantial erosion, siltation, or pollution. The construction impact associated with sea level rise adaptation infrastructure would be less than significant (LTS).

Operation

Once constructed, projects such as levees, seawalls, marsh restoration, and tidal gates would not be expected to cause or contribute to erosion or pollution runoff. Elevated roadway adaptation infrastructure would improve the transportation system's resilience to sea level rise and would be subject to the regulations described below for other transportation projects that reduce the potential for release of pollutants. Thus, because of the nature of the sea level rise adaptation infrastructure and through compliance with established regulations that would address the potential for hydromodification that could provide substantial additional sources of polluted runoff, the operational impacts associated with sea level rise adaptation infrastructure would be less than significant (LTS).

Transportation System Impacts

Construction

Construction and earth-moving activities associated with transportation projects could increase erosion, which could result in sediment loading in local waterways and subsequent effects on water quality. The extent of the impacts would be dependent on soil erosion potential, type of construction practice, extent of disturbed area, timing of precipitation events, topography, and proximity to drainage channels. Transportation projects that would disturb more than 1 acre would be required to adhere to the same NPDES Construction General Permit requirements discussed above for land development projects. The permit requirements include preparation and implementation of a SWPPP detailing BMPs that would be employed to control on-site stormwater drainage during construction. Projects that fall under Caltrans's jurisdiction also would be required to adhere to the Caltrans NPDES permit. Projects that would disturb less than 1 acre would be subject to the CALGreen requirements related to stormwater drainage for nonresidential projects, including BMPs designed to prevent soil loss and release of contaminants.

The design of transportation projects that would have the potential to alter drainage patterns, such as road widening or construction of other additional impervious surfaces, would conform to local stormwater drainage master plans, regional MS4 permit requirements, and any applicable Caltrans drainage requirements. Caltrans has a Storm Water Management Plan that describes the procedures

and practices it implements to reduce or eliminate the discharge of pollutants to storm drainage systems and receiving waters. The Caltrans Project Planning and Design Guide (2017) was developed with the intention to reduce, to the maximum extent practicable, pollutant loadings from a project site after construction, and comply with the Caltrans NPDES permit and Construction General Permit. Permanent stormwater BMPs reduce suspended particulate loads in runoff and, thus, pollutants associated with sediment particles (e.g., certain metals, such as lead and mercury, PCBs, and polycyclic aromatic hydrocarbons). The Caltrans Project Planning and Design Guide contains guidance on the selection and implementation of many of the Phase II MS4 permit requirements, such as site design measures, stormwater treatment, and hydromodification management BMPs. The Caltrans Storm Water Management Plan sets the maintenance practices for controlling erosion and siltation. Therefore, the potential impacts associated with the implementation of proposed Plan's transportation projects would be less than significant (LTS).

Operation

Operation of the proposed Plan's transportation projects and programs could also increase nonpoint pollution of stormwater runoff because of litter, fallout from airborne particulate emissions, or discharges of vehicle residues, including petroleum hydrocarbons and metals, that could affect the quality of receiving waters. During the dry season, vehicles and other urban activities release contaminants onto the impervious surfaces, where they can accumulate until the first storm event. During a storm event, the concentrated pollutants can be transported via runoff to stormwater drainage systems that discharge into rivers, agricultural ditches, sloughs, and channels and ultimately could degrade the water quality of any of these water bodies. As new roads, lanes, or other new impervious surfaces are added to accommodate projected vehicular traffic, the potential also increases for associated stormwater pollutants to enter receiving waters because of the increase in the extent of impervious surfaces and the anticipated increase in vehicle travel. For further discussion of pollutants commonly associated with transportation corridors, refer to Section 3.9, "Hazards and Wildfire."

Any enhancements or modifications to California State highways would be required to follow Caltrans guidelines, which include the preparation of a hydraulic study and submittal of a hydraulics study report for any project intercepting a waterway or encroaching upon a floodplain, to assess the potential impacts on natural processes and beneficial uses as part of the environmental review (Caltrans 2016). Transportation projects for which local agencies are the lead agency are subject to local and State regulations for construction and nonconstruction runoff prevention. In accordance with federal, State, and local stormwater management regulations, new construction must incorporate proper pollutant source controls and treat stormwater runoff through BMPs when source control or exposure protection is insufficient for reducing runoff pollutant loads. Because transportation projects would comply with these requirements, implementation of the proposed Plan would not be expected to alter existing drainage patterns in a manner that would result in substantial erosion, siltation, or additional sources of polluted runoff. Therefore, the potential impacts associated with the implementation of proposed Plan's transportation projects would be less than significant (LTS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects could result in new development and redevelopment that would have the potential to result in project-specific changes to existing drainage patterns. In compliance with adopted regulations, individual projects are expected to adopt BMPs appropriate to local conditions. This impact would be **less than significant (LTS)** because there are existing federal,

State, and local regulations and oversight in place that would effectively reduce the potential for erosion and siltation or release of pollutants due to drainage pattern changes to an acceptable level.

Mitigation Measures

None required.

Impact HYDRO-4: Substantially alter existing drainage patterns, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in runoff that exceeds capacity of existing or planned stormwater drainage systems or results in flooding on- or off-site (LTS)

Land Use Impacts

Construction and Operation

Implementation of the proposed Plan's forecasted land use development pattern would increase the amount of impervious surface in the region, such as new paved areas, building rooftops, and parking lots. This increase in the amount of impervious surface has the potential to generate additional stormwater runoff. In addition, runoff could discharge at a greater rate, leading to higher peak flows during storm events that could increase the potential for stormwater to cause flood conditions. Urban areas can flood when storm drains and small channels become blocked or surcharged during intense short-duration storms.

Drainage plans would be consistent with the San Francisco Bay RWQCB MS4 NPDES permit or any applicable local drainage control requirements that exceed or reasonably replace any of these measures to control the rate of stormwater runoff. NPDES Provision C.3 includes postconstruction drainage control requirements that address the volume of off-site flows. As described above, project proponents are required to plan, design, and develop sites to limit both increases in the extent of impervious areas and disturbance of natural drainage features. Under Provision C.3, the San Francisco Bay RWQCB requires designs that prevent increases in runoff flows from new development and redevelopment projects. In some cases, adherence to NPDES Provision C.3 requirements may result in improved retention of stormwater rates and volumes, compared to existing conditions, through implementation of LID drainage control measures. LID features include creating bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. Projects that would disturb less than 1 acre would be subject to the CALGreen requirements related to stormwater drainage. Projects would also generally comply with the design guidelines established in the *Stormwater Best Management Practice Handbook: New Development and Redevelopment* (CASQA 2003) to minimize increases in both the volume and rate of stormwater runoff. In addition, development near the coast would be subject to the California Coastal Commission's Coastal Development Permit under the California Coastal Act, which would impose specific management measures and BMPs for protection of coastal watersheds. The California Coastal Act also provides the commission with authority to control development that contributes to flooding and surface alterations in and around the development site.

As described in Section 3.14, "Public Utilities and Facilities," development could require the expansion or construction of new stormwater drainage facilities consistent with State water quality standards, applicable local ordinance, and any design standards adopted by the local utility. These may include on-site retention or detention ponds and upgrades to off-site stormwater transmission (e.g., pipeline improvements, culvert upgrades, or enhanced flood protection along natural drainageways used for

stormwater conveyance) that attenuate flow from the site and facilitate conveyance. Local plan review would generally require preparation of hydrologic engineering reports that demonstrate the project would not substantially increase the rate or amount of off-site flow, as well as analysis of the capacity of off-site infrastructure to accommodate flows. Based on local conditions and applicable local ordinances, on-site LID measures to reduce flow would be incorporated into the project. The application, plans, and specifications (if any) would be checked by the appropriate building official or engineer and may be reviewed by other departments of the county or city to ensure compliance with the laws and ordinances under their jurisdiction.

Land development that occurs to accommodate forecast population in the Plan area would have the potential to alter existing drainage patterns. In accordance with federal, State, and local stormwater management regulations, new construction must maintain pre-project hydrology. Local ordinances generally provide prescriptive requirements related to infrastructure capacity and design and limit the potential for development to increase off-site flows. All projects that would disturb 1 acre or more would be subject to San Francisco Bay RWQCB requirements that prevent increases in runoff flows from new development and redevelopment projects. The required LID drainage control measures may, in some cases, result in improved retention of stormwater rates and volumes compared to existing conditions. Development near the coast would be subject to the California Coastal Commission's Coastal Development Permit and oversight. Therefore, impacts associated with the implementation of the proposed Plan's forecasted land use development pattern would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

Construction and Operation

As described above, the sea level rise adaptation infrastructure would protect communities and infrastructure from sea level rise through a strategy that employs a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. Marsh restoration and horizontal levees can intentionally open an area to flooding and attenuate rising tides. Both BCDC and the proposed Plan support use of wetlands to buffer tides and streamflows to reduce the potential for flooding.

Many of these projects (e.g., levees and sea walls) would be located in proximity to the San Francisco Bay and would not contribute additional runoff to a storm drain system, because they would drain directly to the surface water bodies (see Impact HYDRO-1 for further discussion). Elevated roadway adaptation infrastructure would improve the transportation system's resilience to sea level rise and would not result in a substantial increase in runoff volumes. Additionally, as discussed above for the land use impacts, compliance with existing regulations, particularly the San Francisco Bay RWQCB MS4 NPDES permit, would address the potential for construction or operation of the sea level rise infrastructure to result in an increase in runoff. However, because they provide a physical barrier to potential floodwater, sea walls and traditional levees could affect shore hydrology and the potential for off-site flooding if not designed appropriately. These projects would be subject to oversight and permitting from a variety of agencies, potentially including the California Coastal Commission, BCDC, USACE, the San Francisco Bay RWQCB, and EPA. Implementing agencies would conduct or require project-specific hydrology studies for projects proposed to be constructed within floodplains to demonstrate compliance with Executive Order 11988 (for federally funded projects) and the Cobey-Alquist Floodplain Management Act, which prohibits construction of structures in the designated floodway that would restrict carrying capacity. Engineering designs would evaluate the anticipated project-level effects to area hydrology, and permitting agencies would limit fill or other shoreline modifications.

As described above, sea level rise adaptation infrastructure within the bay and other waterways would require permits from the State that would impose requirements to study the potential effects of any hydromodification. The design of in-water structures, such as sea walls and levees, would be subject to permitting from agencies, including the California Coastal Commission and the San Francisco Bay RWQCB, that require projects to demonstrate that there would not be a substantial increase in off-site runoff and that off-site flooding would not occur. Therefore, impacts associated with the implementation of the proposed Plan's sea level rise adaptation infrastructure would be less than significant (LTS).

Transportation System Impacts

Construction and Operation

Many of the transportation projects would involve alteration or expansion of existing facilities. Improvements to existing facilities, such as the conversion of paved shoulders to lanes, would not likely alter drainage patterns because the facilities are already served by drainage systems and there would not be a substantial increase in the extent of impervious surfaces. However, those improvements that involve grading, recontouring, bridge pilings, and new impervious surfaces may alter existing drainage patterns, including the course of streams and rivers, which may result in increased stormwater flow volumes and velocity, resulting in the potential for erosion, additional sources of polluted runoff, and on- and off-site flooding.

The design of transportation projects that would have the potential to alter drainage patterns would conform to local stormwater drainage master plans and regional MS4 permit requirements, as described above for the land use changes. Transportation projects for which local agencies are the lead agency are subject to local and State regulations for construction and nonconstruction runoff prevention. Transportation projects would also be required to incorporate BMPs and LID stormwater management principles.

In addition, any enhancements or modifications to California State highways would be required to follow Caltrans guidelines, which include the preparation of a hydraulic study and submittal of a hydraulics study report for any project intercepting a waterway or encroaching upon a floodplain, to assess the potential impacts on natural processes and beneficial uses as part of the environmental review (Caltrans 2016). The Caltrans Highway Design Manual (2010) requires that road storm drain systems be designed to safely drain the 25-year return interval storm, cross-culverts be designed to safely drain the 10-year interval storm, and the headwater depth for the 100-year interval storm not overtop freeways. These existing regulatory requirements substantially address the potential for impacts on drainage patterns and rates.

In accordance with federal, State, and local stormwater management regulations, new construction must maintain preproject hydrology. Because transportation projects would comply with these requirements, implementation of the proposed Plan would not be expected to alter existing drainage patterns in a manner that would result in runoff that exceeds the capacity of existing or planned stormwater drainage systems or results in flooding. Therefore, impacts associated with the implementation of the proposed Plan's transportation infrastructure would be less than significant (LTS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects could result in new development and redevelopment that would have the potential to result in project-specific changes to existing drainage patterns. In compliance with adopted regulations, individual projects are expected to adopt BMPs appropriate to local conditions. This impact would be **less than significant (LTS)** because there are existing State and

local regulations and oversight in place that would effectively reduce the potential for erosion and siltation, release of pollutants, or flooding related to drainage pattern changes to an acceptable level.

Mitigation Measures

None required.

Impact HYDRO-5: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows (LTS)

Land Use Impacts

Construction and Operation

In addition to hydromodifications that could cause localized flooding discussed in Impact HYDRO-4, development of areas that are currently prone to flooding could impede or redirect flood flows. As described above and depicted in **Figure 3.10-2**, FEMA has designated 100-year and 500-year storm event flood hazard zones in the Bay Area. While the majority of proposed Plan's land use growth footprint is outside these hazard areas, implementation of the development pattern identified in the Plan could result in 4,000 acres of development in the 100-year floodplain and an additional 4,900 acres of development in the 500-year floodplain (**Table 3.10-7**).

Table 3.10-7: Acreage of Land Use Growth Footprint within Flood Zones

County		100-Year (acres)	500-Year (acres)
Alameda	County Total	440	800
	Within TPAs	130	350
Contra Costa	County Total	910	340
	Within TPAs	70	30
Marin	County Total	390	220
	Within TPAs	90	120
Napa	County Total	50	30
	Within TPAs	30	20
San Francisco	County Total	0	0
	Within TPAs	0	0
San Mateo	County Total	300	360
	Within TPAs	130	220
Santa Clara	County Total	1,300	2,900
	Within TPAs	710	1,600
Solano	County Total	380	180
	Within TPAs	10	30
Sonoma	County Total	200	60
	Within TPAs	1	20
Regional Total	County Total	4,000	4,900
	Within TPAs	1,200	2,400

Notes: TPA acreages are a subset of County acreages. Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100. Figures may not sum because of independent rounding.
Sources: Data compiled by MTC/ABAG in 2021 based on data from FEMA 2020

FEMA delineates the regulatory floodplain to assist local governments with land use and floodplain management decisions to avoid flood-related hazards. Structures that impede flood flows can cause a backwater effect by potentially raising flood levels, causing more severe flooding impacts on existing vulnerable areas, or exposing new areas that would not have previously flooded to flooding impacts. To avoid flooding, FEMA and the local agencies require that an encroachment into a floodplain not increase the water surface elevation of the 100-year flood by more than 1 foot in floodplains and 0.1 foot in floodways. In addition, any projects constructed within areas subject to flooding because of levee failure, as mapped by FEMA, must be built in compliance with standard building codes and federal, State, and local regulations.

Development (including construction, reconstruction, renovation, repair, expansion, or alteration of buildings, bridges, streets, and other paving and installation of utilities) within a floodplain requires a local floodplain development permit. The specific requirements for a project depend on the flood zone and the type of development. The basic standards that must be met by any floodplain development are that the proposed development must be reasonably safe from flood damage (which for most buildings means elevated above the height of floodwaters) and must not result in physical damage to any other property. Additional requirements for development in flood hazard zones contained in local ordinances and standards may also apply. Technical analysis may be required if there is potential for increased flood heights or diversion of flow.

Any developments proposed within the 100-year flood zone would be required to meet local, State, and federal flood control design requirements. Implementing agencies would conduct or require project-specific hydrology studies for projects proposed to be constructed within floodplains to demonstrate compliance with Executive Order 11988 (for federally funded projects), the NFIP, the National Flood Insurance Act, and the Cobey-Alquist Floodplain Management Act, as well as any further FEMA or State requirements that are adopted at the local level. These studies would identify project design features that reduce impacts on either floodplains or flood flows that would be required through the permitting process. Projects in TPAs that are located within a floodplain or floodway do not qualify as sustainable community projects under Section 21155.1 of the Public Resources Code unless the applicable general plan or zoning ordinance contains provisions to mitigate the risk of a flood. With these floodplain development requirements, continuing flood protection programs, and the drainage requirements described above, impacts related to flood flows would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

Construction and Operation

Sea level rise adaptation infrastructure would protect existing businesses, residences, and infrastructure from rising seas. **Table 3.10-8** provides the acreage of the sea level rise adaptation footprint within the 100-year and 500-year flood zones established by FEMA. The sea level rise adaptation infrastructure could affect flooding and surface waters in the region. Although intended to protect the parts of the Plan area most vulnerable to flooding caused by sea level rise, there is a potential that the adaptation infrastructure could redirect flows. For example, sea walls and traditional levees could affect shore hydrology and the potential for off-site flooding if not designed appropriately because they provide a physical barrier to potential floodwater. In addition, tidal gates can intentionally open an area to flooding to attenuate rising tides and reduce the potential for flooding of upland areas. Marsh restoration and horizontal levees require careful engineering that evaluates the potential to redirect floodwaters. Elevated roadway adaptation infrastructure would improve the transportation system's resilience to sea level rise but may require structures, such as bridge abutments, within the floodplain.

Table 3.10-8: Acreage of SLR Resilience Footprint within Flood Zones

County	100-Year (acres)	500-Year (acres)
Alameda	630	300
Contra Costa	240	10
Marin	700	40
Napa	< 1	0
San Francisco	0	0
San Mateo	540	30
Santa Clara	600	80
Solano	590	11
Sonoma	140	2
Regional Total	3,400	480

Notes: Numbers less than 1 are shown as "<1." Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC/ABAG in 2021 based on data from FEMA 2020

In addition to the oversight for development of floodplains through the NFIP and related local regulations, sea level rise adaptation infrastructure projects would be subject to oversight and permitting from a variety of agencies, potentially including the California Coastal Commission, BCDC, USACE, the San Francisco Bay RWQCB, and EPA. Potential for such projects to alter existing drainage patterns in a manner that would adversely affect conditions outside of the area they are designed to protect would be evaluated and mitigated, as appropriate, through the permitting process. As discussed above, implementing agencies would conduct or require project-specific hydrology studies for projects proposed to be constructed within floodplains. These studies would identify project design features that reduce impacts on either floodplains or flood flows, which would inform the project's permit requirements. As described above, FEMA and the local agencies require that an encroachment into a floodplain (i.e., activities or construction within the floodway, including fill, new construction, substantial improvements, and other development) not increase the water surface elevation of the 100-year flood by more than 1 foot in floodplains and 0.1 foot in floodways. With these floodplain development requirements, continuing flood protection programs, and the drainage requirements described above, impacts related to flood flows would be less than significant (LTS).

Transportation System Impacts

Construction and Operation

Some of the transportation projects included in the proposed Plan intersect areas mapped within the flood hazard areas. In total, approximately 1,700 acres of potential construction are anticipated in 100-year flood zones for the entire region and an additional 1,900 acres of development in the 500-year floodplain (see **Table 3.10-9**). Those projects in identified flood hazard areas could involve support structures or other aboveground improvements in the floodway that could potentially obstruct floodwaters in some locations. Placement of structures within a floodplain can displace floodwaters and alter the base flood elevations in the surrounding areas. As described above, structures can create a backwater effect, resulting in an increase in the flood elevation level upstream and in neighboring areas. Drainage areas could also be altered by highway corridors, in which floodwaters could be detained by medians and along the roadside. Proposed bridge supports could block debris in waterways, creating obstructions and further elevating upstream flood levels.

Table 3.10-9: Acreage of Transportation Projects Footprint within Flood Zones

County	100-Year (acres)	500-Year (acres)
Alameda	280	140
Contra Costa	110	50
Marin	40	30
Napa	8	2
San Francisco	0	0
San Mateo	370	250
Santa Clara	660	1,300
Solano	230	80
Sonoma	60	2
Regional Total	1,700	1,900

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC/ABAG in 2021 based on data from FEMA 2020

The regulatory requirements listed in the discussion of land use impacts also apply to transportation projects. Projects and programs in the proposed Plan also would be required to comply with FEMA regulations, which mandate no development within the 100-year regulatory floodplain if it could increase the flood elevation by 1 foot or more in floodplains and 0.1 foot in floodways. Any enhancements or modifications to California State highways would be required to follow Caltrans guidelines, which include the preparation of a hydraulic study and submittal of a hydraulics study report for any project intercepting a waterway or encroaching upon a floodplain, to assess the potential impacts on natural processes and beneficial uses as part of the environmental review (Caltrans 2016). Federally funded projects must also comply with the federal Executive Order 11988, which requires that floodplain encroachment occur only if there is no alternative to avoid the floodplain and that all feasible mitigation for floodplain impacts be included in the project. With these floodplain development requirements, continuing flood protection programs, and the drainage requirements described above, impacts related flood flows would be less than significant (LTS).

Conclusion

Because implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would be required to adhere to appropriate federal, State, and local requirements designed to ensure that flooding conditions are not exacerbated, this impact would be **less than significant (LTS)** because there are existing federal, State, and local regulations and oversight in place that would effectively manage surface runoff.

Mitigation Measures

None required.

Impact HYDRO-6: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation (LTS)

Land Use Impacts

Construction and Operation

As described above, flooding occurs regularly in the Plan area, and local structural flood damage reduction measures, such as reservoirs, levees, and channel improvements, have been implemented.

Impact HYDRO-5 discusses the potential for the Plan to result in development in flood hazard zones. Because the Plan is intended to reduce risks from hazards, including planning to protect homes, businesses, and transportation infrastructure from flooding, it is expected to minimize the risk of release of pollutants attributable to flooding in established hazard zones. Further, although tsunami and seiche zones are mapped in the Plan area, the risk of release of pollutants attributable to inundation is considered low based on the limited documented history of tsunami- and seiche-induced flooding of the Plan area. No substantial damage is expected from either tsunamis or seiches in the Plan area, and implementation of the Plan would not increase the inherent risk of these natural forces on the Plan area.

Numerous existing federal, State, and local laws and regulations are in place to address the management and control of pollutants, including regulations addressing the proper disposal, transportation, storage, and handling of potentially hazardous materials (refer to Section 3.9, "Hazards and Wildfire"). The proposed Plan's forecasted land use development pattern would be subject to these regulations for the management of pollutants, which would limit the release of pollutants in the event of inundation attributable to flood, levee or dam failure, or seiche. Moreover, subsequent development would be subject to existing regulations intended to limit the potential for flooding to affect development. These include FEMA flood insurance and State flood protection regulations intended to limit flood risk, as well as local flood management programs, zone districts, and regulations; and California Building Code requirements. These regulations would guide growth away from hazardous areas. Therefore, considering the existing regulatory framework, physical context of the Plan area and proposed areas of improvements, the forecasted development under the Plan would not result in risk related to the release of pollutants attributable to flooding, seiche, or tsunami. Impacts associated with construction and implementation of the proposed Plan would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

Construction and Operation

The sea level rise adaptation infrastructure would be located in flood hazard, tsunami, and seiche zones. Construction of the sea level rise adaptation infrastructure would use potentially hazardous materials in limited quantities for maintaining and operating construction equipment. As described in Section 3.9, "Hazards and Wildfire," these activities are regulated, and the routine use of hazardous materials is unlikely to result in a substantial risk release of pollutants related to project inundation. Once constructed, the sea level rise adaptation infrastructure would not include uses that would result in the release of pollutants if inundated.

Therefore, although sea level rise adaptation infrastructure is likely to be located in flood hazard, tsunami, and seiche zones, it is intended to reduce the risk of secondary flooding hazards, including release of pollutants. The impact of construction and operation of this adaptation infrastructure would be less than significant (LTS).

Transportation System Impacts

Construction and Operation

Some of the transportation projects included in the proposed Plan would be placed within the 100-year flood hazard area and potential dam inundation areas. In addition, projects located in the immediate vicinity of shoreline areas may be exposed to inundation from tsunami or seiche waves. As noted above, new transportation structures proposed within a floodplain or inundation areas would

be required to adhere to State and federal regulations. The Caltrans Highway Design Manual also requires that the headwater depth for the 100-year interval storm not overtop freeways.

Similar to the sea level rise infrastructure, limited hazardous materials use would be associated with construction of the transportation projects. As described in Section 3.9, "Hazards and Wildfire," these activities are regulated, and the routine use of hazardous materials is unlikely to result in a substantial risk release of pollutants related to project inundation. Once constructed, the facilities could be used to transport hazardous materials, but storage of materials that could be released if inundated would be unlikely. As discussed in Section 3.9, "Hazards and Wildfire," the routine transport of hazardous materials on transportation infrastructure in the Plan area would not present a substantial hazard to the public or the environment. The transportation system would not substantially increase the risk of release of pollutants related to project inundation in flood hazard, tsunami, or seiche zones. This impact would be less than significant (LTS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would be subject to implementation of local, State, and federal floodplain regulations and project-level review. Further, the sea level rise adaptation infrastructure would decrease the potential for inundation in flood hazard, tsunami, and seiche zones, which could reduce the potential for release of pollutants from existing uses. Therefore, considering the existing regulatory framework and physical context of the Plan area, potential for release of pollutants attributable to flooding would be reduced to an acceptable level, and this impact would be **less than significant (LTS)**.

Mitigation Measures

None required.

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3.11 LAND USE, POPULATION, AND HOUSING

3.11.1 Introduction

This section evaluates the potential effects of the proposed Plan on land use and housing in the Bay Area. It describes trends in overall land use and physical development, including job and housing growth. The impact analysis addresses the potential for physical disruption to land uses, displacement of people or housing, and division or separation of communities. In addition, the proposed Plan's consistency with adopted land use plans and policies is addressed (see the discussion of Impact 3.11-1, below).

Comments received in response to the Notice of Preparation (NOP) included requests for analysis of the growth geographies outside existing urban growth boundaries; impacts to existing coast-side parks and beaches; consistency with the Delta Plan; financial ability of residents to purchase homes; low-income housing and jobs; and transportation and development corridors. Project elements such as land use strategies to address the job to housing ratio and low-income populations and the development of the transportation projects are addressed in Chapter 2, "Project Description." Consistency with natural community conservation plans and habitat conservation plans is addressed in Section 3.5, "Biological Resources." Consistency with airport land use compatibility plans is addressed in Section 3.9, "Hazards and Wildfire."

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important" (CEQA Guidelines Section 15083). Neither the CEQA Guidelines nor the statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.11.2 Environmental Setting

PHYSICAL SETTING

Land Use Patterns

The pattern of land uses in the Bay Area includes a mix of open space, agriculture, developed urban centers, suburban commercial and residential areas, and scattered older towns. This pattern reflects the landforms that physically define the region: the bay, rivers, and valleys. The land uses surrounding the bay margins tend to be more intensely developed, particularly from San Francisco south along the peninsula to Santa Clara County, and from Contra Costa County south through Alameda County to Santa Clara County. These areas also include extensive networks of open space. The counties north of the bay (Marin, Sonoma, and Napa) are more sparsely developed with a combination of suburban development, smaller cities and towns, and agricultural areas of the Bay Area, such as the East Bay (away from the bay margins) and Solano County further to the east, tend to be more suburban in character, with heavy industry related to oil refineries dotting the landscape, as well as large swaths

of agriculture. These general characterizations do not capture all the land use types and patterns associated with the nine counties and 101 cities that make up the Plan area.

Extent of Urban Development

According to the most recent data (available from 2016 and 2018), approximately 18 percent of the region's approximately 4.5 million acres were considered to be urban built-up land according to the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) (DOC 2018, Bay Area Open Space Council 2019). The FMMP defines urban built-up land as "land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel." The remaining "undeveloped" area includes open space and agricultural lands, as well as water bodies (excluding the San Francisco Bay) and parks. Approximately 29 percent of the region is identified as protected open space (Bay Area Open Space Council 2019). The amount of urban built-up land according to the FMMP, in each of the nine counties, varies from a low of 5 percent in Napa County to a high of 80 percent in San Francisco (see **Table 2-6** in Chapter 2, "Project Description"). The Bay Area includes 101 cities, with San Jose, San Francisco, and Oakland representing the largest urban centers. Other major urban centers have formed throughout the region, leading to a pattern of urban land and open space as illustrated in **Figure 3.11-1**. As shown in **Table 3.11-1**, the counties with the highest job totals are Santa Clara, Alameda, and San Francisco Counties, while the counties with the highest population are Santa Clara, Alameda, and Contra Costa Counties.

Table 3.11-1: 2015 Jobs and Households, by County

County	Jobs	% of Jobs in TPAs	Households	% of Households in TPAs
Alameda	867,000	61%	552,000	39%
Contra Costa	404,000	27%	383,000	17%
Marin	135,000	28%	109,000	14%
Napa	72,000	6%	50,000	2%
San Francisco	682,000	100%	366,000	99%
San Mateo	393,000	48%	265,000	38%
Santa Clara	1,099,000	59%	623,000	37%
Solano	132,000	6%	142,000	3%
Sonoma	221,000	12%	188,000	8%
Regional Total	4,005,000	55%	2,677,000	37%

Notes: Whole numbers have been rounded (between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.
Source: Data compiled by MTC and ABAG in 2021

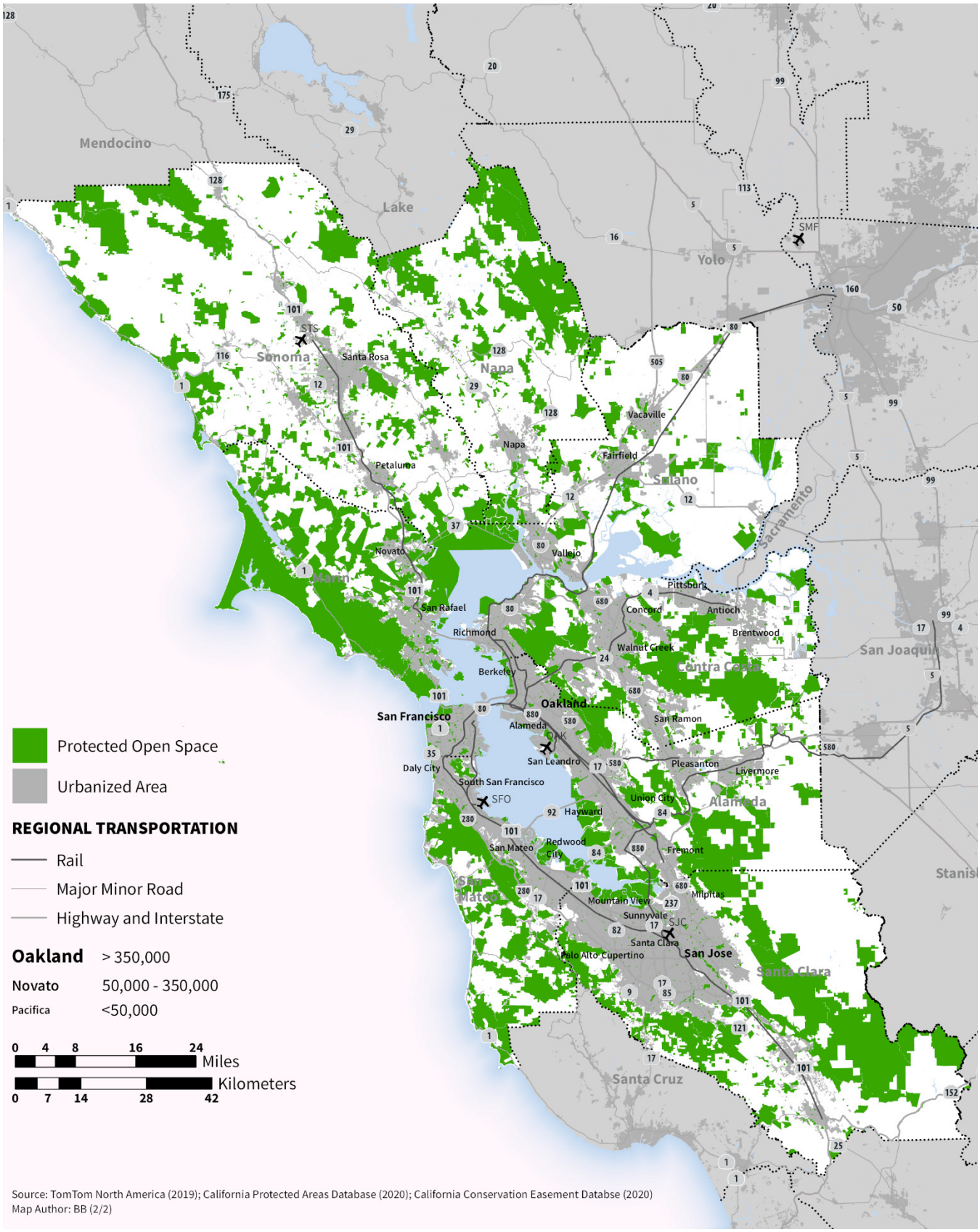


Figure 3.11-1: Urban Land and Open Space

"Focused Growth" Strategy

The proposed Plan's core strategy is "focused growth" in existing communities along the existing transportation network (see Chapter 2, "Project Description"). This strategy helps to achieve key regional economic, environmental, and equity goals: It builds upon existing community characteristics, efficiently leverages existing infrastructure, and lessens impacts in undeveloped areas. Key to implementing the focused growth strategy are designated growth geographies. Three of these growth geography designations—Priority Development Areas (PDAs), Priority Conservation Areas (PCAs), and Priority Production Areas (PPAs)—are nominated by local governments (see Section 2.3.4, "Proposed Plan Growth Geographies").

The proposed Plan also includes the designation of new growth geographies for both housing and jobs. For housing, in addition to PDAs, growth geographies include the newly added High-Resource Areas (HRAs) and Transit-Rich Areas (TRAs). HRAs—communities with well-resourced schools and easy access to jobs, parks, and other amenities—identified by the State of California were included as a new housing growth geography to counterbalance housing policies that have historically led to limited housing development, particularly housing affordable to low-income households. TRAs—areas close to rail, ferry, or frequent bus service—were also included as growth geographies to support climate emissions goals, with more housing near transit allowing more people to have access to sustainable transportation options (see Section 2.3.4, "Proposed Plan Growth Geographies").

Housing Stock

The following discussion is summarized from the proposed Plan document and Vital Signs[1]. For more information, please see the full document, available at www.mtc.ca.gov and www.vitalsigns.mtc.ca.gov. Currently, the Bay Area does not contain enough housing, market-rate or affordable, to accommodate the growing number of residents and jobs. Key reasons for the lack of sufficient housing include the length of time it takes to secure development approvals at the local level, reduced support from State and federal government for affordable housing, and strong demand driven by exceptional regional economic performance, among others. Relatively high salaries and job growth in the fast-growing technology industry, for example, coupled with limited growth in housing supply, has driven up the cost of housing at a rapid pace. Today the Bay Area has one of the most severe housing crises of the nation's large metropolitan areas, and there are limited policy tools to help address the problem at a regional level.

There has been a mismatch between growth in job levels and growth in housing supply. Jobs have grown by at least 3 percent each year since 2012, reaching a new peak of over 4 million jobs in 2018 (EDD 2020). The Bay Area has added nearly two jobs for every housing unit built since 1990. This deficit in housing production has been most substantial in jobs-rich parts of the region, especially in high-income areas along the peninsula and in Silicon Valley. Despite the COVID-19 economic downturn, the resilient regional economy, combined with increased household formation among the millennial generation, has contributed to an ever-more acute housing shortage. In 2018, the Bay Area added just 15,400 housing units, a fraction of the peaks seen in the 1990s. Multi-family home construction has driven growth since 2010, with 135,000 new multi-family units built between 2010 and 2018 – 73

[1] Vital Signs is a monitoring initiative to track trends related to transportation, land and people, the economy, the environment, and social equity. Led by the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), this effort relies upon extensive collaboration with the Bay Area Air Quality Management District, the San Francisco Bay Conservation and Development Commission and the Bay Area Regional Collaborative.
Vital Signs is a data-driven website that compiles dozens of indicators; each is presented with interactive visualizations that allow users to explore historical trends, examine differences between cities and counties, and compare the Bay Area with other peer metropolitan areas. https://www.vitalsigns.mtc.ca.gov/about

percent of the total produced. In 2018, there was a roughly 50-50 split between single-family and multi-family production. This is due in large part to substantially lower multi-family housing production rates in San Francisco and Santa Clara Counties, which produced 2,000 and 3,700 fewer multi-family units, respectively, in 2018 than in 2017 (MTC 2021). Please see the proposed Plan document for more information related to these issues.

The lack of new housing supply, combined with increasing job opportunities, growing population levels, and a growing disparity between high- and low-household income levels, has been a major contributor to rising housing prices. With the increased number of higher-income households and most income growth going to the top 20 percent of earners, demand for housing has remained very strong at the upper end of the market. Conversely it has become more difficult for low- and middle-wage households to compete for market-rate housing as a larger pool of high-wage workers bid up a limited housing supply. Housing has become increasingly more expensive for lower- and middle-income households, which has further intensified competition for limited affordable housing opportunities.

Coastal Bay Land Uses

The California Coastal Commission and the Bay Conservation and Development Commission (BCDC) regulate land use near the coastline and along the bay (respectively) to protect and enhance the coastline and to promote public access within the coastal zone of California. On land, the coastal zone varies in width from several hundred feet in highly urbanized areas to up to 5 miles in certain rural areas, and offshore, the coastal zone extends along a 3-mile-wide band of ocean, as shown in **Figure 3.11-2**. The coastal zone established by the California Coastal Act does not include San Francisco Bay, where development is regulated by BCDC. More information on how these agencies regulate uses near the coast is addressed in the Section 3.11.3, "Regulatory Setting," below.

Parks and Open Space

The Bay Area contains over 1 million acres of parks and open space across nine counties (see **Table 3.11-2** and **Figure 3.11-3**). Approximately half of the nearly 1.4 million acres of parks and open space are available for public use (privately owned land held in permanent reserve as of 2020), while the remaining half is not available for public use. Although access by the general public to some areas is restricted, these areas are considered important for the preservation of wildlife habitats and the protection of the environmental and rural characteristics of various parts of the region. These areas, as defined in the Conservation Lands Network 2.0 and the Bay Area Protected Areas Database, are designated in one of two ways: either by purchasing or acquiring a "conservation easement" to a privately owned property or by purchasing a property outright for conservation purposes. These areas can be parks, preserves, ranches, farms, or forests and can be small, large, publicly accessible, or not publicly accessible.

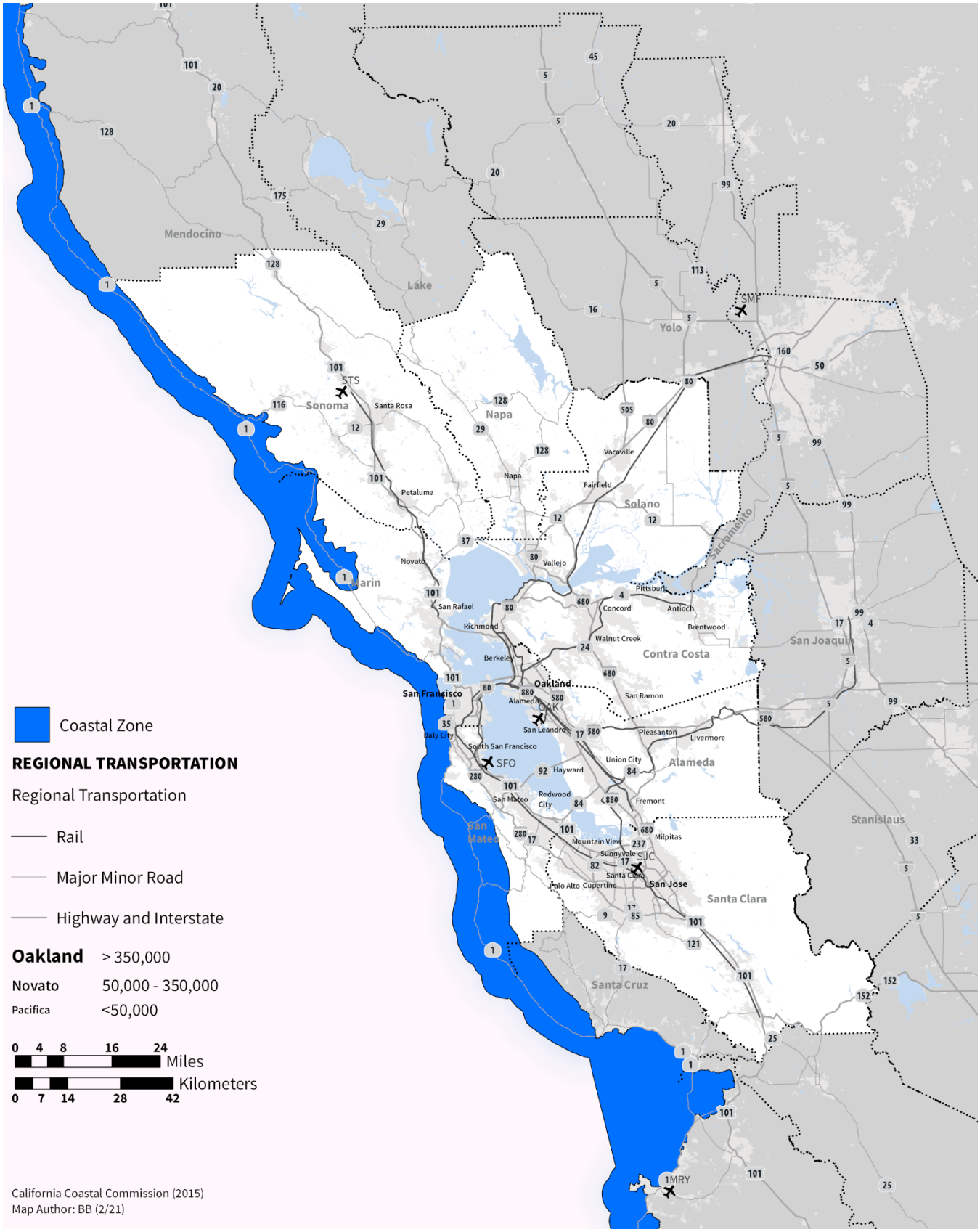


Figure 3.11-2: California Coastal Zone

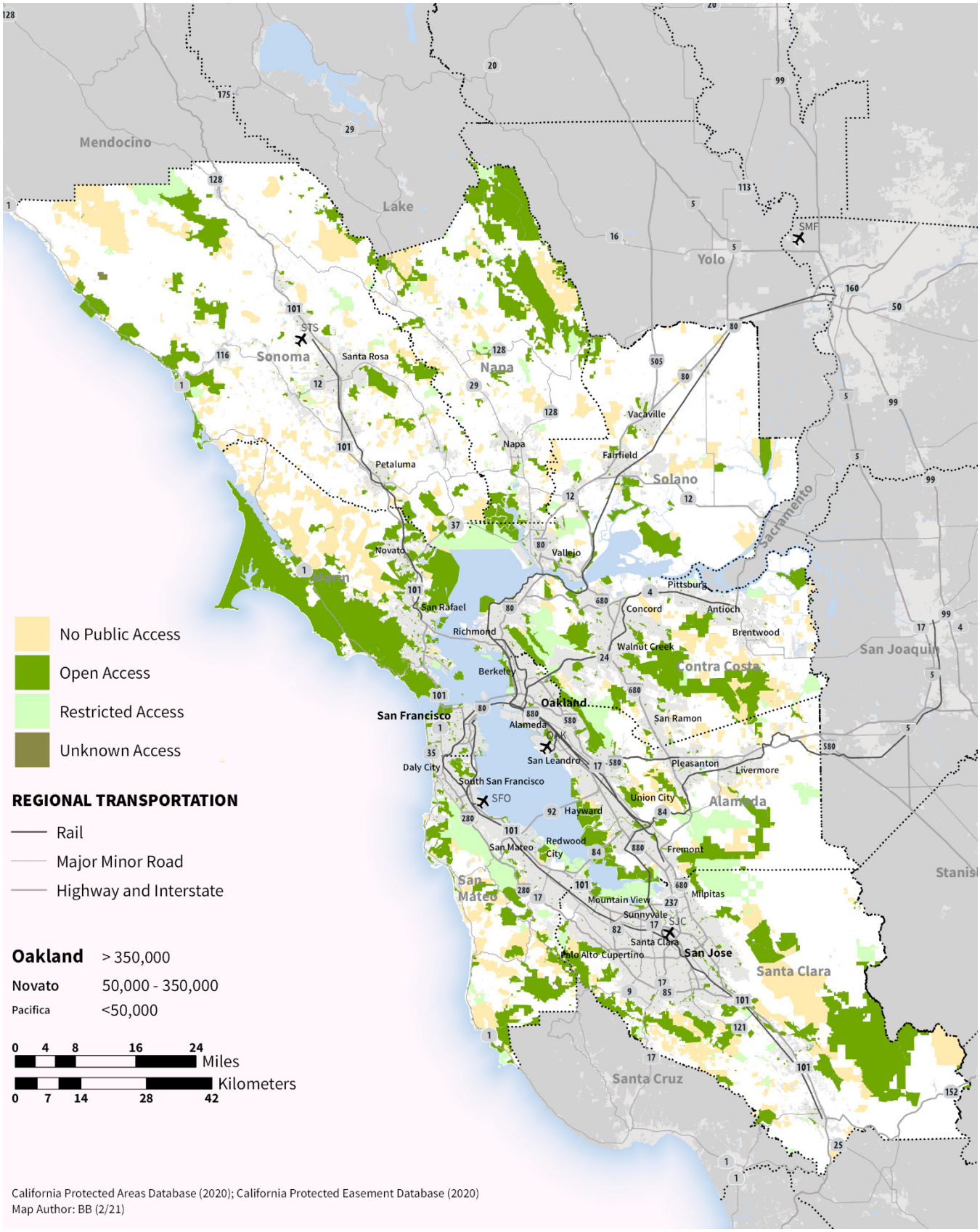


Figure 3.11-3: Access to Parks and Open Space Lands

Table 3.11-2: Acreage of Parks and Open Space

County	Open Access (acres)	Restricted Access (acres)	No Access (acres)	Other/ Unknown (acres)	Total (acres)
Alameda	66,600	32,000	30,400	0	128,600
Contra Costa	79,600	21,800	52,200	0	153,400
Marin	140,500	1,000	60,000	0	201,600
Napa	90,100	17,400	49,200	50	156,700
San Francisco	5,100	120	80	0	5,200
San Mateo	54,600	29,900	40,400	180	124,900
Santa Clara	140,800	31,800	93,900	<1	266,600
Solano	33,500	13,700	34,600	0	81,800
Sonoma	96,700	33,500	134,600	730	265,100
Regional Total	707,500	181,400	495,500	970	1,384,000

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.
Sources: California Conservation Easement Database 2020; California Protected Areas Database 2020

3.11.3 Regulatory Setting

FEDERAL REGULATIONS

Department of Housing and Urban Development Act

The Department of Housing and Urban Development Act created the U.S. Department of Housing and Urban Development (HUD) as a cabinet-level agency. HUD is responsible for national policy and programs that address housing needs in the United States. HUD is responsible for enforcing fair housing laws. HUD plays a major role in supporting homeownership by underwriting homeownership for lower- and moderate-income families through its mortgage insurance programs.

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S. Code Section 4601 et seq.), passed in 1970 and amended in 1987, is intended to provide for uniform and equitable treatment for persons displaced through federally funded or assisted transportation and redevelopment projects that require property acquisition. The act lays out rules for notification, relocation counseling, social services or assistance for disabled residents, and compensation for replacement housing and moving costs. The rules stipulate that replacement housing must be comparable to previous housing in terms of location, size, and access to jobs and public facilities and that it must be "decent, safe, and sanitary." The rules apply if federal funds are in any phase of the program or project, even if the property acquisition itself is not federally funded.

Code of Federal Regulations Title 25

Federally recognized Native American tribes are considered domestic dependent nations with tribal sovereignty. "Tribal sovereignty" refers to tribes' right to govern themselves, define their own membership, manage tribal property, and regulate tribal business and domestic relations; it further recognizes the existence of a government-to-government relationship between such tribes and the

federal government. In general, State and local governments do not have "civil regulatory" jurisdiction (i.e., land use) on Indian Land, which is land held in trust or restricted status for a tribe.

Fixing America's Surface Transportation Act (Public Law 114-94)

As noted in Chapter 1, "Introduction," under the Fixing America's Surface Transportation Act (FAST Act) and Moving Ahead for Progress in the 21st Century Act (MAP-21), the U.S. Department of Transportation requires that metropolitan planning organizations, such as MTC, prepare long-range RTPs and update them every 4 years if they are in areas designated as "nonattainment" or "maintenance" for federal air quality standards. While the FAST Act is primarily a transportation law, Section 78001 of the act also amended the United States Housing Act of 1937 to allow public housing agencies and owners in the Housing Choice Voucher, Public Housing, and Section 8 Project-Based Rental Assistance programs to eliminate annual income reviews in some years by applying a cost of living adjustment determined by the U.S. Department of Housing and Urban Development Secretary to fixed-income sources for families with incomes that are at least 90 percent fixed income. The public housing agency or owner is not required to verify nonfixed income amounts in years when no fixed-income review is required but is still required to use third-party documentation for a full income recertification every 3 years.

STATE REGULATIONS

Zenovich–Moscone–Chacon Housing and Home Finance Act of 1975

In response to State population and household growth, and to ensure the availability of affordable housing for all income groups, the California Department of Housing and Community Development (HCD) is responsible for determining the regional housing need for all jurisdictions in California.

Housing Element Law

Enacted in 1969, housing element law (Government Code Sections 65580–65589.8) mandates that local governments adequately plan to meet the existing and projected housing needs of all economic segments of the community. The law acknowledges that in order for the private market to adequately address housing needs and demand, local governments must adopt land use plans and regulatory systems that provide opportunities for, and do not unduly constrain, housing development. As a result, housing policy in the State rests largely upon the effective implementation of local general plans and, in particular, local housing elements. Housing element law also requires HCD to review local housing elements for compliance with State law and to report its written findings to the local government.

California Relocation Assistance Act of 1971

The California Relocation Assistance Act (Government Code Section 7260 et seq.) was passed in 1971, following the Uniform Relocation Assistance and Real Property Acquisition Policies Act in 1970 (see discussion above under "Federal Regulations"). California's version of the law has similar provisions requiring notification, counseling, social services, and financial assistance for persons displaced by transportation and land redevelopment projects. Under the California act, these procedural protections and benefits apply when the project causing the displacement has received State funding during any phase of the program or project, even if it did not receive federal funding.

Regional Housing Needs Allocation

California Government Code Sections 65583(a)(1) and 65584 require that each council of government consult with the California Division of Housing Policy Development and determine each region's existing and projected housing need through preparation of a Regional Housing Needs Allocation

(RHNA) that allocates a share of the regional housing need to each city, county, or city and county based on an analysis of population and employment trends and documentation of projections and a quantification of the locality's existing and projected housing needs for all income levels, including extremely low income households, as defined in subdivision (b) of Section 50105 and Section 50106 of the Health and Safety Code.

The future need for housing is determined primarily by the forecasted growth in households in a community, based on historical growth patterns, job creation, household formation rates, and other factors to estimate how many households will be added to each community over the projection period. The housing need for new households is then adjusted to account for an ideal level of vacancy needed to promote housing choice, maintain price competition, and encourage acceptable levels of housing upkeep and repair. The RHNA also accounts for units expected to be lost because of demolition, natural disaster, or conversion to non-housing uses. The sum of these factors—household growth, vacancy need, and replacement need—form the "construction need" assigned to each community. Finally, the RHNA considers how each jurisdiction might grow in ways that will decrease the concentration of low-income households in certain communities. The need for new housing is distributed among income groups so that each community moves closer to the regional average income distribution.

Sustainable Communities and Climate Protection Act of 2008

Senate Bill 375 (SB 375) (Chapter 728, Statutes of 2008) focuses on aligning transportation, housing, and other land uses to achieve regional greenhouse gas (GHG) emission reduction targets established under the California Global Warming Solutions Act, also known as Assembly Bill 32 (AB 32). SB 375 requires California metropolitan planning organizations to develop an SCS as part of the RTP, with the purpose of identifying policies and strategies to reduce per capita passenger vehicle-generated GHG emissions. The SCS must:

- identify the general location of land uses, residential densities, and building intensities within the region;
- identify areas within the region sufficient to house all the population of the region;
- identify areas within the region sufficient to house an 8-year projection of the regional housing need;
- identify a transportation network to service the regional transportation needs;
- gather and consider the best practically available scientific information regarding resources areas and farmland in the region; and
- consider the State housing goals; set forth a forecasted development pattern for the region; and allow the RTP to comply with the federal Clean Air Act of 1970 (42 U.S. Code Section 7401 et seq.).

The development pattern in the SCS, when integrated with the transportation network and other transportation measures and policies, must reduce the GHG from automobiles and light-duty trucks to achieve the GHG emission reduction targets approved by the California Air Resources Board (CARB). If the SCS does not achieve the GHG emission targets set by CARB, an alternative planning strategy must be prepared to demonstrate how the targets could be achieved.

SB 375 also imposes a number of new requirements on the regional housing needs process. Before SB 375, the RTP and regional housing needs processes were not required to be coordinated. SB 375

now synchronizes the schedules of the RHNA and RTP processes. The RHNA, which is adopted after the RTP, must also allocate housing units within the region consistent with the development pattern included in the SCS. Previously, the RHNA determination was based on population projections produced by the California Department of Finance (DOF). SB 375 requires the determination to be based upon population projections by DOF and regional population forecasts used in preparing the RTP. If the total regional population forecasted and used in the RTP is within a range of 3 percent of the regional population forecast completed by DOF for the same planning period, then the population forecast developed by the regional agency and used in the RTP shall be the basis for the determination. If the difference is greater than three percent, then the two agencies shall meet to discuss variances in methodology and seek agreement on a population projection for the region to use as the basis for the RHNA determination. If no agreement is reached, then the basis for the RHNA determination shall be the regional population projection created by DOF.

Existing law requires local governments to adopt a housing element as part of their general plan. Unlike the rest of the general plan, where updates sometimes occur at intervals of 20 years or longer, under previous law the housing element was required to be updated as frequently as needed and no less than every five years. Under SB 375, this period has been lengthened to eight years and timed so that the housing element period begins no less than 18 months after adoption of the RTP to encourage closer coordination between the housing and transportation planning done by local governments and metropolitan planning organizations. SB 375 also changes the implementation schedule required in each housing element. Previous law required the housing element to contain a program that set forth a five-year schedule to implement the goals and objectives of the housing element. The new law instead requires this schedule of actions to occur during the eight-year housing element planning period and requires that each action have a timetable for implementation.

Government Code Section 65583 (SB 2, Chapter 633, Statutes of 2007) strengthens State housing element law (Government Code Section 65583) by ensuring that every jurisdiction identifies potential sites where new emergency shelters can be located without discretionary review by the local government. It also increases protections for providers seeking to open a new emergency shelter, transitional housing, or supportive housing development by limiting the instances in which local governments can deny such developments.

The Delta Protection Act of 1992

The Delta Protection Act of 1992 established the Delta Protection Commission, a State entity to plan for and guide the conservation and enhancement of the natural resources of the Delta while sustaining agriculture and meeting increased recreational demand. The act defines a Primary Zone, which comprises the principal jurisdiction of the Delta Protection Commission. The Secondary Zone is the area outside the Primary Zone and within the “Legal Delta”; the Secondary Zone is not within the planning area of the Delta Protection Commission. Portions of Alameda, Contra Costa, and Solano Counties overlap with the Primary Zone. The act requires the Delta Protection Commission to prepare and adopt a land use and resource management plan for the Primary Zone of the Delta, which must meet specific goals.

Sacramento-San Joaquin Delta Reform Act of 2009

The Delta Plan, required by the 2009 Sacramento-San Joaquin Delta Reform Act, creates rules and recommendations to further the State’s coequal goals for the Delta: improve Statewide water supply reliability and protect and restore a vibrant and healthy Delta ecosystem. The plan provides that the goals can be achieved all in a manner that preserves, protects, and enhances the Delta’s unique agricultural, cultural, and recreational characteristics.

Public Resources Code Sections 21094.5 and 21094.5.5

PRC Sections 21094.5 and 21094.5.5 (SB 226, Chapter 469, Statutes of 2011) set forth a streamlined review process for infill projects and include performance standards to be used to determine an infill project's eligibility for streamlined review. The intent of PRC Sections 21094.5 and 21094.5.5 is to streamline the environmental review process by "limiting the topics subject to review at the project level where the effects of infill development have been addressed in a planning level decision or by uniformly applicable development policies." Residential, commercial, and retail development, public office buildings, transit stations, and schools are eligible for this streamlining provided they meet the following requirements: (1) are located in an urban area on a site that has been previously developed or adjoins existing qualified urban uses on at least 75 percent of the site's perimeter; (2) satisfy the performance standards provided in Appendix M of the CEQA Guidelines; and (3) are consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in either a sustainable communities strategy or an alternative planning strategy, with some exceptions. Some development and transportation projects included in the proposed Plan may be eligible to use a streamlined version of the environmental review process.

Senate Bill 743

SB 743 (2013) (PRC Sections 21099 and 21155.4) created an exemption from CEQA for certain projects that are consistent with a specific plan. (See PRC Section 21155.4.) A specific plan is a local plan that contains specific policies and development regulations for a defined area, such as a downtown core or along a transit corridor. The exemption applies if a project meets all of the following criteria:

- It is a residential, employment center, or mixed-use project.
- It is located within a TPA.
- The project is consistent with a specific plan for which an EIR was certified.
- It is consistent with an adopted SCS or alternative planning strategy.

The exemption cannot be applied if the project would cause new or worse significant environmental impacts compared to what was analyzed in the EIR for the specific plan. If the project would cause new or worse significant environmental impacts, supplemental environmental review must be conducted. SB 743 also specifies that aesthetic and parking impacts of residential, mixed-use residential, or employment center uses on infill sites within a TPA shall not be considered significant effects on the environment (see PRC Section 21099[d]). **Table 1-2** in Chapter 1 describes the SB 375 requirements for CEQA streamlining related to an SCS.

California Coastal Act

The California Coastal Commission is one of California's three designated coastal management agencies that administer the federal Coastal Zone Management Act (CZMA) in California. In partnership with coastal cities and counties, it plans and regulates the use of land and water in the coastal zone. Development activities, which are broadly defined by the CZMA to include (among other activities) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters, generally require a coastal permit from either the California Coastal Commission or the local government. CZMA gives State coastal management agencies regulatory control over all activities that may affect coastal resources, including any new developments, and highway improvement projects that use federal funds.

The mission of the California Coastal Commission, established by voter initiative in 1972 and later made permanent by the legislature through adoption of the California Coastal Act of 1976, is to protect, conserve, restore, and enhance environmental and human-based resources of the California coast and ocean for environmentally sustainable and prudent use by current and future generations. The

California Coastal Act includes specific policies that address issues such as shoreline public access and recreation, lower-cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, industrial uses, water quality, offshore oil and gas development, transportation, development design, power plants, ports, and public works. The coastal zone, which was specifically mapped by the legislature, covers an area larger than the State of Rhode Island. On land, the coastal zone varies in width from several hundred feet in highly urbanized areas to up to 5 miles in certain rural areas, and offshore, the coastal zone includes a 3-mile-wide band of ocean. The coastal zone established by the Coastal Act does not include San Francisco Bay, where development is regulated by BCDC.

The California Coastal Commission plans and regulates the use of land and water in the coastal zone in partnership with coastal cities and counties. Development activities are defined by the Coastal Act to include (among others) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters, and they generally require a coastal permit from either the Coastal Commission or the local government. Implementation of Coastal Act policies is accomplished primarily through the preparation of local coastal programs (LCPs), which are required to be completed by each of the 15 counties and 60 cities located in whole or in part in the coastal zone. Completed LCPs must be submitted to the California Coastal Commission for review and approval. An LCP includes a land use plan, which may be the relevant portion of the local general plan, including any maps necessary to administer it and the zoning ordinances, zoning district maps, and other legal instruments necessary to implement the land use plan. Coastal Act policies are the standards by which the commission evaluates the adequacy of LCPs, and amendments to certified land use plans and LCPs become effective only after approval by the commission. The California Coastal Commission is required to review each certified LCP at least once every 5 years to ensure that coastal resources are effectively protected in light of changing circumstances.

The Bay Area coastline is part of the North Central Coast Area. As of 2020, LCPs were effectively certified for Sonoma County, Marin County, San Francisco City and County, San Mateo County, Daly City, and the City of Pacifica (certification draft sent to the California Coastal Commission June 2020).

McAteer-Petris Act

BCDC is dedicated to the protection and enhancement of San Francisco Bay and the Suisun Marsh and to the encouragement of their responsible use. As the other designated coastal zone management agency, and pursuant to the McAteer-Petris Act, BCDC is designated as the agency responsible for the protection of the bay and its natural resources and for the regulation of the development of the bay and shoreline to their highest potential with a minimum of bay fill. For development projects, including transportation projects, BCDC jurisdiction includes the bay itself (including San Pablo and Suisun Bays, sloughs, and certain creeks) and, in general, a 100-foot band along the bay shoreline.

The McAteer-Petris Act further specifies that certain water-oriented land uses should be permitted on the shoreline, including ports, water-related industries, airports, wildlife refuges, water-oriented recreation and public assembly, desalinization plants, and power plants requiring large amounts of water for cooling purposes. BCDC implements the SF Bay Plan to control bay filling dredging and shoreline development. To minimize the future filing of the bay, the Bay Plan identifies Priority Use Areas (PUAs), which are reserved for these water-oriented land uses. It is necessary to obtain BCDC approval before undertaking any work within 100 feet of the bay shoreline (including grading); filling of the bay or certain tributaries of the bay; dredging; Suisun Marsh projects; and any filling, new construction, major remodeling, substantial change in use, and many land subdivisions in the bay,

along the shoreline, in salt ponds, duck hunting preserves or other managed wetlands adjacent to the bay.

Regional Conservation Investment Strategy Program

AB 2087 (2016) created the California Department of Fish and Wildlife's Regional Conservation Investment Strategy pilot program and was amended by SB 103 on July 21, 2017. The program uses a science-based approach to identify conservation and enhancement opportunities that, if implemented, will help California's declining and vulnerable species by protecting, creating, restoring, and reconnecting habitat and may contribute to species recovery and adaptation to climate change and resiliency. The program consists of three components: regional conservation assessments (RCAs), regional conservation investment strategies (RCISs), and mitigation credit agreements (MCAs). An RCA is a voluntary, nonregulatory, nonbinding conservation assessment that includes information and analyses of important species, ecosystems, protected areas, and habitat linkages at the U.S. Department of Agriculture ecoregion scale and may include more than one ecoregion. An RCIS is a voluntary, nonregulatory, and nonbinding conservation assessment that includes information and analyses relating to the conservation of focal species, their associated habitats, and the conservation status of the RCIS land base. An RCIS establishes biological goals and objectives at the species level and describes conservation actions and habitat enhancement actions that, if implemented, will contribute to those goals and objectives. An MCA is a mitigation credit agreement developed under an approved RCIS. An MCA is developed in collaboration with the California Department of Fish and Wildlife to create mitigation credits by implementing the conservation or habitat enhancement actions identified in an RCIS. RCIS's have been adopted in Alameda, Contra Costa, and Santa Clara Counties.

Quimby Act

The 1975 Quimby Act (California Government Code Section 66477) authorized cities and counties to pass ordinances requiring that developers set aside land, donate conservation easements, or pay fees for park improvements. The act states that the dedication requirement of parkland can be a minimum of 3 acres per thousand residents or more and up to 5 acres per thousand residents if the existing ratio is greater than the minimum standard. Revenues generated through in-lieu fees collected under the Quimby Act cannot be used for the operation and maintenance of park facilities. In 1982, the act was substantially amended. The amendments further defined acceptable uses of and restrictions on the use of Quimby Act funds, provided acreage/population standards and formulas for determining the exaction, and indicated that the exactions must be closely tied to a project's impacts as identified through studies required by CEQA.

State Open Space Standards

State planning law (Government Code Section 65560) provides a structure for the preservation of open space by requiring every city and county in the State to prepare, adopt, and submit to the Secretary of the Resources Agency a "local open-space plan for the comprehensive and long-range preservation and conservation of open-space land within its jurisdiction." The following open space categories are identified for preservation:

- **open space for public health and safety**, including, but not limited to, areas that require special management or regulation because of hazardous or special conditions;
- **open space for the preservation of natural resources**, including, but not limited to, natural vegetation, fish and wildlife, and water resources;

- **open space for resource management and production**, including, but not limited to, agricultural and mineral resources, forests, rangeland, and areas required for the recharge of groundwater basins;

- **open space for outdoor recreation**, including, but not limited to, parks and recreational facilities, areas that serve as links between major recreation and open space reservations (such as trails, easements, and scenic roadways), and areas of outstanding scenic and cultural value; and

- **open space for the protection of Native American sites**, including, but not limited to, places, features, and objects of historical, cultural, or sacred significance, such as Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines located on public property (further defined in PRC Sections 5097.9 and 5097.993).

State Public Park Preservation Act of 1971

The primary instrument for protecting and preserving parkland is the State Public Park Preservation Act of 1971 (PRC Sections 5400–5409). Under the act, cities and counties may not acquire any real property that is in use as a public park for any nonpark use unless compensation or land, or both, are provided to replace the parkland acquired. This ensures no net loss of parkland and facilities.

REGIONAL AND LOCAL REGULATIONS

In accordance with Government Code Section 65584(a), ABAG has been designated by the State and federal governments as the official comprehensive planning agency for the Bay Area. ABAG reviews projects of regional significance for consistency with regional plans. Plan Bay Area provides a policy guide for planning the region's housing, economic development, environmental quality, transportation, recreation, and health and safety.

MTC Resolution 3434 Transit Oriented Development Policy for Regional Transit Expansion Projects

MTC adopted a Transit Oriented Development (TOD) Policy (Resolution 3434) in 2005 to support the development of communities around new transit lines and stations identified as part of the Resolution 3434 Regional Transit Expansion Program. Resolution 3434 is intended to improve the cost-effectiveness of regional investments in new transit expansions to ease the Bay Area's chronic housing shortage, create vibrant new communities, and help preserve open space through ensuring that new development patterns are more supportive of transit. The three key elements of the regional TOD policy are:

- corridor-level thresholds to quantify appropriate minimum levels of development around transit stations along new corridors;

- local station area plans that address future land use changes, station access needs, circulation improvements, pedestrian-friendly design, and other key features in a TOD; and

- corridor working groups that bring together congestion management agencies (CMAs), city and county planning staff, transit agencies, and other key stakeholders to define expectations, timelines, roles and responsibilities for key stages of the transit project development process.

TOD policy application applies only to physical transit extensions funded in Resolution 3434 with regional discretionary funds (as defined in the policy guidelines), regardless of the level of funding. However, single-station extensions to international airports are not subject to the TOD policy because of the infeasibility of housing development. The implementation process of the TOD policy involved

coordination with the transit agency, city, and MTC/CMA/ABAG to determine thresholds for station areas and housing. Each transit extension project funded in Resolution 3434 must determine corridor-level thresholds, which may vary by modes of transit, in the form of minimum number of housing units along the corridor. Along with determining thresholds, each physical transit extension project seeking funding from Resolution 3434 must demonstrate that the thresholds for the corridor are met through existing development and adopted station area plans that commit local jurisdictions to a level of housing that meets the threshold.

One Bay Area Grant Program

MTC's One Bay Area Grant program (OBAG) is a funding approach that aligns MTC's investments with support for focused growth. Established in 2012, OBAG taps federal funds to maintain MTC's commitments to regional transportation priorities while also advancing the Bay Area's land use and housing goals. OBAG includes both a regional program and a county program that:

- targets project investments in PDAs and
- rewards cities and counties that approve new housing construction and accept allocations through the RHNA process.

Cities and counties can use these OBAG funds to invest in:

- local street and road maintenance,
- streetscape enhancements,
- bicycle and pedestrian improvements,
- transportation planning,
- Safe Routes to School projects, and
- PCAs.

MTC in late 2015 adopted a funding and policy framework for the second round of OBAG grants. Known as OBAG 2 for short, the second round of OBAG funding is projected to total about $800 million to fund projects from 2017-18 through 2021-22.

California Government Code, Section 56000

Each county in California has a local agency formation commission (LAFCO), which is the agency that has the responsibility to create orderly local government boundaries, with the goals of encouraging the orderly formation of local governmental agencies and the preservation of open space lands and discouraging urban sprawl. LAFCOs are governed by Section 56000 of the California Government Code. This legislation sets the commission's powers and duties, procedures for establishing and changing governmental boundaries, and other Statewide policies that LAFCOs must consider while making their determinations. While LAFCOs have no direct land use power, their actions determine which local government will be responsible for planning new areas. LAFCOs address a wide range of boundary actions, including creation of spheres of influences for cities, adjustments to boundaries of special districts, annexations, incorporations, detachments of areas from cities, and dissolutions of cities.

City and County General Plans

The most comprehensive land use planning for the San Francisco Bay Area region is provided by city and county general plans, which local governments are required by State law (California Government Code Section 65300 et seq.) to prepare as a guide for future development. The general plan contains goals and policies concerning topics that are mandated by State law or that the jurisdiction has chosen to include. Required topics are land use, circulation, housing, conservation, open space, noise,

and safety. Other topics that local governments frequently choose to address are public facilities, parks and recreation, community design, and/or growth management. City and county general plans must be consistent with each other. County general plans must cover areas not included by city general plans (i.e., unincorporated areas). Issues pertaining to land use are described in the land use element, issues pertaining to agricultural and forest resources are described in the conservation element, and issues pertaining to open space are described in the open space element of general plans.

Specific and Master Plans

A city or county may also provide land use planning by developing community or specific plans for smaller, more specific areas within their jurisdiction. These plans are more localized and provide focused guidance for developing a specific area, including development standards tailored to the area, and systematic implementation of the general plan.

Zoning

The city or county zoning code is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different uses and identifies which uses are allowed in the various zoning districts of the jurisdiction. Since 1971, State law has required the city or county zoning code to be consistent with the jurisdiction's general plan (California Government Code Section 65860).

Growth Control Measures

Local growth control endeavors to manage community growth by various methods, including tying development to infrastructure capacity or traffic level of service standards, limiting the number of new housing units, setting limits on the increase of commercial square footage, linking development to a jobs-to-housing balance, and adopting urban growth boundaries. These goals and others can be achieved through the adoption of a countywide growth management program. Growth management programs, including those related to adopting urban growth boundaries, have been implemented by county government and/or cities in all of the nine Bay Area counties. **Table 3.11-3** lists cities and counties that have implemented urban growth boundaries and countywide land use measures.

Table 3.11-3: Bay Area Urban Growth Boundaries and Wide Land Use Measures

County	Wide Measure	Cities with an Urban Growth Boundary
Alameda	Yes	Dublin, Fremont, Hayward, Livermore, Pleasanton
Contra Costa	Yes	Antioch, Contra Costa, Danville, El Cerrito, Hercules, Martinez, Oakley, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, Walnut Creek
Marin	Yes	Novato
Napa	Yes	American Canyon, Napa, St. Helena, Yountville
San Francisco	No	--
San Mateo	Yes	Urban-Rural Boundary applies to all jurisdictions in the
Santa Clara	Yes	Cupertino, Gilroy, Los Gatos, Milpitas, Morgan Hill, Palo Alto, San José
Solano	Yes	Benicia, Fairfield, Rio Vista, Vallejo, Vacaville
Sonoma	Yes	Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, Windsor

Notes: San Francisco has no affected farmland acres.
Source: Greenbelt Alliance 2020

3.11.4 Impact Analysis

SIGNIFICANCE CRITERIA

Significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the Plan Bay Area 2040 EIR (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- physically divide an established community (Criterion LU-1);
- cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect (Criterion LU-2);
- induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure) (Criterion LU-3); or
- displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere (Criterion LU-4).

METHOD OF ANALYSIS

This program-level EIR evaluates potential impacts on land use, population, and housing based on the location of the proposed Plan's footprint associated with the forecasted development pattern (i.e., the land use growth footprint), sea level rise adaptation infrastructure (i.e., sea level rise adaptation footprint), and transportation projects (i.e., transportation system footprint) relative to the known distribution of land use, population, and housing throughout the Bay Area. The baseline for the following analysis reflects existing conditions when the EIR NOP was released in September 2020.

Quantitative results are presented for the region (i.e., the entire footprint, often summarized by county) and for the portions of the land use growth footprint specifically within transit priority areas (TPAs). TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county.

For this impact assessment, a geographic information system (GIS) was used to digitally overlay the proposed Plan's footprints associated with forecasted land use development, sea level rise adaptation infrastructure, and transportation projects onto parks and open space, BCDC's Priority Use Areas, Delta Plan/Primary Zone, and the coastal zone.

This evaluation of land use, population, and housing impacts assumes that construction and development under the proposed Plan would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts. Land use impacts related implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would be inherently operational in nature, and the following analyses discuss effects of the proposed Plan following implementation. Therefore, construction impacts are not addressed separately. The physical effects of future construction are addressed in the other EIR technical

sections. For additional information on analysis methodology, refer to Section 3.1, "Approach to the Analysis."

Residential Displacement

This assessment evaluates potential direct impacts to existing communities, including potential displacement of residents, as a result of the proposed land use strategy and transportation projects. This analysis provides a qualitative approach to address effects of implementation of the proposed Plan. The Equity Report (which is available as a supplemental report to Plan Bay Area 2050) provides an analysis of risk of displacement; this information was used in consideration of potential Plan effects.

CEQA requires analysis and mitigation of potentially substantial adverse changes in the physical environment (PRC Sections 21151, 21060.5, and 21068). "Economic and social changes resulting from a project are not treated as significant environmental effects [citation] and, thus, need not be mitigated or avoided under CEQA." (*San Franciscans for Reasonable Growth v. City and County of San Francisco* (1984) 209 Cal.App.3d 1502, 1516.). Physical changes in the environment caused by economic or social effects of a project may constitute significant environmental effects (CEQA Guidelines Sections 15131 and 15064(e)). Social and economic effects in and of themselves, however, are not significant effects on the environment under CEQA (*Melom v. City of Madera* (2010) 183 Cal.App.4th 41, 55.).

Consistency with Local Growth Controls

The EIR qualitatively evaluates local and sub-regional growth controls and the potential impacts of the proposed Plan on those efforts, including:

- general plan policies and development controls that require voter approval (such as those set by initiative),
- general plan policies and development controls based on joint powers agreements (such as regional open space reserves, buffers between communities, or urban service boundaries and urban limit lines), and
- general plan policies and development controls reflecting infrastructure constraints or severe environmental constraints.

Local jurisdictions are responsible for adopting land use policies as part of their general and neighborhood plans and implementing them through local ordinance. As a result, MTC and ABAG have no direct control over local land use planning, nor does SB 375 require that local jurisdictions align their general plans to conform to the proposed Plan; this alignment is discretionary but encouraged through the availability of streamlined environmental review for consistent projects. MTC's OBAG targets federal transportation funds to projects in PDAs to support the proposed Plan's focused growth strategy.

IMPACTS AND MITIGATION MEASURES

Impact LU-1: Physically divide an established community (PS)

Land Use Impacts

The proposed Plan was designed to accommodate the people, households, and jobs identified in the regional growth forecast. The proposed Plan designates growth geographies as areas prioritized to accommodate the forecasted regional growth. The proposed Plan's core strategy remains "focused growth" in existing communities along the existing transportation network. This reflects the

foundational and regional growth pattern established in the original Plan Bay Area (2013) and Plan Bay Area 2040. Urbanization—in this context defined as development on land not designated as urban built-up land according to the FMMP—is forecasted to occur on approximately 12,300 acres, representing 31 percent of the land use growth footprint, as described in Section 2.2.3, "Conditions Under the Proposed Plan." The greatest amount of urbanization is forecasted to occur in Contra Costa County (5,300 acres), followed by Solano and Alameda Counties (see Impact AGF-1 in Section 3.3, "Agriculture and Forestry Resources").

The majority (69 percent) of the proposed Plan's land use growth footprint would occur on land identified by the FMMP as urban built-up. The proposed Plan's strategies and growth geographies would create more centralized residential areas and commercial centers. Development and redevelopment to accommodate the regional growth forecast would typically occur on vacant or underutilized sites. Thus, the land use growth footprint would not result in the physical division of established communities. Rather, development would be integrated into established communities. Thus, this impact would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

The proposed Plan's sea level rise adaptation footprint would include a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates that would be located along the shoreline edges of existing communities. This infrastructure is not anticipated to physically divide established communities by creating a physical barrier between existing established communities. The sea level rise adaptation infrastructure would protect established shoreline communities from sea level rise. Sea level rise adaptation infrastructure would be required to conform to land use restrictions detailed in the Bay Plan or applicable LCP. In cases where the sea level rise adaptation footprint overlaps a PUA, the uses within the PUA must be consistent with Bay Plan requirements.

Potential for the proposed Plan to result in a barrier that would divide communities from the shoreline, which would affect the ability of residents to access and utilize regionally important water-oriented uses, such as shoreline parks and trails, water-related recreation, ports, water-related industry, and wildlife refuges along the bay or coast is addressed in Section 3.13, "Public Services and Recreation." The potential for sea level rise adaptation infrastructure to physically divide an established community would be less than significant (LTS).

Transportation System Impacts

The proposed Plan includes a variety of transportation projects and programs, including regional transit projects, local transit projects, road pricing improvements, and highway and roadway improvements projects. Most of the major proposed transportation projects would be located in existing rights-of-way, meaning they would not create a new physical division within existing communities. Some projects in the proposed Plan could improve or expand interconnections between neighborhoods and communities that are currently separated by major transportation corridors. Examples include bridges or undercrossings (with bike lanes) of commuter rail lines, the Transbay railway, bicycle/pedestrian overcrossings of freeways, and urban trail and pathway projects. Additionally, many proposed projects, such as expansion of transit services, are intended to improve mobility and accessibility and may, as a result, improve community connectivity. However, larger infrastructure projects, such as rail extension or expansion projects, may require the acquisition of land in existing communities, which may divide established communities. These transportation projects would require subsequent project-level environmental review prior to their implementation. Detailed project design or specific plans could address potential divisions of existing communities. Through regional programs such as OBAG, MTC and ABAG would continue to support planning efforts

for locally sponsored traffic calming and alternative transportation initiatives, such as paths, trails, overcrossings, bicycle plans, that foster improved neighborhoods and community connections. However, MTC and ABAG cannot require local implementing agencies to implement these projects. Project approval would remain subject to the discretion of local agencies. Transportation project impacts related to division of an established community would be potentially significant (PS). be potentially significant (PS).

Conclusion

Implementation of the proposed Plan's land use strategies would result in future development being integrated into existing communities along the existing transportation network and would therefore not physically divide established communities. Sea level rise adaptation infrastructure would primarily be located along the shoreline or other waterways, which would limit the potential for this infrastructure to physically divide an established community. Many proposed transportation projects, such as expansion of transit services or the building of active transportation infrastructure, are intended to improve mobility and accessibility and may, as a result, improve community connectivity. However, larger infrastructure projects, such as new rail extension or expansion projects, may require the acquisition of land in existing communities, which may divide established communities. As a result, this impact would be **potentially significant (PS)**. Mitigation Measure LU-1 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure LU-1 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Incorporate design features such as sidewalks, bike lanes, and bike/pedestrian bridges or tunnels that maintain or improve access and connections within existing communities and to public transit through regional programs, such as OBAG.
- Encourage implementing agencies to orient transportation projects to minimize impacts on existing communities by:
  - selecting alignments within or adjacent to existing public rights-of-way;
  - designing sections above or below grade to maintain viable vehicular, cycling, and pedestrian connections between portions of communities where existing connections are disrupted by the transportation project; and
  - wherever feasible incorporating direct crossings, overcrossings, or undercrossings at regular intervals for multiple modes of travel (e.g., pedestrians, bicyclists, vehicles).

Where it has been determined that it is infeasible to avoid creating a barrier in an established community, encourage implementing agencies to consider other measures to reduce impacts, including but not limited to:

- shifting alignments to minimize the area affected;
- reducing the proposed right-of-way take to minimize the overall area of impact; and
- providing for bicycle, pedestrian, and vehicle access across improved roadways.

Significance after Mitigation

Implementation of Mitigation Measure LU-1 would reduce the potentially significant impact of division of an established community because it would implement design features that would improve access and connections within existing communities and to public transit, which would reduce the effects of separation on existing communities. Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, because sites are unique, it cannot be concluded with certainty that all potentially significant divisions of established communities could be avoided. This impact would remain **significant and unavoidable (SU)**.

Impact LU-2: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect (PS)

Land Use Impacts

General Plans and Specific Plans

The proposed Plan's land use strategies are designed to accommodate the region's forecasted growth of 1.4 million households and 1.4 million jobs from 2015 through 2050. Strategy H03, "Allow a Greater Mix of Housing Densities and Types in Growth Geographies," would call for increased density and intensity of development in many designated growth geographies compared to that currently planned for and/or allowed by the local jurisdictions. Local lead agencies would determine consistency with adopted general plans and specific plans by conforming the projects or amending land use designations. If the lead agency wishes to approve a project that is consistent with the proposed Plan in order for the project to take advantage of streamlined environmental review, but the project is inconsistent with an adopted general plan or specific plan, project approval would include amendment of the general plan or specific plan.

The proposed Plan contains strategies to guide anticipated population, households, and employment growth in the Plan area by 2050. The land use strategies were developed as a result of MTC's bottom-up planning process outlined in the proposed Plan. This process involved extensive outreach to and input from local jurisdictions, including counties and local city planners. While the Plan was developed primarily from assumptions derived from local general plans and input from local governments and transportation agencies, SB 375 does not require local land use policies, regulations, or general plans to be consistent with the Plan. Also, although the land use strategies included in the Plan are generally compatible with county- and regional-level general plans, local general plans may not have been updated since the adopted 2017 RTP/SCS. Therefore, it is possible that there could be incompatibilities with existing general plans in the region.

Two of the proposed Plan's environmental strategies—Strategy EN04, "Maintain Urban Growth Boundaries," and Strategy EN05, "Protect and Manage High-Value Conservation Lands"—expand access to parks and open space and seek to reduce conflicts with applicable open space protection policies by focusing new growth in existing urban areas to help preserve natural areas. Furthermore, Strategy EN06, "Modernize and Expand Parks, Trails, and Recreation Facilities," would invest in parks, trails, and open spaces to expand access across the region. However, portions of the proposed Plan's land use growth footprint (approximately 740 acres) could overlap with open space/parklands. The largest overlaps are anticipated in Santa Clara, Sonoma, Contra Costa, and San Francisco Counties (**Table 3.11-4**). In TPAs, open space/parklands included in the land use growth footprint are smaller,

totaling 150 acres regionwide. While TPAs are areas in which growth is focused, they would not be developed in their entirety and would include diverse land uses, in addition to jobs and housing, that could include preservation of open space and parklands.

Table 3.11-4: Acreage of Land Use Growth Footprint within Parks and Open Space

County		Total (acres)
Alameda	County Total	40
	Within TPAs	20
Contra Costa	County Total	120
	Within TPAs	< 1
Marin	County Total	20
	Within TPAs	10
Napa	County Total	30
	Within TPAs	< 1
San Francisco	County Total	110
	Within TPAs	20
San Mateo	County Total	80
	Within TPAs	20
Santa Clara	County Total	170
	Within TPAs	60
Solano	County Total	7
	Within TPAs	< 1
Sonoma	County Total	160
	Within TPAs	20
Regional Total	County Total	740
	Within TPAs	150

Notes: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.

Sources: Data compiled by MTC and ABAG in 2021 based on data from California Conservation Easement Database 2020 and California Protected Areas Database 2020

Local Coastal Programs

Sonoma County, Marin County, the City and County of San Francisco, San Mateo County, and the cities of Daly City, Pacifica, and Half Moon Bay all have certified LCPs. As calculated using a GIS-based overlay analysis, the land use growth footprint overlaps with areas of the Coastal Zone in approximately 90 acres in San Mateo County, 10 acres in San Francisco County, 3 acres in Sonoma County, and less than one acre in Marin County. Development that occurs within the Coastal Zone would be subject to the respective LCP. LCPs contain, generally, a land use plan, development code, and policy and zoning maps. Development in the coastal zone is subject to a coastal development permit when there would be change in the use of land or water. The overall goal of applying for and receiving a coastal development permit is to ensure that a project is consistent with the Coastal Act, and by extension LCPs. However, conflicts could occur between specific projects and LCPs.

BCDC

The San Francisco Bay Plan establishes policies to guide the use of San Francisco Bay and its shoreline. In particular, BCDC, which is responsible for implementation of the Bay Plan, is authorized to control both bay filling/dredging and shoreline development. To minimize the future filling of the bay, the Bay Plan identifies PUAs, which are reserved for water-oriented land uses including ports, water-related industries, airports, wildlife refuges, water-oriented recreation and public assembly, desalinization plants, and power plants requiring large amounts of water for cooling purposes.

Regionally, overlap between PUAs and the land use growth footprint is approximately 870 acres. As shown in **Table 3.11-5**, the overlap is greatest in Contra Costa and San Francisco Counties. Individual projects that overlap with PUAs would be required to conform to land use restrictions detailed in the Bay Plan. Generally, implementation of the proposed Plan is intended to result in development of communities that would complement transportation systems; however, some of the proposed uses in the projected development area may conflict with BCDC land use policies. In cases where the projected development area overlaps a PUA, the uses within the PUA must be consistent with Bay Plan requirements. Land use compatibility would be further addressed during subsequent environmental review as individual projects are implemented and detailed project design or specific plans resolve land use inconsistencies. This would include consideration of zoning and land use designation amendments, as appropriate, to allow for implementation of a specific project. However, conflicts could occur between specific projects and the Bay Plan.

Table 3.11-5: Acreage of Land Use Growth Footprint within BCDC's Priority Use Areas

County		Total (acres)
Alameda	County Total	30
	Within TPAs	10
Contra Costa	County Total	570
	Within TPAs	< 1
Marin	County Total	< 1
	Within TPAs	0
Napa	County Total	0
	Within TPAs	0
San Francisco	County Total	190
	Within TPAs	120
San Mateo	County Total	40
	Within TPAs	30
Santa Clara	County Total	3
	Within TPAs	0
Solano	County Total	50
	Within TPAs	20
Sonoma	County Total	0
	Within TPAs	0
Regional Total	County Total	870
	Within TPAs	180

Notes: TPA acreages are a subset of county acreages. Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on data from BCDC 2020

Delta Plan

Portions of Alameda, Contra Costa, and Solano Counties overlap with areas covered by the Delta Plan. The boundaries, which are described in Delta Plan Policy DP Pl, Locate New Urban Development Wisely (23 CCR Section 5010), are intended to strengthen existing Delta communities while protecting farmland and open space, providing land for ecosystem restoration needs, and reducing flood risk. Delta Plan Policy DP Pl is consistent with the Delta Reform Act (PRC Section 29702), which states that one of the basic goals of the State for the Delta is to "[p]rotect, maintain, and, where possible, enhance and restore the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities. Projected development could affect consistency with the Delta Plan adopted by the Delta Stewardship Council because development at the urban edge could adversely impact agriculture, natural resources, recreational land, and water quality in the Delta. In

order to be consistent with Delta Plan Policy DP P1, new residential, commercial, or industrial development is permitted outside the urban boundaries only if it is consistent with the land use designated in the relevant county general plan as of the date of the Delta Plan's adoption (January 2019). Jurisdictions with land in the Primary Zone are required by PRC Section 29763 to adopt general plans with land uses consistent with the goals and policies in the Delta Plan, subject to review by the Delta Stewardship Council. Therefore, subsequent projects within the proposed Plan that fall within the Delta Plan boundaries would be required to demonstrate consistency with the plan and satisfy mitigation requirements.

Sea Level Rise Adaptation Impacts

General Plans and Specific Plans

Implementation of the proposed adaption infrastructure archetypes would affect shoreline development as compared to that planned for/allowed by the local jurisdiction. Development that occurs within land subject to adopted General Plan and Specific Plans would be subject to the respective land use designations. Local lead agencies would determine consistency with adopted General Plans and Specific Plans by conforming the projects or amending land use designations. The bay shoreline includes large areas of open space in parks and wildlife refuges. Implementation of the Plan would have a potential to result in conflicts with open space/parklands protection policies. Portions of the proposed Plan's sea level rise adaptation footprint (approximately 1,600 acres) overlap with open space/parklands. The largest overlaps are anticipated in Santa Clara, Alameda, and Marin Counties (**Table 3.11-6**). Thus, conflicts could occur between specific projects and local general and specific plans.

Table 3.11-6: Acreage of Sea Level Rise Adaptation Footprint within Parks and Open Space

County	Total (acres)
Alameda	380
Contra Costa	40
Marin	320
Napa	<1
San Francisco	2
San Mateo	210
Santa Clara	590
Solano	270
Sonoma	40
Regional Total	1,600

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.

Sources: Data compiled by MTC and ABAG in 2021 based on data from California Conservation Easement Database 2020 and California Protected Areas Database 2020

Local Coastal Programs

Sonoma County, Marin County, the City and County of San Francisco, San Mateo County, and the cities of Daly City, Pacifica, and Half Moon Bay all have certified LCPs. As calculated using a GIS-based overlay analysis, the sea level rise adaptation footprint overlaps with areas of the Coastal Zone in approximately 20 acres in Marin County. Development that occurs within the Coastal Zone would be subject to the respective LCP. LCPs contain, generally, a land use plan, development code, and policy and zoning maps. Development in the coastal zone is subject to a coastal development permit when

there would be change in the use of land or water. The overall goal of applying for and receiving a coastal development permit is to ensure that a project is consistent with the Coastal Act and, by extension, LCPs. However, conflicts could occur between specific projects and LCPs

BCDC

The San Francisco Bay Plan establishes policies to guide the use of San Francisco Bay and its shoreline. In particular, BCDC, which is responsible for implementation of the Bay Plan, is authorized to control both bay filling/dredging and shoreline development. To minimize the future filling of the bay, the Bay Plan identifies PUAs, which are reserved for water-oriented land uses including ports, water-related industries, airports, wildlife refuges, water-oriented recreation and public assembly, desalinization plants, and power plants requiring large amounts of water for cooling purposes.

Regionally, overlap between PUAs and the sea level rise adaptation footprint is approximately 1,300 acres. As shown in **Table 3.11-7**, the overlap is greatest in Santa Clara, San Mateo, Alameda, and Solano Counties. Individual projects that overlap with PUAs would be required to conform to land use restrictions detailed in the Bay Plan. Generally, implementation of the proposed Plan is intended to result in shoreline adaptation that maximizes use of green archetypes and maintains or provides access to shoreline PUAs. In cases where the projected footprint associated with sea level rise adaptation infrastructure overlaps a PUA, the uses within the PUA must be consistent with Bay Plan requirements. Land use compatibility would be further addressed during subsequent environmental review as individual projects are implemented and detailed project design or specific plans resolve land use inconsistencies. However, conflicts could occur between specific projects and the Bay Plan.

Table 3.11-7: Acreage of Sea Level Rise Adaptation Footprint within BCDC's Priority Use Areas

County	Total (acres)
Alameda	270
Contra Costa	80
Marin	110
Napa	0
San Francisco	3
San Mateo	300
Santa Clara	310
Solano	220
Sonoma	10
Regional Total	1,300

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on data from BCDC 2020

Transportation System Impacts

General Plans and Specific Plans

The majority of proposed transportation projects were nominated by local jurisdictions and may already exist in local or Countywide Transportation Plans. While it is not anticipated that the proposed Plan's transportation strategies would conflict with local general plans, where inconsistencies could occur local agencies could amend their general plans to be consistent with the proposed Plan.

Transportation projects that require the expansion of existing, or designation of new, rights-of-way have the potential to result in direct and indirect effects on open space/parkland—conversion, fragmentation, and use conflicts—similar to those of the land use growth footprint. Generally, to minimize environmental impacts and project costs, it is common practice to design the footprint of new transportation projects within existing rights-of-way as much as feasible. This practice is assumed as a part of this analysis. However, development of some projects, such as roadway widening, roadway extension, and transit expansion projects, could result in the disturbance and/or loss of open space / parkland. The proposed Plan's transportation projects footprint has the potential to convert 650 acres of parks and open space. The largest overlaps are anticipated in Alameda and Solano Counties (**Table 3.11-8**). Local jurisdictions are precluded by State law from undertaking land use activities inconsistent with their respective general plans. While transportation projects on State and interstate highways and those sponsored by special districts are not necessarily derived from local general plans, these project sponsors work with their respective county CMAs to ensure consistency with local jurisdiction planning efforts. As a result, the transportation projects in the proposed Plan are not expected to conflict with the land use designations of current local general plans.

Table 3.11-8: Acreage of Transportation Projects Footprint within Parks and Open Space

County	Total (acres)
Alameda	230
Contra Costa	70
Marin	< 1
Napa	4
San Francisco	20
San Mateo	30
Santa Clara	90
Solano	220
Sonoma	3
Regional Total	650

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on data from California Conservation Easement Database 2020 and California Protected Areas Database 2020

Local Coastal Programs

The proposed Plan's transportation projects footprint minimally overlaps with the Coastal Zone, with less than one acre of overlap occurring in San Francisco and San Mateo Counties. As described above, San Mateo County and San Francisco County have adopted LCPs, consistent with the Coastal Act. Development in the coastal zone is subject to a coastal development permit when there would be change in the use of land or water. The overall goal of applying for and receiving a coastal development permit is to ensure that a project is consistent with the Coastal Act, and by extension LCPs. Thus, inconsistencies with LCPs would not occur.

BCDC

Regionally, overlap between PUAs and the transportation projects footprint is approximately 290 acres. As shown in **Table 3.11-9**, the overlap is greatest in Solano, Alameda, San Mateo, and San Francisco Counties. Proposed transportation projects generally seek to improve access and mobility throughout the region and are expected to promote public access to lands within BCDC jurisdictions

in general. BCDC can permit auto and transit projects on bay fill only if the structure is a bridge. It is necessary to obtain BCDC approval before undertaking any work within 100 feet of the bay shoreline (including grading); filling of the bay or certain tributaries of the bay; dredging; Suisun Marsh projects; and any filling, new construction, major remodeling, substantial change in use, and many land subdivisions in the bay, along the shoreline, in salt ponds, and in duck hunting preserves or other managed wetlands adjacent to the bay. Future analysis would be conducted to identify areas of overlap between specific project footprints and these areas. However, conflicts could occur between specific projects and the Bay Plan.

Table 3.11-9: Acreage of Transportation Projects Footprint within BCDC's Priority Use Areas

County	Total (acres)
Alameda	80
Contra Costa	1
Marin	0
Napa	<1
San Francisco	40
San Mateo	50
Santa Clara	0
Solano	120
Sonoma	5
Regional Total	290

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum because of independent rounding.
Sources: Data compiled by MTC and ABAG in 2021 based on data from BCDC 2020

Delta Plan

Portions of Alameda, Contra Costa, and Solano Counties overlap with areas covered by the Delta Plan, adopted by the Delta Stewardship Council. The boundaries, which are described in Delta Plan Policy DP Pl, Locate New Urban Development Wisely (23 CCR Section 5010), are intended to strengthen existing Delta communities while protecting farmland and open space, providing land for ecosystem restoration needs, and reducing flood risk. Delta Plan Policy DP Pl is consistent with the Delta Reform Act (PRC Section 29702), which states that one of the basic goals of the State for the Delta is to "[p]rotect, maintain, and, where possible, enhance and restore the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities. Development of transportation projects could affect consistency with the Delta Plan if transportation projects were developed at the urban edge and had adverse impacts on agriculture, natural resources, recreational land, and water quality in the Delta. Therefore, subsequent transportation projects within the proposed Plan that fall within the Delta Plan boundaries would be required to demonstrate consistency with the plan and satisfy mitigation requirements.

Conclusion

Implementation of the proposed Plan could result in a land use development pattern, sea level rise adaption infrastructure, and transportation projects in areas that are not consistent with existing long-range plans, including local general plans, the Bay Plan, and LCPs. MTC does not have the authority to adopt, approve, implement, or otherwise regulate local or regional land use plans. In addition, cities and counties are not required to change their land use plans and policies, including general plans, to be consistent with the proposed Plan. Therefore, there is a potential for

inconsistencies with general plans and regional conservation plans. This impact would be **potentially significant (PS)**. Mitigation Measure LU-2 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure LU-2 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- MTC shall continue to provide targeted technical services, such as GIS and data support for cities and counties to update their general plans at least every 10 years, as recommended by the Governor's Office of Planning and Research.
- MTC shall provide technical assistance and regional leadership to encourage implementation of the Plan goals and strategies that integrate growth and land use planning with the existing and planned transportation network.

Significance after Mitigation

Mitigation Measure LU-2 would reduce significant impacts related to conflict with land use plans, policies, and regulations adopted for the purpose of avoiding or mitigating an environmental effect. Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, because of the regional nature of the analysis and MTC's lack of authority to ensure consistency with local and regional plans, there may still be instances in which conflicts with land use plans, policies, and regulations would occur. This impact would remain **significant and unavoidable (SU)** for purposes of this program-level review.

Impact LU-3: Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure) (LTS)

Land Use Impacts

As discussed in Chapter 2, "Project Description," the forecasted housing and employment growth includes the projected population distribution that would occur in 2050 if the policies and investments included in the Plan are implemented. The regional growth forecast projects the region's employment to grow by 1.4 million to just over 5.4 million total jobs between 2015 and 2050. Population is forecasted to grow by 2.7 million people, to a population of 10.3 million. This population would comprise over 4.0 million households, for an increase of nearly 1.4 million households from 2015. The draft regional growth forecast was released in spring 2020 and subsequently revised to integrate substantial reductions in population and employment levels due to the pandemic caused by the COVID-19 coronavirus and 2020 recession on the first decade of the planning period. In September 2020, MTC and ABAG approved the regional growth forecast (see Section 2.3, "Planning Assumptions"). The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that would result in focused housing and job growth concentrated primarily in or adjacent to already developed areas and along existing transit corridors. The proposed Plan does not induce growth; rather, it identifies integrated strategies to accommodate the forecasted growth.

Government Code Section 65080(b)(2)(B)(ii) requires that an RTP/SCS must accommodate all the population of the region, including all economic segments of the population, over the course of the

planning period of the regional transportation plan. In accordance with requirements, the proposed Plan's housing strategies detail how the region's forecasted 1.5 million new housing units could be accommodated over the next 30 years. The housing strategies continue the region's commitment to "focused growth" but are also intended to protect current residents from displacement, preserve existing affordable housing, and produce new housing to secure long-term affordability in order to address the Bay Area's housing crisis, especially housing at the lower income categories. As mandated by State Housing Law as part of the periodic (every eight years) process of updating local housing elements of the General Plan, ABAG is responsible for the allocation of regional housing need to jurisdictions in the region. As discussed in the Regulatory Framework above, ABAG is in the process of its RHNA Allocation Plan, which is expected to be adopted in 2022.

The proposed Plan's growth geographies build on local and regional planning efforts and include 216 locally nominated PDAs and 36 locally nominated PPAs within the nine-county Bay Area. HRAs—communities with well-resourced schools and easy access to jobs, parks, and other amenities—identified by the State of California were also included as a new housing growth geography to counterbalance housing policies that have historically led to limited housing development, particularly housing affordable to low-income households. Areas close to rail, ferry, or frequent bus service (TRAs) were also included as growth geographies to support climate emissions goals, with more housing near transit allowing more people to have access to sustainable transportation options.

Implementation of the proposed Plan's land use development pattern would accommodate 54 percent of the region's future growth within PDAs, 15 percent in PPAs, 11 percent in HRAs, 9 percent in TRAs, and 11 percent in HRA-TRAs. Proposed Plan strategies would move the region towards more compact, mixed-use development with a variety of housing types leading to more opportunities for walking and biking, more transit use, and shorter auto trips. Additionally, proposed Plan Strategy EN04, "Maintain Urban Growth Boundaries," confines new development within areas of existing development or areas otherwise suitable for growth within urban growth boundaries, as established by local jurisdictions. This would limit the potential for inducement of unplanned growth within the region.

Nonetheless, in some cases, implementation of the proposed Plan's land use development pattern would in some cases result in greater density/intensity of growth than included in current adopted local general plans. The proposed Plan does not change local land use policies; individual jurisdictions retain land use authority. As such, implementation of the proposed Plan would require the local jurisdiction to consider and resolve those differences through appropriate amendments to local planning documents and appropriate environmental review, thus avoiding impacts related to unplanned growth at the local level. The impacts of implementing the proposed Plan's land use development pattern are analyzed throughout this EIR.

Overall, the Plan accommodates forecasted growth through implementation of the Plan's land use strategies to intensify density in developed areas, rather than induces unplanned growth. Impacts would be less than significant (LTS).

Sea Level Rise Adaptation Impacts

The proposed Plan's sea level rise adaptation infrastructure would protect existing developed areas and support the proposed Plan's focused growth strategy by adapting shorelines and reducing sea level rise inundation hazards. Strategy EN01, "Adapt to Sea Level Rise," protects shoreline communities expected to be affected by sea level rise. The protection of existing communities would limit the potential for inducement of unplanned growth within the region. Impacts would be less than significant (LTS).

Transportation System Impacts

The proposed Plan's transportation strategies detail how the region's $573 billion in forecasted transportation revenues would be invested over the next 30 years. The proposed Plan strategies would move the region towards more compact, mixed-use development with a variety of housing types leading to more opportunities for walking and biking, more transit use, and shorter auto trips. Transportation strategies included in the proposed Plan would support increased density in existing urban areas by facilitating travel and would not be expected to induce population growth as these projects are growth accommodating and generally are intended to improve the existing transportation networks.

The proposed Plan would result in increased transit productivity, an increased bicycling and walking mode share, a decreased auto mode share, and decreased VMT per capita. This substantiates the conclusion that the strategic roadway expansions in the proposed Plan, in combination with other modal investments, support more compact development and more sustainable and more efficient development without inducing the type of population growth that would require development of more land for urban purposes. As a result, the transportation projects in the proposed Plan are not expected to induce substantial unplanned population growth. Impacts would be less than significant (LTS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would move the region toward more compact, mixed-use development with a variety of housing types. As discussed, the proposed Plan does not induce growth but accommodates growth forecasted to occur in the region. Additionally, proposed Plan strategies confine new development within areas of existing development or areas otherwise suitable for growth within urban growth boundaries, as established by local jurisdictions. This would limit the potential for inducement of unplanned growth within the region. Sea level rise adaptation infrastructure would protect existing development and locally planned growth. Transportation strategies likewise are designed to support existing uses and accommodate forecasted development rather than induce unplanned growth. Impacts would be **less than significant (LTS)**.

Mitigation Measures

None required.

Impact LU-4: Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere (PS)

Land Use Impacts

The discussion in this section addresses both regional and localized displacement, including displacement of lower-income residents. The proposed Plan's housing strategies support accommodation of the region's forecasted 1.5 million new housing units over the next 30 years. The housing strategies continue the region's commitment to "focused growth" but are also intended to protect current residents from displacement, preserve existing affordable housing, and produce new housing to secure long-term affordability in order to address the Bay Area's housing crisis. Protecting and preserving existing affordable housing, including policies and investments that ensure existing affordable housing is not converted into market rate housing is key to advancing the proposed Plan's vision for a more affordable region. Additionally, the proposed Plan takes on the region's decades-long housing affordability challenges and resulting displacement—affecting both renters and owners In the Bay Area—including legal protections and prohibition of exploitative landlord behaviors.

Strategies build upon existing State and local legislation to protect renters from discriminatory action from landlords or untenable rent increases, creating a standard of tenant protections and services available regionwide to limit displacement. These strategies are detailed in Chapter 2, "Project Description." These targets are discussed in the performance supplemental report to the Plan.

Displacement risk is a function of the location and availability of affordable housing near major job centers in a growing regional economy. As the growth in jobs (particularly those that pay higher wages) outpaces the supply of housing (particularly those that are affordable to lower-income households), the cost of housing inevitably rises faster than wages for all workers. In such market conditions, higher-income workers are better positioned to compete for the limited supply of housing opportunities, resulting in a higher risk of displacement for all other residents. To the extent that the private or the public sectors can provide more market rate and deed-restricted affordable housing in these communities, this risk subsides.

Displacement risk for lower-income residents may increase because of other reasons as well. These include:

- physical constraints such as a lack of available land for new housing in communities that have a significant number of jobs, with the resulting potential for redevelopment of existing residential areas with new employment or residential development;
- policy constraints such as regulations that hinder environmentally-sound development of infill sites or other sites that could support higher-density housing, and inadequate public spending on housing and transportation infrastructure;
- social constraints such as local community opposition to higher-density rental housing; and
- economic conditions, such as high land and labor costs, loss of household income as a result of a shrinking market for middle-wage jobs, and competition for available land from other uses.

The Bay Area is currently facing a severe housing shortage, leading to significant displacement pressures on the region's lower-income residents. These risks are expected to continue to increase with or without the adoption of the proposed Plan. To the extent that the proposed Plan provides incentives to local jurisdictions to plan for and build new housing at all income levels, preserve existing affordable housing, and implement anti-displacement policies and programs, the future risk of displacement will be lower than what can be anticipated otherwise.

Adoption of the proposed Plan does not authorize or provide entitlement to redevelopment or construction projects in the region. Rather, the proposed Plan is a collection of integrated strategies that set a vision for future development, which must still be reviewed, analyzed, and approved by local governments, which retain full control over local land use authority. This is described in more detail in Chapter 2, "Project Description."

Despite these limitations, the proposed Plan addresses displacement risk by increasing resources for affordable housing and non-automobile transportation access in lower-income neighborhoods, and by supporting economic opportunities across the region that benefit existing residents. Additional strategies to address housing affordability and displacement risk are described in the proposed Plan. The Implementation Plan includes several recommendations:

- **Advance funding and legislative solutions for housing**: Implement the recommendations of the Committee to House the Bay Area, in coordination with ABAG's Regional Planning Committee.

- **Continue recent housing successes**: Implement the housing initiatives adopted in OBAG, including the Naturally Occurring Affordable Housing preservation fund, JumpStart program, and funding for transportation conditioned on RHNA performance.

- **Spur housing production at all income levels and invest directly in affordable housing**: Seek to include housing provisions or conditions in upcoming new funding sources (including planning grants), analyze applicability for additional regional funding sources to incentivize housing production and affordability. Continue to monitor and evaluate PDA performance.

- **Use housing performance to prioritize funding for long-range transportation projects**: Continue to evolve RTP/SCS Project Performance methods to seek stronger alignment between prioritizing transportation projects and housing performance.

- **Strengthen policy leadership on housing**: Expand and transform regional agency technical assistance for local jurisdictions tailored to both Bay Areawide challenges and challenges unique to specific parts of the region. Focus areas for technical assistance could include guidance on implementing State legislation for housing production, guidance on housing preservation and community stabilization policies and coordination of neighboring jurisdictions along transit corridors and in sub-regions to identify shared solutions to housing challenges.

- **Close data gaps for housing:** Continue to collect, analyze, and disseminate information about housing opportunity sites, zoning, development trends and policy implementation by local governments to inform local, regional, and State policy development and evaluation; create accessible database of major development and publicly owned sites.

CEQA requires analysis and mitigation of potentially substantial adverse changes in the physical environment (PRC Sections 21151, 21060.5, and 21068). "Economic and social changes resulting from a project are not treated as significant environmental effects [citation] and, thus, need not be mitigated or avoided under CEQA" (*San Franciscans for Reasonable Growth v. City and County of San Francisco* (1984) 209 Cal.App.3d 1502, 1516). Physical changes in the environment caused by economic or social effects of a project may constitute significant environmental effects (CEQA Guidelines Sections 15131 and 15064(e)). Social and economic effects in and of themselves, however, are not significant effects on the environment under CEQA (*Melom v. City of Madera* (2010) 183 Cal.App.4th 41, 55). The following addresses the potential for physical impacts associated with displacement risk at the regional and local levels.

Regional Displacement Impacts

Regional displacement is addressed under SB 375, which requires that the SCS identify sufficient areas in the region to house all the projected population. The proposed Plan's housing targets are based on the regional growth forecast, which identifies how much the Bay Area might grow between the proposed Plan's baseline year (2015) and its horizon year (2050), including population, jobs, households and associated housing units. During the Blueprint planning phase, the regional growth forecast was used to identify the total amount of growth for the region. The draft regional growth forecast was released in spring 2020 and subsequently revised to integrate the significant adverse effects of the coronavirus pandemic and 2020 recession on the first decade of the planning period. In September 2020, MTC and ABAG approved the regional growth forecast.

The regional growth forecast projects the region's employment to grow by 1.4 million to just over 5.4 million total jobs between 2015 and 2050. Population is forecasted to grow by 2.7 million people to 10.3 million. This population will comprise over 4.0 million households, for an increase of nearly 1.4 million

households from 2015. The number of housing units plans for no net growth in the in-commute into the region, consistent with State law and MTC and ABAG's legal settlements with the Building Industry Association. This housing unit projection includes housing for all projected households plus the number of units that would be needed to house the increased number of workers estimated to commute into the region.

Incorporating the regional growth forecast into the proposed Plan ensures sufficient capacity such that the entire regional workforce added under the Plan is housed within the Bay Area with no net increase in in-commuting from other counties outside the region. Thus, the projected land use strategy would accommodate 1.4 million new households and 1.4 million new jobs between 2015 and 2050, which would be consistent with population and employment growth projections in the Bay Area. Through the use of modeling, described in detail in Chapter 2, "Project Description," the land use growth footprint assumes an adequate number of residential units to meet the forecasted demand, taking into account localized displacement of some households within the region. Thus, implementation of the proposed Plan would not result in displacement at the regional scale and impacts at the regional level would be less than significant (LTS). Displacement outside of the region is discussed in the cumulative analysis provided in Chapter 5, "Other CEQA-Mandated Sections."

Local Displacement Impacts

At the local level, displacement can result in physical effects both directly and indirectly. The potential for direct effects would result from projected growth occurring at the site of existing residential units. Redevelopment of such a site could result in displacement of current residents and may necessitate construction of replacement housing, resulting in direct impacts. Projected redevelopment and new housing is included in the overall land use strategy and development footprint of the proposed Plan, and as a result the associated physical environmental impacts from this development are analyzed throughout this EIR. The full impacts from the projected redevelopment and new housing construction would depend on site-specific conditions and project design details that cannot be known at this time. This EIR analyzes potential impacts that may result from this change in the following areas: aesthetics and visual resources, agriculture and forestry resources, air quality, biological resources, climate change, greenhouse gases, and energy, cultural resources and tribal cultural resources, geology, seismicity, and mineral resources, hazards and wildfire, hydrology and water quality, land use, population, and housing, noise, public services and recreation, public utilities and facilities, and transportation.

The potential for indirect (or secondary) impacts results from economic factors potentially driving some households to find other housing because of rising rents. When these forces result in housing further from jobs, household commutes may increase, thus affecting air quality, noise, traffic, and GHG emissions. These impacts are analyzed in other sections of this EIR as part of the analysis of overall impacts of the proposed Plan on air quality, noise, traffic, and GHG emissions.

As explained above, the proposed Plan accounts for future replacement housing, because it includes sufficient housing to accommodate new job growth, including in-commuters from adjacent counties. The impacts of this growth are addressed throughout this EIR and in some cases has been identified as potentially significant. For this reason, this impact would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

The proposed Plan's sea level rise adaptation infrastructure would require the expansion of existing, or addition of new levees, seawalls, elevated roadways, marsh restoration, and tidal gates for regularly inundated shoreline areas. Not all of the proposed Plan's sea level rise adaptation infrastructure would be expected to require earthmoving activities and/or have a footprint associated with

implementation. For example, marsh land restoration was not included in the adaptation footprint, whereas elevated highway/roadways, levees, sea walls and tidal gates have been included in the footprint. The overall footprint associated with adaptation infrastructure is approximately 5,500 acres. Actual displacement of homes by sea level rise adaptation infrastructure would depend on site-specific conditions and project design details that cannot be known at this time. This EIR analyzes the potential impacts that may result from replacement of these housing units in the following areas: aesthetics and visual resources, agriculture and forestry resources, air quality, biological resources, climate change, greenhouse gases, and energy, cultural resources and tribal cultural resources, geology, seismicity, and mineral resources, hazards and wildfire, hydrology and water quality, land use, population, and housing, noise, public services and recreation, public utilities and facilities, and transportation. This impact would be potentially significant (PS).

Transportation System Impacts

Transportation projects that require the expansion of existing, or designation of new, rights-of-way have the potential to result in the direct displacement of existing housing that must be removed for infrastructure development. Generally, to minimize environmental impacts and project costs, it is common practice to design the footprint of new transportation projects within existing rights-of-way as much as feasible. This practice is assumed as a part of this analysis. However, development of some projects, such as roadway widening, roadway extension, and transit expansion projects, could result in the disturbance and/or loss of residential uses. In particular, the proposed Plan includes: New Transbay Rail Crossing, Bay Area Rapid Transit to Silicon Valley Phase 2, Valley Link and Caltrain/High-Speed Rail Grade Separations projects, which would be located in urban areas and could cause displacement of residents. The degree of the disruption would generally depend on the size and extent of the project and the resulting need for new right-of-way. For the purposes of this analysis, proposed transportation projects were assumed to affect approximately 14,300 additional acres across the Bay Area. This is described in more detail in Section 3.1, "Approach to the Analysis." This is a conservative assumption intended to avoid a risk of understating the impact. Actual displacement of homes by transportation projects would depend on site-specific conditions and project design details that cannot be known at this time. The replacement of these housing units would result in environmental impacts, which are described throughout this EIR for the following potential impact areas: aesthetics and visual resources, agriculture and forestry resources, air quality, biological resources, climate change, greenhouse gases, and energy, cultural resources and tribal cultural resources, geology, seismicity, and mineral resources, hazards and wildfire, hydrology and water quality, land use, population, and housing, noise, public services and recreation, public utilities and facilities, and transportation. This impact would be potentially significant (PS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects may result in displacement of existing residential units, necessitating the construction of replacement housing elsewhere. Significant environmental impacts associated with the replacement housing are addressed throughout this EIR. This is a **potentially significant (PS)** impact. Mitigation Measure LU-4 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure LU-4 Implementing agencies and/or project sponsors shall implement, where feasible and necessary based on project- and site-specific considerations, the mitigation measures described throughout this EIR to address the effects of displacement that could result in the construction of replacement housing, including:

- Mitigation Measures AES-1 through AES-4
- Mitigation Measures AGF-1 through AGF-3
- Mitigation Measures AQ-2 through AQ-4
- Mitigation Measures BIO-1 through BIO-3 and BIO-5
- Mitigation Measures GHG-1 and GHG-3
- Mitigation Measures CUL/TCR-1, CUL/TCR-2, and CUL/TCR-4
- Mitigation Measure GEO-7
- Mitigation Measures HAZ-4, HAZ-6 and HAZ-7
- Mitigation Measures LU-1 and LU-2
- Mitigation Measures NOISE-1 through Noise-4
- Mitigation Measures PSR-1 and PSR-2
- Mitigation Measures PUF-1 through PUF-4
- Mitigation Measure TRA-2

Significance after Mitigation

Implementation of this mitigation measure would reduce the magnitude of potentially significant impacts, as explained in the impact discussions related to each impact and mitigation measure. However, as noted under Impacts AES-1, AES-2, AES-3, AGF-1, AGF-2, AGF-3, AQ-3, AQ-4, GHG-1, GHG-3, CUL/TCR-1, CUL/TCR-2, CUL/TCR-4, HAZ-7, LU-1, LU-2, PSR-1, PSR-2, PUF-1, PUF-2, PUF-4, and TRA-2, there would still be instances where the impact remains significant following implementation of mitigation measures. Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. This impact would remain **significant and unavoidable (SU)**.

3.12 NOISE

This section assesses the potential noise/vibration impacts associated with implementation of the proposed Plan. The following includes acoustical terminology and background information relevant to the proposed Plan, a presentation of applicable regulatory standards, assessment of acoustical impacts related to implementation of the proposed Plan, and identification of potentially feasible noise mitigation measures where appropriate.

Comments received in response to the Notice of Preparation addressed the effects of population growth during the Plan period and the effects of the COVID-19 pandemic on road and air travel frequency. The effects of population growth in the Plan area between now and 2050 on ambient noise levels are addressed in this section. Additionally, the reduction in vehicular travel on roadways, as well as decreased air traffic from nearby airports, related to the COVID-19 pandemic and the consequent reduction in associated ambient noise levels are addressed. Comments also raised concerns with overall noise pollution, vehicle noise, aircraft, and seagoing freighters associated with population growth. Impacts related to traffic noise are discussed in Impact NOISE-2, and aircraft noise impacts are addressed in Impact NOISE-4. Increases in the use of seagoing freighters would not result in increased community noise levels and are not evaluated in this EIR.

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." (CEQA Guidelines Section 15083.) Neither the CEQA Guidelines nor Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require they be considered. Consistent with these requirements, the comments in response to the NOP have been carefully reviewed and considered by MTC/ABAG in the preparation of impacts in this chapter. Appendix B includes all NOP comments received.

3.12.1 Environmental Setting

ACOUSTIC FUNDAMENTALS

Acoustical Terminology

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound. In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver. Acoustics addresses primarily the propagation and control of sound.

Frequency

The number of sound pressure peaks traveling past a given point in a single second is referred to as the frequency, expressed in cycles per second, or hertz (Hz). A given sound may consist of energy at a single frequency (pure tone) or in many frequencies over a broad frequency range (or band). Human hearing is generally affected by sound frequencies between 20 Hz and 20,000 Hz (20 kilohertz).

Amplitude

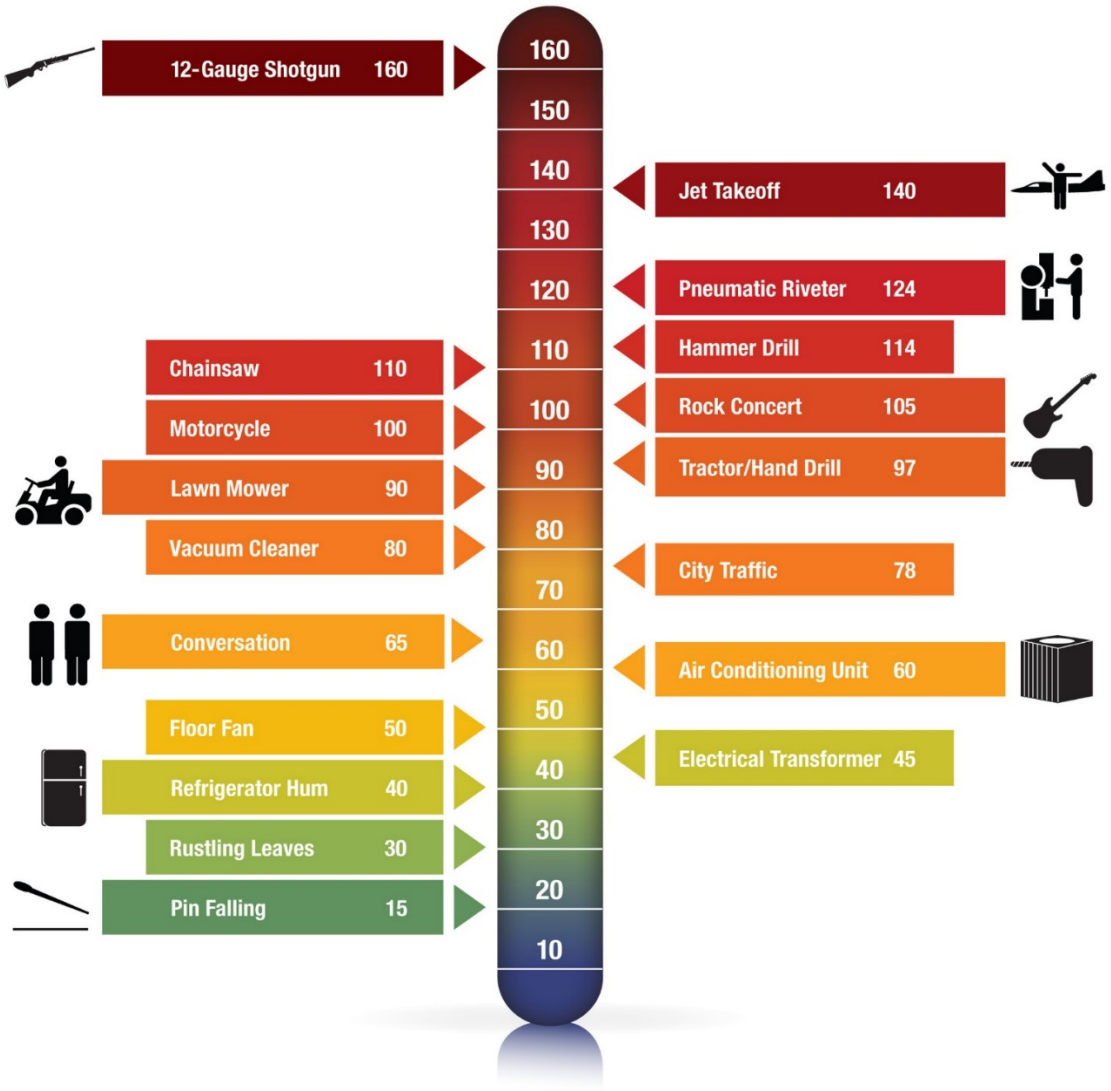
The amplitude of pressure waves generated by a sound source determines the perceived loudness of that source. Sound pressure amplitude is measured in micro-Pascals (μPa). One μPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from fewer than 100 μPa to 100,000,000 μPa. Because of this huge range of values, sound is rarely expressed in terms of pressure. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of human hearing (near total silence) is approximately 0 dB, which corresponds to 20 μPa.

Addition of Decibels

Because decibels are logarithmic units, addition and subtraction of SPL is not linear. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dB higher than one of the sources under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level of approximately 5 dB louder than one source, and 10 sources of equal loudness together produce a sound level of approximately 10 dB louder than the single source.

A-Weighted Decibels

Figure 3.12-1 illustrates sound levels associated with common sound sources. The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental sound levels, perception of loudness is relatively predictable and can be approximated by frequency filtering using the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard descriptor for environmental noise assessment. All noise levels reported in this section are presented in terms of A-weighting.



Sources: National Institute of Occupational Safety and Health 2020; 3M 2016

Figure 3.12-1: Decibel Scale and Common Noise Sources

Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3-dB increase in the sound level. However, an exact doubling of the sound level as measured by precise instrumentation will usually differ from the subjective human perception of a doubling of loudness.

Under controlled conditions in a laboratory setting, the trained, healthy human ear is able to discern 1-dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the midfrequency range (1,000–8,000 Hz). In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible; however, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness; therefore, a doubling of sound energy that would result in a 3-dB increase in sound pressure level would generally be perceived as barely detectable. Please refer to **Table 3.12-1**.

Table 3.12-1: Approximate Relationship between Increases in Environmental Noise Level and Human Perception

Noise Level Increase, dB	Human Perception (Typical)
Up to about 3	Not perceptible
About 3	Barely perceptible
About 6	Distinctly noticeable
About 10	Twice as loud
About 20	Four times as loud

Source: Egan 2007

Noise-Sensitive Land Uses

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses typically include residences, hospitals, schools, transient lodging, libraries, and certain types of recreational uses. Noise-sensitive residential receivers are found throughout the Plan area.

Noise Descriptors

Noise in daily environments fluctuates over time. Various noise descriptors have been developed to describe time-varying noise levels. The following noise descriptors are the most commonly used in environmental noise analysis:

- **Equivalent Sound Level (L_{eq}):** The L_{eq} represents an average of the sound energy occurring over a specified time period. In effect, the L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1- hour, A-weighted equivalent sound level (L_{eq}[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period, and it is the basis for noise abatement criteria (NAC) used by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA).

- **Percentile-Exceeded Sound Level (L_n):** The L_n represents the sound level exceeded "n" percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time).

- **Maximum Sound Level (L_{max}):** The L_{max} is the highest instantaneous sound level measured during a specified period.

- **Day-Night Average Level (L_{dn}):** The L_{dn} is the energy-average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours (10 p.m.–7 a.m.). The L_{dn} is often noted as the DNL.

- **Community Noise Equivalent Level (CNEL):** Similar to L_{dn}, CNEL is the energy-average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A- weighted sound levels occurring during the nighttime hours (10 p.m.–7 a.m.) and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours (7 p.m.–10 p.m.). The CNEL is usually within 1 dB of the L_{dn}, and for all intents and purposes, the two are interchangeable.

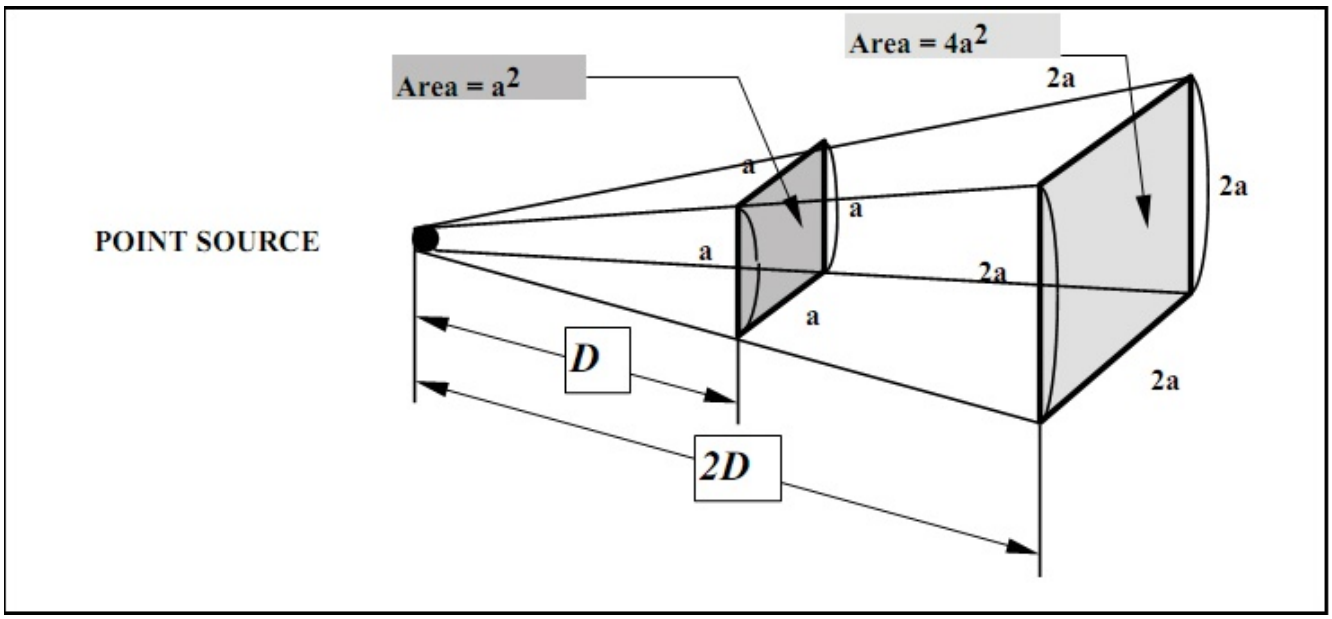
- **Single-Event Noise Level (SEL):** SEL is a receiver's cumulative noise exposure from a single impulsive-noise event, which is defined as an acoustical event of short duration that involves a change in sound pressure above some reference value. It is typically used for evaluating noise exposure from aircraft flight events.

Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

Geometric Spreading

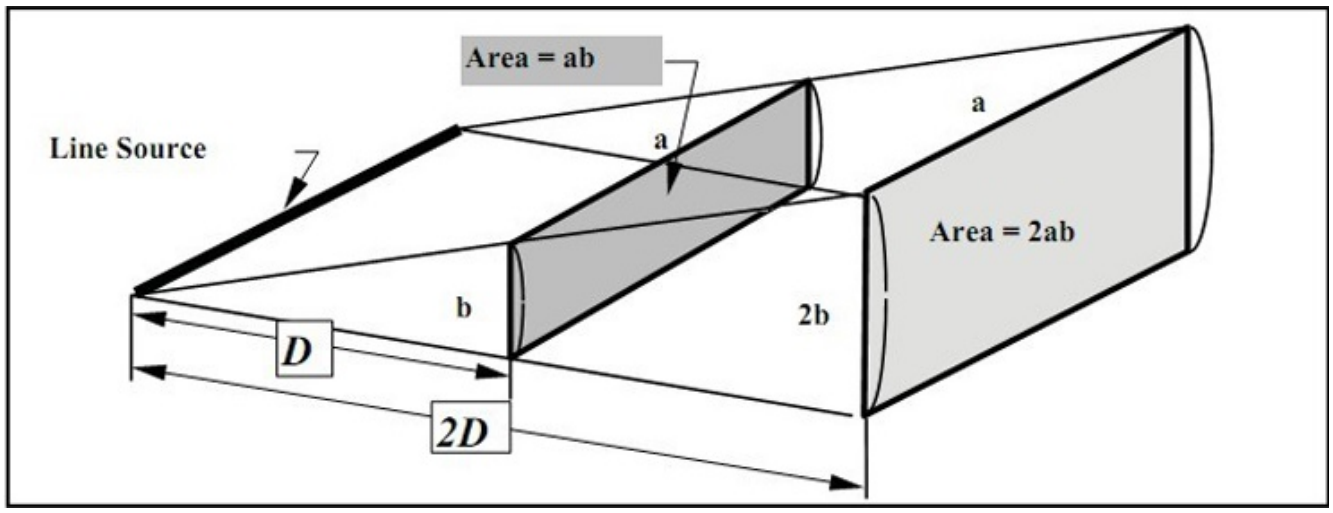
Sound from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern; therefore, this type of propagation is called *spherical spreading*. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point/stationary source as its energy is continuously spread out over a spherical surface (see **Figure 3.12-2**).



Source: Caltrans 2013

Figure 3.12-2: Point Source Spreading with Distance

Roadways and highways, and to some extent, moving trains, consist of several localized noise sources on a defined path and hence are treated as "line" sources, which approximate the effect of several point sources (see **Figure 3.12-3**). Noise from a line source propagates over a cylindrical surface, often referred to as *cylindrical spreading*. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. Therefore, noise attributable to a line source attenuates less with distance than that of a point source with increased distance.



Source: Caltrans 2013

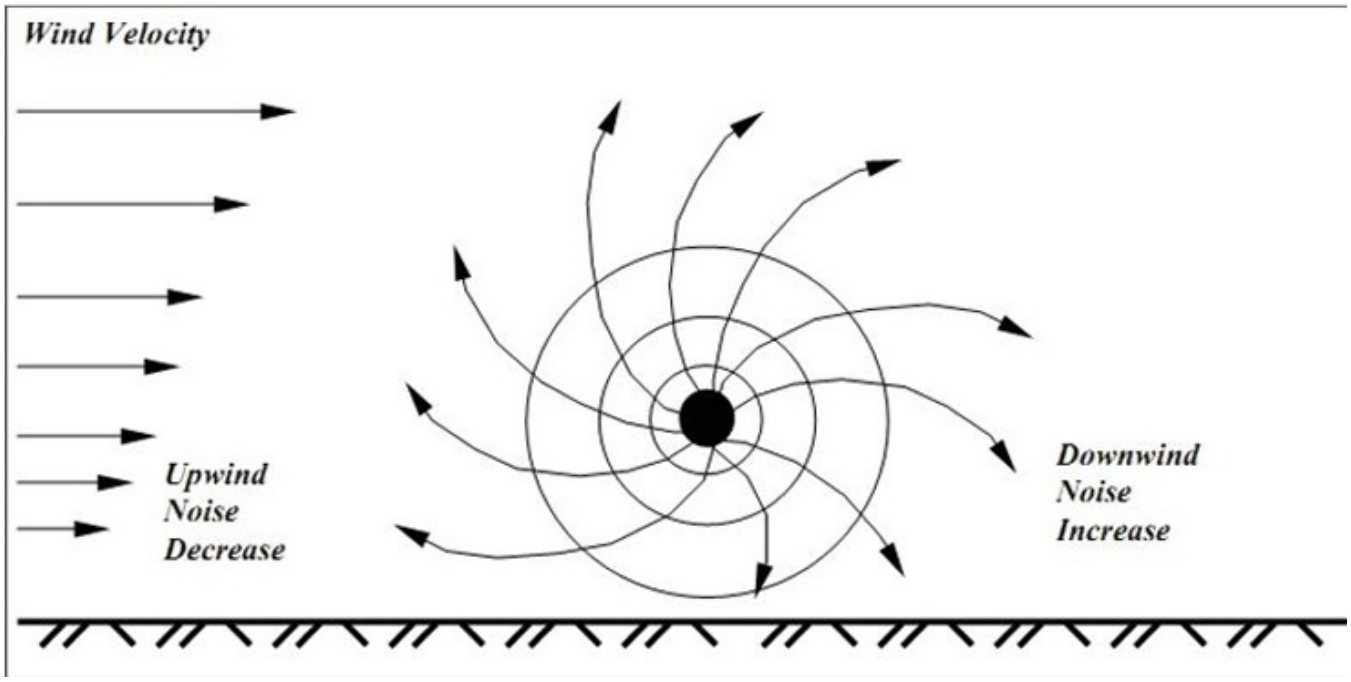
Figure 3.12-3: Line Source Spreading with Distance

Ground Absorption

The propagation path of noise from many typical sources, such as roadways, to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a paved parking lot or body of water), no excess ground attenuation is generally assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is typically assumed. When added to cylindrical spreading from traffic noise sources, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance. When added to spherical spreading (point sources), it results in an overall drop-off rate of approximately 7.5 dB. These approximations are generally applicable only for receivers within 300 feet of the noise source(s) and should not be applied to sound path lengths of more than 300 feet.

Atmospheric Effects

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas receivers upwind from the source can have lowered noise levels. This is illustrated in **Figure 3.12-4**.



Source: Caltrans 2013

Figure 3.12-4: Wind Effects on Noise Levels

In addition to the enhancing effect produced by wind, sound levels can increase at large distances from the source (e.g., more than 500 feet) because of atmospheric temperature inversions (i.e., increasing temperature with elevation) or can decrease with distance from the source at a higher rate than the typical spreading loss with distance rate (see above) because of a temperature lapse condition (i.e., decreasing temperature with elevation).

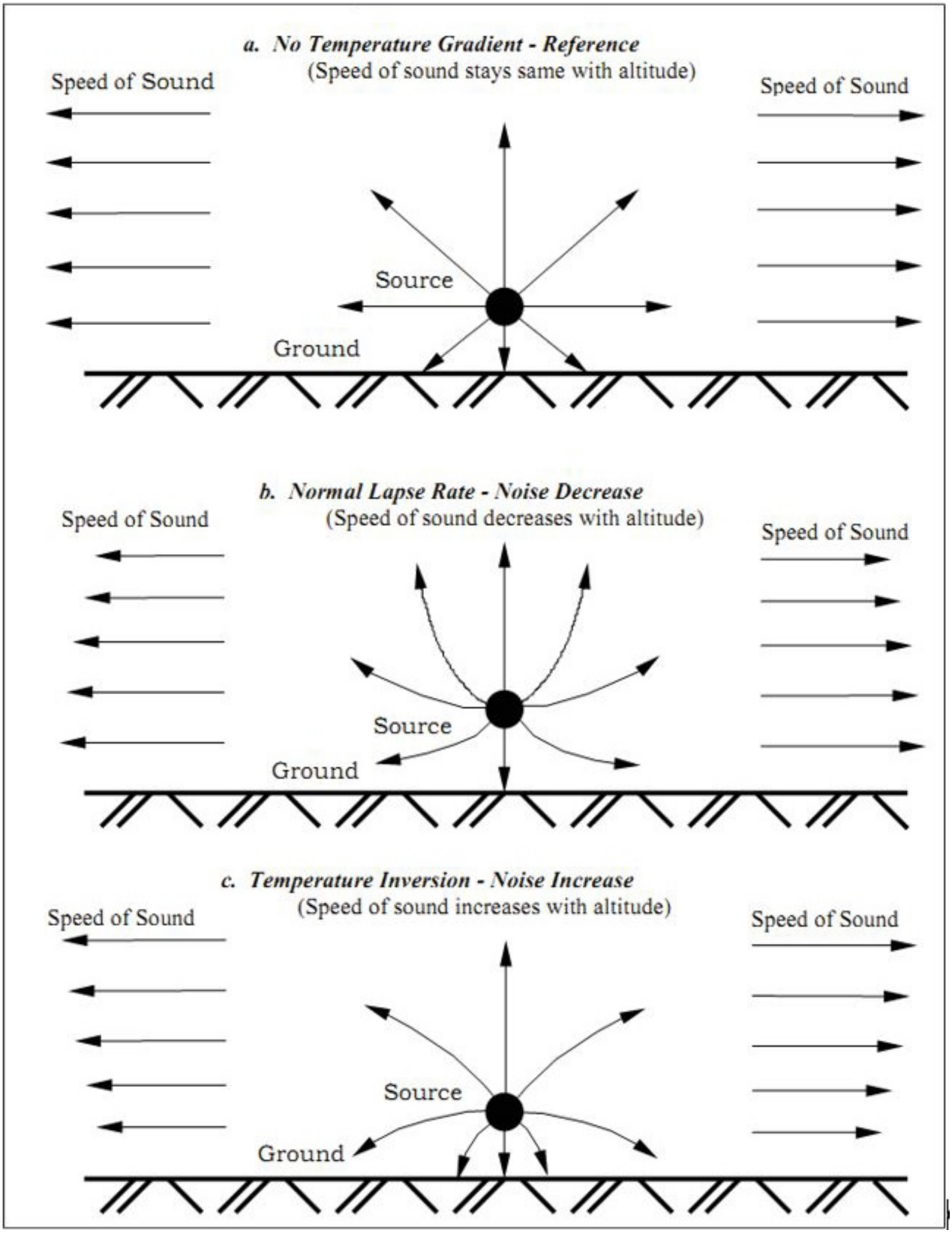
Temperature inversions are a common part of the meteorological environment in California. During a temperature inversion, the air temperature at the ground is cooler than that several hundred feet above the ground. These temperature inversions are typically caused when a warm, sunny day is followed by a cold, clear night; generally, this occurs more frequently and with higher intensity in the fall and the spring seasons. The sun warms the earth surface during the day, and generally the air temperature near the ground is higher than the air temperature at higher elevations, but when the sun sets, the earth cools quickly by infrared radiation into space, and so does the air mass at lower elevations, so that the temperature of air at high elevations soon becomes warmer than that of the air near the ground. The speed of sound is higher in warmer air, and this inverted temperature profile causes the sound waves in the warmer air to overtake those travelling in cooler air; thus, the sound "bends" back toward the ground (**Figure 3.12-5**).

Other factors, such as air temperature, humidity, and turbulence, can also affect sound propagation. For instance, air temperature and humidity affect the rate of molecular absorption as sound travels large distances. A sound consisting primarily of middle frequencies, such as speech or animal vocalization, attenuates approximately five additional decibels for every 1,000 feet of travel with an air temperature of 70 degrees Fahrenheit and a humidity of 30–40 percent. This atmospheric effect is in addition to the other effects discussed above.

Vibration

Generally speaking, vibration is energy transmitted in waves through the ground. These energy waves dissipate with distance from the vibration source. Because energy is lost during the transfer of energy from one particle to another, the vibratory energy is reduced with increasing distance from the source. Vibration attenuates at a rate of approximately 50 percent for each doubling of distance from the source. This approach takes into consideration only the attenuation from geometric spreading. Because there are additional factors that reduce vibration over distance (e.g., damping from soil condition), this approach tends to provide for a conservative assessment of vibration level at the receiver.

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. Vibration is typically described by its peak amplitude and its root-mean-square (RMS) amplitude. The RMS value can be considered an average value over a given time interval. The peak vibration velocity is the same as the "peak particle velocity" (PPV), generally presented in units of inches/second (in/sec). PPV is defined as the maximum instantaneous positive or negative peak of the vibration signal, and PPV is generally used to assess the potential for damage to buildings and structures. The RMS amplitude is typically used for assessing human annoyance to vibration.



Source: Caltrans 2013

Figure 3.12-5: Effects of Temperature Gradients on Noise

PHYSICAL SETTING

The existing noise environment in the Bay Area is composed of two primary categories of noise sources: transportation and non-transportation. Transportation sources include surface vehicle traffic; railroad train operations, including light rail and commuter trains; and aircraft operations. Non-transportation, or stationary/fixed, sources include commercial/industrial equipment, construction equipment, and any other sources not associated with the transportation of people or goods. Existing noise exposure in the Bay Area associated with these primary noise sources is presented below.

Traffic Noise Sources

The ambient noise environment in urban areas is primarily influenced by traffic noise. Traffic noise exposure is primarily a function of the volume of vehicles per day, the speed of those vehicles, the type of ground (i.e., hard or soft), the number of those vehicles represented by medium and heavy trucks, the distribution of those vehicles during daytime and nighttime hours, and the proximity of noise-sensitive receivers to the roadway. Baseline traffic noise (based on the traffic study) within the Plan area has been characterized by traffic noise modeling. The baseline for the noise analysis is a simulation of 2015 traffic levels and land use. Based on modeling conducted for all roadway types within the Plan area, average noise levels range from 52.6 dBA CNEL (next to collector and small roads) to as high as 74.9 dBA CNEL (next to freeways). Refer to Impact NOISE-2 and **Table 3.12-7** for more details regarding traffic noise modeling. The traffic noise assessment in this analysis is inclusive of bus transit, as buses are an assumed percentage of overall roadway volumes used in the calculation of roadside noise levels.

Rail Noise Sources

The Bay Area is also affected by noise from freight and passenger rail operations. While these operations generate significant noise levels in the immediate vicinity of the railways, train operations are intermittent and area railways are widely dispersed. Commuter rail, such as San Francisco Municipal Railway and Valley Transportation Authority, operate with more frequency than standard gauge rail operations but at lower speeds, resulting in lower noise levels. Bay Area Rapid Transit operations, on the other hand, can attain higher speeds and have the potential for greater noise levels along extended stretches. Based on available data, noise levels from rail operations within the Plan area can range from 62 dBA CNEL to 81 dBA CNEL (California High-Speed Rail Authority 2020). Train operations may also be a source of ground vibration near the tracks. Vibration levels depend on several factors, including track and train type, ground type, and the speed and weight of the passing train.

Aircraft Noise Sources

The Bay Area has many airports, including public use, private use, and military facilities. Major airports include San Francisco International, Oakland International, and Norman Y. Mineta San Jose International. In addition to the daily aircraft operations originating and terminating at these facilities, aircraft not using these airports frequently fly over the Bay Area. All of these operations contribute to the overall ambient noise environment. In general, like rail noise, the proximity of the receiver to the airport and aircraft flight path determines the noise exposure. Other contributing factors include the type of aircraft operated, altitude of the aircraft, and atmospheric conditions. Atmospheric conditions may contribute to the direction of aircraft operations (flow) and affect aircraft noise propagation.

As discussed in further detail below, State law requires land use commissions to prepare and adopt an airport land use compatibility plan (ALUCP) for each public use and military airport. These plans typically include airport noise contour maps, which are modeled based on airport-specific activity data. Airport noise contours are specific to each airport. However, for informational purposes, noise

contours from three of the largest airports within the Plan area (San Francisco International Airport, Oakland International Airport, and Mineta San Jose International Airport) are briefly identified below.

Based on the ALUCP for San Francisco International Airport, the 65 dBA CNEL contour extends approximately 6 miles northwest of the airport (C/CAG 2012). Based on the ALUCP for Oakland International Airport, the 65 dBA CNEL contour extends approximately 5 miles south of the airport (Alameda County 2010). Based on the ALUCP for Mineta San Jose International Airport, the 65 dBA CNEL contour extends approximately 2.5 miles northwest of the airport (Santa Clara County 2016). Many other smaller airports and airstrips in the Plan area with widely varying noise levels contribute to the existing ambient noise levels.

Construction Noise Sources

New development and implementation of transportation improvements will necessarily include construction activities that create relatively short-term noise exposure. Noise production from construction equipment varies greatly depending on factors such as the operation being performed and the equipment type, model, age, and condition. Noise associated with heavy equipment diesel engine operations often dominates the noise environment in the vicinity of construction sites. Stationary sources, such as generators, pumps, and compressors, may also produce a significant contribution; however, if present, operations from impact equipment (e.g., pile driving, pavement breaking) will generally produce the highest noise levels and may also produce significant vibration in the vicinity. Maximum noise exposure from typical construction equipment operations is approximately 75–100 dB (L_{max} at 50 feet) with noise from heavy demolition and pile driving operations having the highest noise production. Please refer to **Table 3.12-2** for typical construction noise levels.

Table 3.12-2: Typical Noise Levels from Demolition/Construction Equipment Operations

Construction Equipment	Noise Exposure Level, dB L_{max} at 50 Feet
Air Compressor	78–81
Backhoe	78–80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82–83
Concrete Mixer (Truck)	79–85
Concrete Pump (Truck)	81–82
Concrete Vibrator	76–80
Crane	81–88
Dozer	82–85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88–89
Loader	79–85
Paver	77–89
Pile Driver (Impact)	101
Pneumatic Tool	85
Pump	76–81

Construction Equipment	Noise Exposure Level, dB L_{max} at 50 Feet
Rail Saw	90
Rock Drill	81–98
Roller	74–80
Saw	76
Scarifier	83–90
Scraper	84–89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Heavy Diesel Truck	88

Source: FTA 2018

INDUSTRY AND OTHER NON-TRANSPORTATION NOISE SOURCES

A wide variety of industrial and other non-transportation noise sources are located within the Bay Area. These include manufacturing plants, landfills, treatment plants (e.g., water), power generation facilities, food packaging plants, lumber mills, and aggregate mining facilities, just to name a few. Noise generated by these sources varies widely but, in many cases, may be a significant if not dominant contributor to the noise environment.

3.12.2 Regulatory Setting

FEDERAL REGULATIONS

Title 23, Part 772 of the Code of Federal Regulation

Title 23, Part 772 of the CFR is the federal regulation governing traffic noise impact. A federal or federally funded project would have a traffic noise impact if it involves the construction of a new highway, or includes substantial modification of an existing highway, where the project would result in a substantial operational noise increase or where the predicted operational noise level approaches or exceeds the FHWA Noise Abatement Criteria (NAC). In this case, a "substantial increase" is not defined by FHWA but is generally defined by the state and/or local governing agencies. The noise level is defined as "approaching" the NAC if it is within 1 dB of the applicable criterion. **Table 3.12-3** summarizes the FHWA NAC as presented in the U.S. Department of Transportation (DOT)/FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance document.

Table 3.12-3: Summary of FHWA Noise Abatement Criteria

Activity Category	NAC, Hourly-Average Noise Level (L_{eq}[h], dBA)	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 Exterior	Developed lands, properties, or activities not included in categories A or B above
D	--	Undeveloped lands
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: DOT 2011

Title 14, Part 36 of the Code of Federal Regulation

Aircraft operated in the United States are subject to federal requirements for noise emission levels. The requirements are set forth in 14 CFR 36, which establishes maximum acceptable noise levels for specific aircraft types, considering model year, aircraft weight, and number of engines.

The Federal Aviation Administration (FAA) Part 150 program encourages airports to prepare noise exposure maps that show land uses that are incompatible with high noise levels (FICON 1992). The program proposes measures to reduce any incompatibility. With an FAA Part 150 program approved, airport projects such as land acquisition and residential/school sound insulation become eligible for federal Airport Improvement Program funding.

Federal Transit Administration Noise Impact Criteria

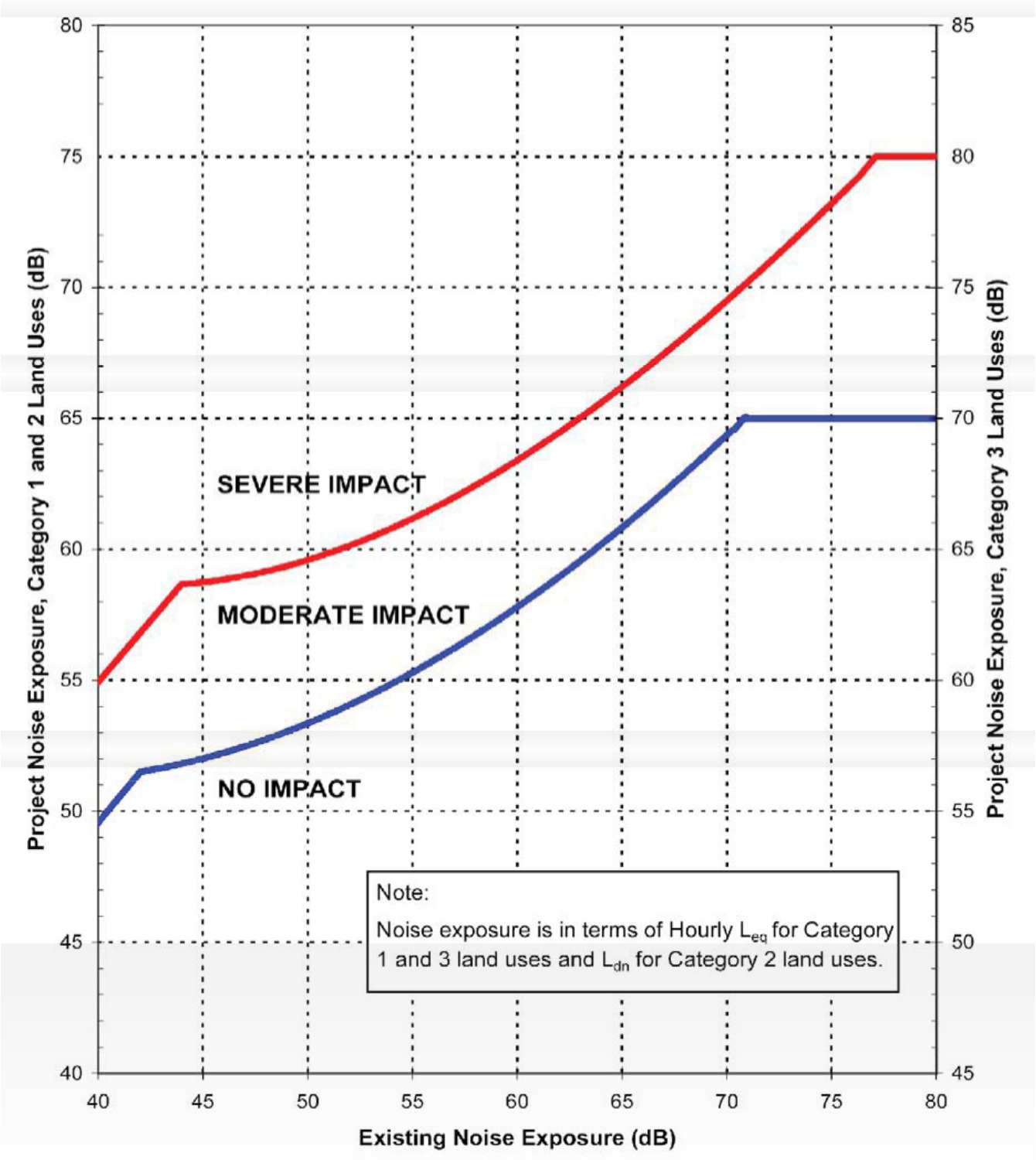
Transit Operations Noise

The Federal Transit Administration (FTA) offers regulations regarding noise exposure associated with federally funded transit projects. "Moderate impact" and "severe impact" criteria are established based on the existing ambient noise environment and the noise sensitivity of the receiving land use. Three categories of land use are established for the impact analysis:

- Category 1: Includes lands set aside for serenity and quiet or for outdoors performing arts entertainment (e.g., national historic landmarks, outdoor amphitheaters)
- Category 2: Residences and buildings where people normally sleep (e.g., homes, hospitals, hotels)
- Category 3: Institutional land with primary daytime and/or evening use (e.g., schools, libraries, churches, medical offices, theaters, parks)

Figure 3.12-6 is a graphical representation of the FTA noise impact criteria. Please note that Categories 1 and 3 apply the L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity. Category 2 applies the L_{dn} because these receivers may be affected by nighttime (10 p.m.–7 a.m.) transit-related events.

Subjectively, a "moderate impact" is generally noticeable to most people but may not be sufficient to cause strong, adverse reactions from the community. A "severe impact" would likely produce a high percentage of highly annoyed people in the community.



Source: FTA 2018

Figure 3.12-6: FTA Noise Impact Criteria

Federal Transit Administration Vibration and Noise Impact Criteria

FTA offers regulations regarding vibration exposure associated with federally funded transit projects. Three categories of land use are established for the impact analysis:

- Category 1: Buildings where vibration would interfere with interior operations
- Category 2: Residences and buildings where people normally sleep (e.g., homes, hospitals, hotels)
- Category 3: Institutional land with primary daytime and/or evening use (e.g., schools, libraries, churches, medical offices, theaters, parks)

Table 3.12-4 summarizes the FTA vibration impact criteria.

Table 3.12-4: FTA Ground-Borne Vibration Impact Criteria for General Assessment

Land Use Category	GVB Impact Levels (VdB re 1 micro-inch /sec)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primary daytime use.	75 VdB	78 VdB	80 VdB

Notes: GVB = ground-borne vibration; VdB re 1 micro-inch /sec = vibration decibels referenced to 1 microinch per second and based on the root mean square velocity amplitude.

[1] "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

[2] "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

[3] "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

Source: FTA 2018:123–126

Construction Noise

In addition to transit operations noise, FTA offers guidance with respect to the evaluation of transit construction noise exposure. Like the operational noise criteria, construction noise criteria should consider the existing (ambient) noise environment. Additionally, construction noise exposure should consider the duration of construction activities and the receiving land use (i.e., sensitivity of receiver). The FTA construction noise guidelines are summarized in **Table 3.12-5**.

Table 3.12-5: Summary of FTA Construction Noise Criteria (Guidelines)

Affected Land Use Type	Hourly L_{eq} dBA		8-hour L_{eq} dBA	
	Daytime (7 a.m.–10 p.m.)	Nighttime (10 p.m.–7 a.m.)	Daytime (7 a.m.–10 p.m.)	Nighttime (10 p.m.–7 a.m.)
Residential	90	80	80	70
Commercial	100	100	85	85
Industrial	100	100	90	90

Note: In urban areas with very high ambient noise levels, construction noise should not exceed ambient noise levels plus 10 dB.
Source: FTA 2018

Construction Vibration

FTA has published guidance relative to impacts from vibration exposure. FTA has established a general impact criterion of 0.5 in/sec PPV. Structural damage to buildings would not be expected

below this value. It is expected that regularly experienced vibration levels of 80 vibration decibels (VdB, 0.01 in/sec PPV) or higher may create an annoyance response from human receivers and may be considered a nuisance.

STATE REGULATIONS

California Department of Transportation Noise and Vibration Standards

Traffic Operations Noise

The Caltrans Traffic Noise Analysis Protocol (Protocol) establishes the policies and procedures to be used in the assessment of traffic noise exposure and impact for new construction and reconstruction projects. The NAC in the Protocol are the same as those presented in 23 CFR 772 (see DOT/FHWA information above). The Protocol defines a substantial project-related traffic noise level increase when the project's worst-case hour exceeds the ambient worst-case hour by 12 dB or more.

Rail Operations Noise

Caltrans endorses the use of the FTA noise criteria and methodologies for assessing project-related rail noise and vibration impacts.

Construction Noise

Caltrans Standard Specifications, Section 14-8.02, Noise Control, establishes a construction noise exposure/production limit of 86 dB (L_{max}) at a distance of 50 feet. Additionally, this specification establishes that all internal combustion engines should be equipped with manufacturer-recommended mufflers and that no internal combustion engines may be operated without mufflers (Caltrans 2018).

Vibration

In 2020, Caltrans published the Transportation- and Construction-Induced Vibration Manual, which provides general guidance on vibration issues associated with construction and operation of projects in relation to human perception and structural damage (Caltrans 2020). **Table 3.12-6** presents Caltrans-recommended levels of vibration that could result in damage to structures exposed to continuous vibration.

Table 3.12-6: Caltrans-Recommended Vibration Levels

PPV (in/sec)	Effect on Buildings
0.4–0.6	Architectural damage and possible minor structural damage
0.2	Risk of architectural damage to normal dwelling houses
0.1	Virtually no risk of architectural damage to normal buildings
0.08	Recommended upper limit of vibration to which ruins and ancient monuments should be subjected
0.006–0.019	Vibration unlikely to cause damage of any type

Notes: PPV = peak particle velocity; in/sec=inches per second.
Source: Caltrans 2020

California Code of Regulations

Aircraft Operations

The California Airport Noise Standards, Title 21, Section 5000 et seq. of the CCR apply to any airport that is deemed to have a "noise problem" as established by the local county board of supervisors in accordance with the provisions in the regulation. Currently, within the Bay Area, Norman Y. Mineta-

San Jose International Airport and San Francisco International Airport have been given this designation. The standards establish a noise exposure limit "acceptable to a reasonable person residing in the vicinity of an airport" of 65 dB CNEL.

Noise Insulation Standards

The California Noise Insulation Standards found in CCR, Title 24, Part 2 (Volume 1, Chapter 12, Interior Environment, Section. 1207.11.2) establish requirements for new multifamily residential units, hotels, and motels that may be subject to relatively high levels of transportation noise. In this case, the noise insulation criterion is 45 dB L_{dn}/CNEL inside habitable, noise-sensitive spaces. For developments with exterior transportation noise exposure (e.g., freeway, expressway, parkway, major street, thoroughfare, airport, rail line, rapid transit line noise) exceeding 60 dB L_{dn}/CNEL, an acoustical analysis and mitigation (if required) must be provided showing compliance with the 45 dB L_{dn}/CNEL interior noise exposure limit.

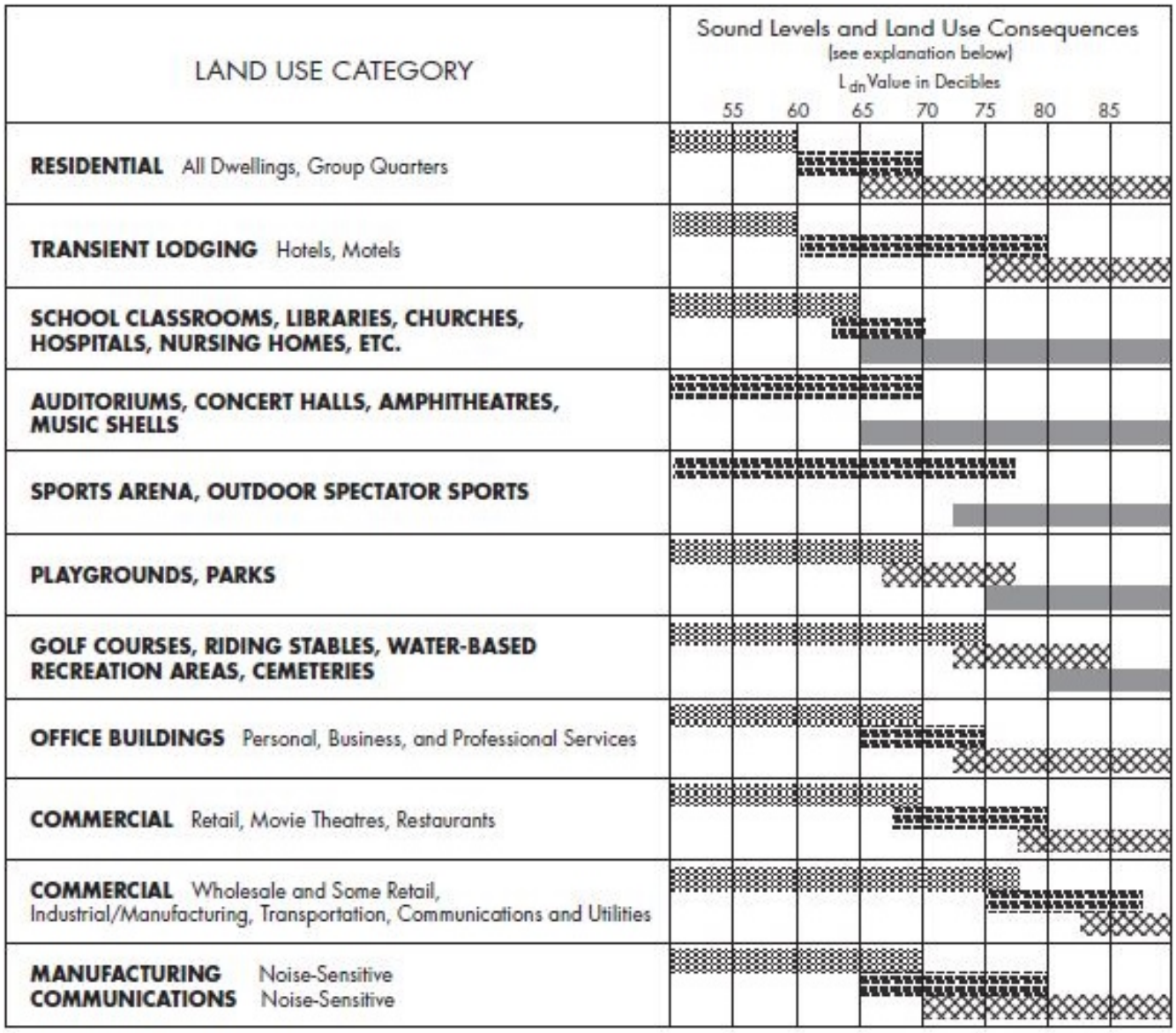
REGIONAL AND LOCAL REGULATIONS

City and County General Plans

Cities and counties within California must adopt a noise element as part of their general plans to identify, assess, and provide mitigation for noise problems within their communities. According to California Government Code 65302, the noise element of a general plan is to be used as "a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise." The noise element should assess current and projected future noise levels associated with local noise sources, including, but not limited to, traffic, trains, aircraft, and industrial operations. California general plan guidance establishes land use compatibility guidelines for various land uses and considers exterior noise levels of below 60 dBA CNEL as normally acceptable for low-density residential land uses, and below 65 dBA CNEL as normally acceptable for multifamily residential land uses. Local jurisdictions may adopt their own noise exposure goals and policies, which may or may not be the same as or similar to those recommended by the State.

In general, State guidance reflects the fact that noise-sensitive land uses are compatible with exterior transportation-related noise exposure not exceeding 65 dB L_{dn}/CNEL, typical standards for suburban areas. However, urban development, such as would occur in transit priority areas, which are required to be near transit, typically near highly trafficked roadways, are frequently located in areas subject to higher noise, and local standards often provide that higher noise levels are conditionally acceptable for residential uses in such areas, so long as it can be demonstrated that interior noise levels would be acceptable, as discussed further below. One example of an urban area with higher noise compatibility standards is the City of San Francisco, which lists noise levels as high as 70 dB L_{dn}/CNEL as conditionally acceptable for residential land uses (see **Figure 3.12-7**). Thus, in San Francisco in areas exceeding 70 dBA CNEL, if appropriate measures are taken to reduce noise exposure, especially interior noise levels, higher exterior noise levels are considered acceptable.

Additionally, based on the Title 24 standards described above and State general plan guidelines, interior noise exposure should not exceed 45 dB L_{dn}/CNEL within noise-sensitive spaces, whether in suburban or urban environments. Standard modern building techniques and requirements, such as use of dual-paned windows, typically reduce exterior to interior noise transmission by 25 dB. The standards within the noise element of locally adopted general plans are for planning policy purposes and are generally not regulatory. Most jurisdictions regulate noise through their municipal code.



Source: City of San Francisco 2004

Figure 3.12-7: City of San Francisco Representative Land Use Compatibility Criteria

The local noise code is generally applied to address noise complaints associated with nontransportation sources (e.g., public address systems, mechanical equipment) and may also address construction noise exposure/production limits. Noise exposure criteria presented within municipal codes should match performance criteria presented in the noise element of the general plan for the given jurisdiction.

Cities and counties often provide noise level performance standards for nontransportation noise sources (e.g., commercial/industrial facilities, mechanical equipment). These standards are used to address intermittent noise exposure and are often in terms of the hourly average noise level (L_{eq}) or maximum noise level (L_{max}). These criteria are generally tied directly to the standards presented in the city/county municipal code (i.e., noise ordinance).

3.12.3 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the Plan Bay Area 2040 EIR (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- generate a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (Criterion NOISE-1);
- generate a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (Criterion NOISE-2);
- generate excessive groundborne vibration or groundborne noise levels (Criterion NOISE-3); or
- for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels (Criterion NOISE-4).

The following impact discussions include numeric thresholds that apply to the applicable significance criteria, where appropriate.

METHOD OF ANALYSIS

The method for the programmatic analysis of noise impacts is described below. Because this analysis is programmatic and focuses on impacts of the Plan on a regional basis, it does not account for site-specific conditions (elevation differences, noise barriers, precise site conditions, detailed traffic conditions). It is expected that project-specific noise and/or acoustical analyses may be required as part of the environmental review prior to project approval by the appropriate lead agency.

Existing traffic noise within the Plan area has been characterized by traffic noise modeling. The baseline for the noise analysis is a simulation of 2015 traffic patterns using Travel Model 1.5. Based on modeling conducted for all roadway types within the Plan area, average noise levels in the 2015 baseline range from 52.6 dBA CNEL (next to collector and small roads) to 74.9 dBA CNEL (next to freeways). Traffic-noise modeling results are presented in **Table 3.12-7** (refer to Appendix F for modeling details).

Table 3.12-7: Average Noise Levels by Roadway Type by County

County	Roadway Type	Modeled Traffic-Noise (CNEL/L_{dn} [dBA] at 100 feet from Roadway Centerline)		
		2015	2050 Plan	Net Change (dB)
San Francisco	Freeway	**72.6**	**73.6**	+1.0
	Expressway	69.3	67.1	-2.3
	Major Arterial	61.9	64.0	+2.2
	Collector and Other	53.1	56.0	+2.9
San Mateo	Freeway	**71.3**	**71.7**	+0.3
	Expressway	66.8	68.8	+2.1
	Major Arterial	58.8	61.7	+2.9
	Collector and Other	52.7	55.5	+2.8
Santa Clara	Freeway	**73.3**	**71.2**	-2.0
	Expressway	67.5	**70.1**	+2.6
	Major Arterial	59.6	62.6	**+3.0**
	Collector and Other	52.6	55.5	+2.9
Alameda	Freeway	**74.9**	**72.3**	-2.5
	Expressway	69.1	**71.2**	+2.1
	Major Arterial	60.2	63.0	+2.7
	Collector and Other	53.7	57.0	**+3.3**
Contra Costa	Freeway	**73.7**	**71.8**	-1.9
	Expressway	68.5	69.4	+0.9
	Major Arterial	59.6	60.4	+0.7
	Collector and Other	54.9	57.1	+2.2
Solano	Freeway	**74.2**	**71.7**	-2.5
	Expressway	66.8	70.0	**+3.3**
	Major Arterial	57.5	57.5	+0.0
	Collector and Other	53.7	55.4	+1.7
Napa	Freeway	**73.2**	**71.3**	-1.9
	Expressway	**70.5**	**70.8**	+0.4
	Major Arterial	60.5	58.4	-2.1
	Collector and Other	52.6	53.1	+0.5
Sonoma	Freeway	**70.9**	70.0	-0.9
	Expressway	**70.1**	**70.7**	+0.6
	Major Arterial	60.0	58.7	-1.3
	Collector and Other	56.5	57.3	+0.8
Marin	Freeway	**73.3**	**72.0**	-1.3
	Major Arterial	60.0	59.2	-0.8
	Collector and Other	53.7	55.8	+2.0

Notes: Bolded text represents areas that exceed project-specific maximum noise exposure limits (i.e., 70 dBA CNEL for freeways and expressways and 65 dBA CNEL for major arterials, collectors, and all other roads) and where a substantial permanent increase in noise of 3.0 dB or greater would occur.

Regional Growth/Land Use Changes

The proposed Plan includes housing and economic strategies to accommodate 2.7 million new persons, 1.4 million new households, 1.5 new forecasted housing units, and 1.4 million new jobs by 2050 (compared to the 2015 baseline). For more details, please see Section 2, "Project Description," and Section 3.1, "Approach to the Analysis." This impact analysis assesses how implementation of the proposed Plan could affect the noise environment. The analysis of noise impacts associated with the forecasted land use development pattern assesses the potential noise levels associated with future mobile and stationary sources of noise. A comprehensive review of noise compatibility standards for cities and counties within the Plan area was conducted, and it revealed widely varying standard of noise levels that are considered acceptable for different land uses (e.g., residential, commercial, schools). However, the overarching theme identified was that acceptable noise levels for sensitive land uses likely to be located within urbanized and densely populated areas, such as downtowns and/or near major roadways or transit corridors (e.g., U.S. Highway 101, BART right-of-way), would be higher than for land uses that would likely be in suburban or rural areas.

Under the proposed Plan, forecasted land use development would be primarily focused within existing urbanized areas and highly concentrated within the largest cities in the Plan area (e.g., San Francisco, Oakland, and San Jose), which currently experience relatively high noise levels. Therefore, considering the relatively high noise environment where development would occur and available guidance from the State and local jurisdictions within the Plan area, the noise compatibility thresholds described above were established based on the range of standards in the region. In addition to exterior noise compatibility guidelines, this analysis also considers interior noise standards set by the California Building Code.

Transportation Network

Traffic and Transit Noise

Changes in land use and the implementation of proposed transportation strategies, such as tolling and speed limits, would affect the distribution of vehicle travel throughout the region. Bay Area UrbanSim 2.0 and Travel Model 1.5 allow for the proposed Plan (2050) traffic simulation to reflect both the forecasted development pattern and the implementation of transportation projects and strategies. However, Travel Model 1.5 is not sensitive to the full range of strategies in the proposed Plan. The results presented in Table 3.12-7, and throughout this analysis, do not account for the implementation of Strategy EN09, "Expand Transportation Demand Management Initiatives," due to limitations that do not allow for distribution of the VMT reductions by county.

Therefore, with respect to the potential for an increase in regional roadway noise, this impact assessment includes overall VMT increases from implementation of both the land use growth patterns and transportation projects under the proposed Plan. However, freeway volumes are projected to go down due to the Plan Bay Area 2050 strategies, including Strategy T05, "Implement Per-Mile Tolling on Congested Freeways with Transit Alternatives" and Strategy T09, "Advance Regional Vision Zero Policy through Street Design and Reduced Speeds," both of which are designed to reduce freeway traffic and, thus, per capita VMT.

For this noise analysis, 24-hour CNEL traffic-noise levels were modeled using outputs from Travel Model 1.5, including traffic volume, speed information, vehicle type (i.e., passenger vehicles, trucks, buses), and time of day volume profiles. The modeled traffic-noise levels are based on average daily traffic volumes occurring on every road type (e.g., freeway, expressway, arterial, collector) throughout each county. Thus, reported noise levels represent average noise levels by roadway type in each county within the Plan area.

Traffic-noise modeling for the proposed Plan does not account for noise attenuation provided by existing noise barriers and, therefore, represents a conservative and worst-case approach. To evaluate the proposed Plan, the base year (2015) condition was compared with the proposed Plan (2050). The analysis reports the potential for noise impacts associated with absolute noise levels, as well as increases in noise.

With regard to transit noise, existing noise levels were determined based on available data for transit (i.e., BART, Caltrain) within the Plan area. Increases in transit noise were not modeled but evaluated based on best available information, such as growth projections and ridership data.

Consistent with the method used to establish the noise compatibility thresholds discussed above, traffic and transit noise was also evaluated by considering existing traffic-noise levels and reviewing applicable traffic-noise standards already established by local agencies. Traffic noise is generally the primary noise source within urban areas; therefore, it is treated separately by many agencies when establishing noise standards.

Freeways, expressways, and transit routes are designed to carry heavy traffic volumes and, therefore, typically generate the highest noise levels. Further, these types of facilities are typically concentrated in urban areas in proximity to commercial centers where ambient noise levels are highest. For these reasons, these facilities are inherently noisy and contribute substantially to ambient noise levels. Major arterials, collectors, and all other roadway types do not carry as much traffic as freeways and expressways, and typically extend to beyond the centralized urban core to potentially quieter areas less influenced by freeways. Therefore, these roadway types result in lower noise levels than freeways, expressways, and transit routes and also use lower significance thresholds because they serve fewer urban areas.

In addition to the use of a maximum noise threshold for transportation noise, relative noise increases with implementation of the proposed Plan were also evaluated. As ambient noise levels increase, a smaller increase in noise is sufficient to cause annoyance. Therefore, when existing noise levels exceed applicable thresholds, a smaller increase threshold was applied.

Transit Vibration

To evaluate vibration levels from transit-related vibration, Caltrans and FTA guidance was used. Caltrans guidance provides reference levels for structural damage and FTA guidance provides reference vibration levels for human disturbance. Generally, available data (e.g., the increase in the number of additional hourly train pass-by events) are insufficient to provide a detailed analysis; therefore, vibration impacts were assessed using the best available data from published sources and established reference vibration levels.

Construction

The proposed Plan's forecasted land use growth and transportation projects would be expected to generate short-term noise and vibration level increases during construction. These levels may be substantially higher than existing ambient noise levels or exceed the applicable local construction noise standards, Caltrans, or FTA criteria, adversely affecting acoustically sensitive receivers in the vicinity. Because detailed construction information was not available, the analysis addresses these potential impacts at a program level.

IMPACTS AND MITIGATION MEASURES

Impact NOISE-1: Generate a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (PS)

Land Use Impacts

Construction noise is an unavoidable result of planned growth in a given location. This impact analysis focuses on construction-related noise effects. Please see Impact NOISE-2 for a discussion of operation-related noise effects. As discussed above in Section 3.12.1, "Environmental Setting," noise levels, including construction-related noise, dissipate rapidly from the source. Thus, sensitive land uses closest to activities are of greatest concern when evaluating construction noise. In addition, construction activities are typically temporary and change throughout the day. Construction of projected development could result in temporary noise impacts associated with grading, excavating, earthmoving, paving, building or structure construction, and other related activities. Construction activities would require the use of various noise-generating construction equipment, such as dozers, loaders, forklifts, cranes, jackhammers, pile drivers, paving equipment, and trucks.

As explained above in Section 3.1, "Approach to Analysis," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.7 million residents and 1.4 million jobs, resulting in 1.4 million new households. The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that result in focused housing and job growth concentrated primarily in or adjacent to already urban and built-up areas and along existing transit corridors. Construction noise standards vary throughout the Plan area but generally limit construction activities to times when noise would have the least effect on nearby land uses (i.e., during the daytime). Some cities include robust noise ordinances that contain either property line performance standards on construction equipment relative to land use and time of day (Oakland Planning Code Section 17.120.050) or identify performance noise standards for construction equipment at a specific distance (Article 29 of the San Francisco Police Code). The City of San Jose restricts construction-related activities to certain hours of the day (City of San Jose Municipal Code Section 20.100.450). In addition, some jurisdictions have identified maximum allowable noise limits specifically for construction activities (e.g., Napa County, San Mateo County). Consequently, depending on the extent of construction activities involved and the proximity of construction to existing receptors, localized construction-related noise effects may vary substantially throughout the Plan area. This analysis applies the following criteria to evaluate temporary construction noise impacts:

- Local jurisdiction: construction noise standards and limits
- Caltrans: 86 dB L_{max} at a distance of 50 feet
- FTA: Construction Noise Criteria, not to exceed ambient levels plus 10 dB

Implementation of the proposed Plan's land use growth pattern would result in construction activities. However, due to the regional scale of the proposed Plan and the programmatic level of this analysis and that specific development projects have not been proposed, specific construction-related details (e.g., location, schedule, equipment) for individual land use development projects are not available. Therefore, to evaluate potential construction impacts, a representative construction scenario, including typical equipment (e.g., pile driver, cranes, trucks, generators, jackhammers, backhoes), was assumed. Based on reference noise levels for these types of construction equipment (shown in **Table 3.12-2**), construction noise could reach levels of 92.8 dBA L_{eq} and 97.0 dBA L_{max} at 50

feet from construction sites (see Appendix F for modeling inputs and results). It should be noted that although other specialized equipment may be used (e.g., for tunnel boring), the ones chosen for the modeling include the loudest construction equipment (e.g., jackhammer and impact pile driver), which would generate similar or louder noise levels; thus, construction noise levels would be considered conservatively high.

Based on the modeling conducted, construction-related noise levels could exceed local construction-related noise standards and thresholds, depending on proximity to existing land uses and duration of construction activities, resulting in a potentially significant (PS) noise impact.

Sea Level Rise Adaptation Impacts

The proposed Plan includes sea level rise adaptation infrastructure to protect communities that are in regularly inundated shoreline areas that may be affected by sea level rise. The implementation of this adaptation infrastructure would result in construction of a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. This adaptation infrastructure could result in temporary construction noise impacts associated with grading, excavating, earthmoving, and other related activities. The associated noise levels would be like those presented above for construction associated with land use development projects because similar construction equipment would be used, generating similar noise levels.

Like noise levels associated with land use development, noise levels related to sea level rise adaptation infrastructure construction could exceed local standards and thresholds identified, depending on proximity to existing land uses and duration of construction activities. Therefore, implementation of the proposed Plan's sea level rise adaptation infrastructure may result in generation of excessive temporary construction noise levels, and this impact would be potentially significant (PS).

Transportation System Impacts

Construction-related noise impacts of transportation projects, similar to land use development, would depend on the extent of construction being undertaken, proximity to existing sensitive land uses, and applicable noise standards. Nonetheless, construction noise would be of greatest concern to the land uses closest to construction activities. Similar to the projected land use development discussed above, transportation projects would have the potential for localized noise impacts, particularly when pile driving or other similar invasive foundation work would be required. In addition, specialized equipment, such as tunnel boring machinery, may be used during construction of the Transbay rail crossing.

Proposed transportation projects are spread throughout the Bay Area and are generally limited to existing transportation corridors. Refer to **Table 2-11** (see Chapter 2, "Project Description") for specific transportation project types and locations. In addition, transportation projects typically progress in a linear fashion (i.e., along the right-of-way), and construction is sometimes required to occur during the night, to minimize traffic congestion during peak travel periods. Construction activities may affect individual receptors for shorter periods of time as construction moves in a linear fashion but could result in greater disturbance to nearby receptors if construction occurs during sleeping hours. Further, transportation construction activities that occur in less urbanized areas, where existing ambient noise levels would be less than in urbanized and densely populated areas, could result in a greater relative increase in temporary noise levels. High noise levels added to a lower existing ambient noise level result in a greater increase of annoyance than the same high noise level added to an existing high level.

Implementation of the proposed Plan would result in construction activities associated with transportation projects. However, specific construction-related details (e.g., location, schedule,

equipment) for individual projects are unknown at this time. Therefore, to evaluate potential construction impacts, a representative construction scenario, including typical equipment (e.g., pile driver, cranes, trucks, generators, jackhammers, backhoes) was assumed. Based on reference noise levels for these types of construction equipment (shown in **Table 3.12-2**), construction noise could reach levels of 92.8 dBA L_{eq} and 97.0 dBA L_{max} at 50 feet from future proposed construction sites. Refer to Appendix F for modeling inputs and results.

Based on the modeling conducted, construction-related noise levels could exceed Caltrans-recommended levels of 86 dBA L_{max}, would likely exceed FTA construction noise criteria (i.e., ambient levels plus 10 dB), and could exceed local construction-related noise standards and thresholds identified, depending on proximity to existing land uses and duration of construction activities. Construction noise and impacts would be potentially significant (PS).

Conclusion

Because implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects have the potential to result in substantial construction noise levels such that nearby receptors could be adversely affected and applicable noise standards exceeded, this impact is considered **potentially significant (PS)**. Mitigation Measure NOISE-1 addresses this impact and is described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below.

Mitigation Measure NOISE-1 To reduce construction noise levels to achieve the applicable noise standards of the relevant jurisdiction within the Plan Area, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Comply with local construction-related noise standards, including restricting construction activities to permitted hours as defined under local jurisdiction regulations (e.g., Alameda County Code restricts construction noise to between 7:00 am and 7:00 pm on weekdays and between 8:00 am and 5:00 pm on weekends).
- Notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance.
- Designate an on-site construction complaint and enforcement manager for the project.
- Post procedures and phone numbers at the construction site for notifying the implementing agency staff, local Police Department, and construction contractor (during regular construction hours and off-hours), along with permitted construction days and hours, complaint procedures, and who to notify in the event of a problem.
- Properly maintain construction equipment and outfit construction equipment with the best available noise suppression devices (e.g., mufflers, silencers, wraps).
- Prohibit idling of construction equipment for extended periods of time in the vicinity of sensitive receptors.

- Locate stationary equipment, such as generators, compressors, rock crushers, and cement mixers, a minimum of 50 feet from sensitive receptors, but further if possible.
- Use hydraulically or electrically powered tools (e.g., jack hammers, pavement breakers, and rock drills) for project construction to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust should be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves should be used, if such jackets are commercially available, and this could achieve a further reduction of 5 dBA. Quieter procedures should be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.
- Erect temporary construction-noise barriers around the construction site when adjacent occupied sensitive land uses are present within 75 feet.
- Use noise control blankets on building structures as buildings are erected to reduce noise emission from the site.

Significance after Mitigation

Implementation of Mitigation Measure NOISE-1 would provide substantial reduction in day and night construction noise levels by ensuring proper equipment use (i.e. by locating equipment away from sensitive land uses and requiring the use of enclosures, shields, and noise curtains) (noise curtains typically can reduce noise by up to 10 dB [EPA 1971]). To the extent that a local agency requires an individual project to implement all feasible mitigation measures described above, construction-noise levels could be reduced by 10 dB. Greater reductions may be achieved and the frequency and intensity of construction-related noise at nearby receptors may be further reduced, depending on actual construction activities and proximity to receptors. However, there could be cases where noise levels reductions from implementation of mitigation measures would not be sufficient to reduce sounds levels to an acceptable level. This impact would remain **significant and unavoidable (SU)**.

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact NOISE-2: Generate a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (PS)

Land Use Impacts

As noted above, this impact discussion focuses on the operation-related noise impacts of proposed Plan implementation. The proposed Plan's forecasted land use development pattern would occur throughout the region, resulting in changes to traffic and associated traffic noise, transit operations, noise associated with land uses development. Many of the growth geographies in the proposed Plan are purposely located along existing and projected transit corridors to facilitate a reduction in VMT within the region, but growth and development would also result in traffic and traffic noise increases. Transit noise exposure would vary greatly depending on proximity to existing noise sources (i.e., transit corridors) and ambient noise levels; and typically, urbanized areas where a majority of development

would occur would experience higher noise levels compared to more rural or less densely populated areas. In addition, new development would include stationary sources (e.g., HVAC equipment) and land use development-related sources (e.g., playgrounds, truck loading/unloading), which also contribute to the noise environment. These sources are discussed separately, below.

Land Use-Related Traffic Noise

Traffic noise impacts were assessed at the county level and based on baseline (2015) and buildout (2050) modeled traffic volumes by roadway types, including all on-road vehicles and buses. Thus, traffic-noise modeling represents both regional and local noise levels, but because it is based on outputs from the regional travel demand model ("Travel Model 1.5"), the noise modeling is necessarily imprecise and should be treated as representative of likely noise levels and changes from baseline conditions. To assess long-term permanent increases in traffic noise, the following criteria were used:

- based on the range of existing standards in the Plan area, exceeds project-specific exterior noise levels of 70 dBA CNEL associated with noise levels from major freeways/expressways and 65 dBA CNEL from all other roadway types;
- California Building Code and California General Plan Guidelines–recommended interior noise levels of 45 dBA CNEL for any roadway type; and
- results in a long-term perceptible increase in the ambient noise level (1.5 dBA or greater) in an area where the applicable noise threshold is already exceeded; in areas where applicable thresholds are not exceeded, a 3-dBA increase or greater would be considered substantial.

Implementation of the proposed Plan would result in a mixture of development and redevelopment within the land use growth footprint throughout the Plan area, primarily in designated growth geographies. Changes in land use due to forecasted development would generate new trips, and these trips would be distributed on existing and proposed Plan roadways, transit, bicycle, or pedestrian systems. Due to the anticipated growth for the region, an absolute increase in roadway volumes within the Plan area is anticipated, despite more efficient land uses and transportation projects and strategies. There would be increases in roadway volumes on some highways and roadways in the Plan area and decreases on other highways and roadways, depending on the proposed Plan's land use development pattern relative to the local roadway system.

Significant impacts from traffic noise would result if the noise levels identified in the significance criteria (by roadway type) are exceeded or if traffic noise levels substantially increase. Based on the principal outlined by FTA (2018), that as the existing level of ambient noise increases, the allowable level of transit noise increases, but the total amount that community noise exposure is allowed to increase is reduced, a "substantial" increase is defined as an increase of 1.5 dBA if existing traffic noise is already above thresholds or an increase of 3 dBA if existing noise levels are below noise thresholds. Specifically, FTA allows a 1 dB increase in noise when existing levels exceed 65 dBA, thus 1.5 dB would be considered substantial when existing levels exceed standards. FTA allows 3 dB increases when existing levels are 55 dB and increasingly more allowable increase as existing levels go down. However, 3 dB is the level at which humans perceive a change in noise, thus, conservatively applied for all roadway types where noise currently does not exceed established thresholds.

Table 3.12-7 identifies existing and existing-plus-proposed Plan average noise levels by roadway type (e.g., freeways, expressways, major arterials, and collectors) for each county within the Plan area and identifies significant noise increases in bolded text.

Based on the modeling conducted, and indicated by bold numbers within the 2015 column in **Table 3.12-7**, average noise levels on freeways under existing conditions exceed applicable noise thresholds of 70 dBA CNEL in every county within the region. In addition, existing noise levels on expressways exceed 70 dBA in Napa and Sonoma Counties. Existing average noise levels on smaller roads, such as major arterials and collectors, do not currently exceed levels of 65 dBA CNEL (i.e., threshold applied to roads other than freeways/expressways) in any county.

In areas where traffic-noise levels currently exceed thresholds, it would continue to exceed these thresholds with implementation of the proposed Plan, except in Sonoma County, where freeway noise would decrease with proposed Plan implementation and would no longer exceed thresholds as demand for travel on US-101 in Sonoma County is expected to decline as a result of the proposed Plan's land use and transportation strategies.

As shown in **Table 3.12-7**, increases in traffic-related noise will occur with implementation of the Plan's land use development pattern and transportation projects on almost every roadway type within the Plan area, ranging from 0.3 dB to 3.3 dB. With regard to interior noise thresholds of 45 dBA CNEL, buildings provide varying degrees of exterior-to-interior noise reduction but typically can achieve a minimum 25-dBA reduction. Thus, receptors within areas experiencing noise levels below the exterior noise thresholds of 70 dBA CNEL would also experience acceptable interior noise levels of 45 dBA CNEL (i.e., areas further way from a freeway's 70-dBA CNEL contour). Based on the modeling conducted, under baseline conditions, freeway 70-dBA CNEL contours within the Plan area range from a minimum distance of 122 feet to a maximum distance of 230 feet from the freeway centerlines. With implementation of the proposed Plan, freeway 70-dBA CNEL contours within the Plan area would range from a minimum distance of 106 feet to a maximum distance of 189 feet from the freeway centerlines, a decrease of 41 feet (see Appendix F for noise contour details). In other words, the plan would result in a slight noise reduction on the overall freeway network within the Plan area.

Given that noise levels associated with freeways within the Plan area currently exceed 70 dBA CNEL (up to 230 feet from the freeway centerlines) and would continue to exceed 70 dBA CNEL (up to 189 feet from the freeway centerline) under the proposed Plan, the interior noise thresholds may also be exceeded in these areas. However, while interior and exterior noise levels may continue to exceed thresholds, these exceedances would be less pronounced in all counties except San Francisco and San Mateo Counties with implementation of the proposed Plan. Therefore, while traffic-related noise resulting from implementation of the proposed Plan could result in excessive noise levels (i.e., 70-dBA CNEL land use compatibility and traffic-noise threshold) along some roadways, as well as a substantial permanent noise increase at existing and future projected developments in the area, implementation of the Plan would reduce the extent to which the impacts occur in these counties compared to existing conditions, as indicated in **Table 3.12-7**.

Because the proposed Plan would result in traffic-noise levels that exceed applicable noise thresholds and would result in a substantial noise increase in some areas, this impact would be potentially significant (PS).

Land Use-Related Stationary Noise Sources

Typical community noise sources include small mechanical devices (e.g., lawn mowers, leaf blowers), parks and playgrounds, restaurants and bars, commercial uses, and industrial plants. Stationary sources may include HVAC units, delivery trucks loading and unloading at commercial land uses, and other equipment associated with commercial and industrial land uses (e.g., pumps, back-up generators, auto body shops). To assess long-term increases in stationary noise sources, the following criteria were used:

- based on the range of existing standards in the Plan area, exceeds exterior project-specific noise levels of 70 dBA CNEL (applicable to urban areas/mixed-use/Transit Priority Areas [TPAs]) and 65 dBA CNEL (applicable to suburban/rural areas) and
- California Building Code and California General Plan Guidelines–recommended interior noise level of 45 dBA CNEL. (land use compatibility all noise sources and land use).

To evaluate noise exposure to existing and new receptors, the land use compatibility thresholds of 70 dBA CNEL (exterior) and 45 dBA CNEL (interior) established for this EIR were used. To evaluate substantial increases in noise from new stationary sources resulting from land use development, substantial increases in noise were based on existing noise levels. Because traffic noise is generally the primary noise source within communities, modeled traffic noise shown in **Table 3.12-7** for 2015 was used to characterize existing ambient levels.

The Plan's development pattern would result in new residential, commercial, and industrial land uses that could include stationary sources (e.g., HVAC units, mechanical equipment) and community noise that could expose existing receptors to excessive noise levels or result in a substantial permanent increase in noise. Noise levels from HVAC equipment vary substantially depending on unit efficiency, size, and location, but generally range from 45 to 70 dB L_{eq} at a distance of 50 feet (EPA 1971). Reference noise-level measurements of emergency generators with rated power outputs from 50 to 125 kilowatts (kw) result in noise levels ranging from 61 to 73 dB L_{eq} and 63 to 84 dB L_{max} at a distance of 45 feet (EPA 1971; FHWA 2006). Based on reference noise values and accounting for typical usage factors of equipment used for commercial loading/unloading, noise levels could reach 82 dB L_{eq} and 86 dB L_{max} at a distance of 50 feet.

Stationary and community noise typically is intermittent in nature and fluctuates throughout the day. For example, HVAC units do not typically run all day but operate in short bursts, while noise generated at commercial loading docks may occur more frequently early in the morning, and noise associated with bars and nightclubs would generally occur more frequently in the evening hours. Stationary equipment and community noise is typically regulated through local municipal codes, which provide specific performance-based noise standards, specific to the noise source, and give the local jurisdiction the ability to enforce noise sources that violate the code (e.g., equipment operating loudly, people causing disturbances at night, excessive dog barking).

However, implementation of the proposed Plan would result in increased land use development within areas already experiencing high noise levels. Although specific locations for these noise sources are not known at this time, considering the projected high density of land development in already urbanized areas, where existing sensitive receptors already exist, it is possible that implementation of the Plan's forecasted land use development (and associated noise sources) could result in exposure to existing sensitive receptors to noise levels above 65 dBA CNEL or 70 dBA CNEL (exterior) and 45 dBA CNEL (interior) or a substantial increase in noise (i.e., 1.5 dB). This would be a potentially significant impact (PS).

Sea Level Rise Adaptation Impacts

The proposed Plan also includes sea level rise adaptation infrastructure to protect communities that are located in regularly inundated shoreline areas that may be affected by sea level rise. The adaptation infrastructure would include construction of a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. For construction-related impacts refer to NOISE-1 and NOISE-3.

Regarding levees, seawalls, marsh restoration, and tidal gates, no long-term increases in noise would occur because this infrastructure would not include stationary equipment that generate noise. Regarding elevated roadway projects, research has shown that noise levels of traffic on elevated urban and suburban roadways, such as freeway overpasses 15–20 feet above grade, are no greater or even less than noise levels generated by traffic on at-grade roadways, largely because the direct line of sound propagation from the noise source is elevated above receptors (Zimmer and Buffington 1997). The following adaptation infrastructure may involve elevating existing roadways 15–20 feet above grade, enough to result in noticeable decreases in noise levels, in anticipation of sea level rise:

- I-580/US-101/SMART | Sea Level Rise Resilience Project (Marin),
- SR-37 | Sea Level Rise Resilience Project (Marin, Sonoma, Solano),
- SR-84 | Sea Level Rise Resilience Project (Alameda),
- US-101 | Peninsula Sea Level Rise Resilience Project (San Mateo), and
- SR-237/VTA | Sea Level Rise Resilience Project (Santa Clara).

Thus, although traffic noise would increase as a result of the Plan, as discussed above, the sea level rise adaptation infrastructure could reduce noise levels at the respective project locations, but at a minimum, would not result in additional increases in noise, because an elevated road could move an existing noise source out of the direct line-of-sight of existing receptors. Further, the elevated roads would not be widened, which would allow an increase in capacity, so average daily volumes and associated noise would not increase as a result of the project. Therefore, adaptation infrastructure involving construction of elevated roadways would not result in a significant change in traffic-related noise levels, and this impact would be less than significant (LTS).

Transportation System Impacts

Transit expansion projects would occur in multiple locations within the Plan area but would occur primarily in urbanized areas and near existing transit facilities. Increases in transit-related noise as a result of the proposed Plan could occur throughout the region as transit lines are expanded and service frequency increased. Noise levels would vary greatly depending on the type of transit facility and proximity to existing sensitive land uses. To assess long-term permanent increases in transit noise, the following criteria were used:

- based on the range of existing standards in the Plan area, exceeds project-specific exterior noise levels of 70 dBA CNEL;
- California Building Code and California General Plan Guidelines–recommended interior noise levels of 45 dBA CNEL; and
- results in a long-term perceptible increase in the ambient noise level (1.5 dBA or greater) in an area where the applicable noise threshold is already exceeded; in areas where applicable thresholds are not exceeded, a 3-dBA increase or greater would be considered substantial.

Noise from rail transit can vary depending on the frequency of trains passing throughout the day, the type of train (i.e., electric or diesel), whether or not a warning horn is used, and the type of track (i.e., elevated or not). Based on available data for Caltrain lines within the region, 24-hour noise levels can range from 70 dBA CNEL/L_{dn} at 50 feet from the track to 82 dBA CNEL/L_{dn} at 45 feet from the track (Peninsula Corridor Joint Powers Board 2014).

Extension of passenger rail transit service, as well as increases in transit frequency, could result in exposure of existing sensitive land uses to noise levels exceeding the thresholds developed for this analysis (i.e., 70 dBA CNEL). Such projects include:

- BART Silicon Valley Extension, Phase II – San Jose (Berryessa) to Santa Clara (Santa Clara County),
- Caltrain/California High-Speed Rail – Downtown San Francisco Extension (San Francisco),
- Capitol Corridor – South Bay Connect (Alameda County),
- Dumbarton Rail Group Rapid Transit (San Mateo County),
- Mineta San Jose International Airport Connector Automated People Mover (San Jose),
- SMART – Santa Rosa to Windsor (Sonoma County),
- Transbay Rail – New San Francisco–Oakland Crossing (San Francisco and Oakland), and
- Valley Link – Central Valley to Livermore (Alameda County).

The severity of this impact would depend upon the type (diesel or electric powered) and frequency of rail pass-by events and the existing ambient noise level at the existing receptor. These projects are generally located in urban areas that are already exposed to high levels of vehicle traffic noise.

Expansion of existing or construction of new transit lines would result in a new substantial noise source that could result in excessive noise exposure depending on the type of existing land uses and proximity to the new noise sources. It is likely that new rail lines would have noise levels similar to those discussed above. Therefore, they could exceed applicable exterior (i.e., 70 dBA CNEL) and interior (i.e., 45 dBA CNEL) noise thresholds at existing sensitive land uses. In addition, because new or expanded rail lines could result in noise levels of 70 dBA CNEL and up to 82 dBA CNEL, when compared to existing conditions where no rail currently exists, noise levels would substantially increase (i.e., likely more than 3 dB above ambient levels). It should be noted that implementing agencies or sponsors of transportation projects would coordinate with local jurisdictions to comply with local policies and regulations. In addition to future project-level CEQA review, transportation projects subject to review by the Federal Transit Administration, Federal Railroad Administration, or the Federal Highway Administration would be subject to project-level NEPA review and compliance with applicable guidance related to noise assessments and mitigation.

Because trains could generate noise levels of up to 82 dBA CNEL/L_{dn}, and transit lines are currently located in urbanized areas near major roads and freeways, where noise levels are currently relatively high, a 1.5-dBA increase in transit noise would be considered significant. As explained in Impact TRA-1 in Section 3.15, "Transportation," the proposed Plan includes major investments that create new transit lines or boost frequencies on existing lines. Thus, it is expected that implementation of the proposed Plan would result in a 1.5-dBA or more increase in transit noise. Increases in transit noise on existing facilities would result in a potentially significant (PS) impact.

Conclusion

Implementation of the proposed Plan's land use development pattern and transportation projects could result in regional average noise increases and localized traffic-related noise levels that exceed applicable thresholds, resulting in a substantial permanent increase in noise in some areas. However, as seen in **Table 3.12-7**, along some roadways in some counties, noise levels would decrease with implementation of the Plan. Implementation of the proposed Plan could result in noise exposure to existing or new sensitive receptors in excess of land use compatibility thresholds and could result in a permanent substantial increase in noise. New and expanded passenger rail lines would result in new noise sources and substantial increases in noise depending on proximity to existing sensitive land uses. Due to the traffic noise increases and threshold exceedances in some areas, substantial increases in stationary noise sources, and new or expanded transit services, this impact would be **potentially significant (PS).** Mitigation Measures NOISE-2(a), NOISE-2(b), and NOISE-2(c) address this impact and are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below.

Mitigation Measure NOISE-2(a) To reduce exposure from traffic noise when significant to achieve the applicable noise thresholds for each roadway type (i.e., 70 dBA CNEL for major roads/freeway, 65 dBA CNEL for all other roads), implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Design adjustments to proposed roadway or transit alignments to reduce noise levels in noise-sensitive areas (e.g., below-grade roadway alignments can effectively reduce noise levels in nearby areas by providing a barrier between the source and receptor).
- Use techniques such as landscaped berms, dense plantings, reduced-noise paving materials, and traffic-calming measures in the design of transportation improvements.
- Use rubberized asphalt or "quiet pavement" to reduce road noise for new roadway segments, roadways in which widening or other modifications require re-pavement, or normal reconstruction of roadways where re-pavement is planned.
- Maximize the distance between existing noise-sensitive land uses and new noise-generating facilities and transportation systems.
- Contribute to the insulation of buildings or construction of noise barriers around sensitive receptor properties adjacent to the transportation improvement.
- Use land use planning measures, such as zoning, restrictions on development, site design, and buffers to ensure that future development is noise compatible with adjacent transportation facilities and land uses.
- Monitor the effectiveness of noise reduction measures by taking noise measurements and installing adaptive mitigation measures to achieve the standards for ambient noise levels established by the noise element of the general plan or noise ordinance

Mitigation Measure NOISE-2(b) To reduce the exposure of existing sensitive receptors to non-transportation noise associated with projected development and achieve a noise reduction below 70 dBA CNEL or local applicable noise standard, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Local agencies approving land use projects shall require that routine testing and preventive maintenance of emergency electrical generators be conducted during the less sensitive daytime hours (per the applicable local municipal code). Electrical generators or other mechanical equipment shall be equipped with noise control (e.g., muffler) devices in accordance with manufacturers' specifications.
- Local agencies approving land use projects shall require that external mechanical equipment, including HVAC units, associated with buildings and other stationary sources (e.g., commercial loading docks) incorporate features designed to reduce noise to below 70 dBA CNEL or the local applicable noise standard. These features may include locating equipment or activity areas within equipment rooms or enclosures that incorporate noise reduction features, such as acoustical

louvers, and exhaust and intake silencers. Enclosures shall be oriented so that major openings (i.e., intake louvers, exhaust) are directed away from nearby noise-sensitive receptors. Site design considerations shall also incorporate appropriate setback distances, to the extent practical, from the noise and existing sensitive receptors to minimize noise exposure.

Mitigation Measure NOISE-2(c) To reduce transit-related noise exposure to existing receptors within 50 feet of a rail transit line to below 70 dBA, or other applicable standard, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- When finalizing development project site plans or transportation project design, sufficient setback between occupied structures and the railroad tracks shall be provided to minimize noise exposure to the extent feasible.
- When finalizing development project site plans, noise-sensitive outdoor use areas shall be sited as far away from adjacent noise sources as possible and site plans shall be designed to shield noise-sensitive spaces with buildings or noise barriers whenever possible.
- Prior to project approval, the implementing agency for a transportation project shall ensure that the transportation project sponsor applies the following mitigation measures (or other technologically feasible measures) to achieve a site-specific exterior noise level of 70 dBA CNEL (or other applicable local noise standard) and interior noise level of 45 dBA CNEL at sensitive land uses, as applicable for transit projects:
  - use sound reduction barriers, such as landscaped berms and dense plantings;
  - locate rail extension below grade as feasible;
  - use damped wheels on railway cars;
  - use vehicle skirts;
  - use undercar acoustically absorptive material; and
  - install sound insulation treatments for affected structures.

Significance after Mitigation

Implementation of Mitigation Measure NOISE-2(a) would result in substantial reductions in traffic-related noise. Depending on barrier construction, up to 10 dBA in noise reduction is typically feasible (FHWA 2006), which would be adequate to bring the highest modeled traffic noise levels of 73.6 dBA CNEL to below the 70-dBA CNEL threshold. Site design, including proximity to the noise source, can achieve varying degrees of noise reduction depending on the distance to the source. Building construction methods can typically achieve a minimum of 25-dB exterior-to-interior noise reduction, but much higher levels of reduction are achievable through additional wall insulation and sound-proofing techniques. Implementation of Mitigation Measure NOISE-2(b) would require operational measures to that stationary noise sources would be designed to reduce noise to below 70 dBA CNEL and comply with any applicable local noise codes. Implementation of Mitigation Measure NOISE-2(c) would ensure that site-specific planning would include all technologically feasible measures to reduce transit noise to below 70 dBA CNEL for exterior noise levels and 45 dBA CNEL for interior noise levels. Further, site planning and building construction would be developed to achieve the necessary noise reduction, based on site-specific parameters. To the extent that a local agency requires an individual

project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M).

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact NOISE-3: Generate excessive groundborne vibration or groundborne noise levels (PS)

Land Use and Sea Level Rise Adaptation Impacts

Construction

Vibration sources include the use of impact equipment (e.g., pile driving) during construction and long-term operational sources associated primarily with heavy trucks and buses traveling on roads and transit systems (e.g., heavy rail and commuter rail). Regarding construction-related vibration, cities and counties, including the jurisdictions within the Plan area, typically do not establish individual standards. Thus, Caltrans guidance was used to evaluate potential damage to existing structures from vibration activities, and FTA vibration criteria were used to evaluate potential disturbance to sensitive receptors from vibration noise, using the following criteria:

- Caltrans-recommended vibration levels for structural damage (0.1 to 0.6 PPV in/sec depending on building type) and
- FTA vibration impact criteria for human annoyance (65 VdB to 80 VdB depending on event frequency).

Construction activities may result in varying degrees of temporary ground vibration, depending on the specific construction equipment used and activities involved. When considering new construction, pile driving generates the highest vibration levels and is, therefore, of greatest concern when evaluating construction-related vibration impacts. The proposed Plan includes sea level rise adaptation infrastructure that would include construction of a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. Some of these activities could involve pile driving for elevated roadway projects.

According to FTA, vibration levels associated with pile driving are 1.518 in/sec PPV at 25 feet. Based on FTA's recommended procedure for applying a propagation adjustment to these reference levels, vibration levels from pile driving could exceed the Caltrans-recommended level of 0.5 in/sec PPV with respect to the structural damage for older structures within 50 feet of pile driving activities (refer to Appendix F for modeling details). Therefore, because the majority of projected development would occur in already urban and built-up areas the potential exists for pile driving to occur within 50 feet of a historic or old building, exceeding Caltrans-recommended levels for structural damage.

Vibration levels can also result in interference or annoyance impacts for residences or other land uses where people sleep, such as hotels and hospitals. According to FTA, vibration levels associated with pile driving are 112 VdB at 25 feet (FTA 2018). FTA vibration annoyance potential criteria depend on the frequency of the vibration events. When vibration events occur more than 70 times per day, as would likely be the case with pile driving, they are considered "frequent events." Frequent events in excess

of 72 VdB are considered to result in a significant vibration impact. Based on FTA's recommended procedure for applying propagation adjustments to these reference levels, vibration levels from pile driving could exceed FTA's recommended guidance for "frequent events" within 550 feet of an existing sensitive land use (refer to Appendix F for modeling details). The potential exists for pile driving within 550 feet of an existing sensitive land use, exceeding FTA-recommended levels for vibration annoyance.

Therefore, because the potential exists for pile driving to occur within 50 feet of an older building, exceeding Caltrans-recommended levels for structural damage, and within 550 feet of an existing sensitive land use, exceeding FTA-recommended levels for vibration annoyance, this would be a potentially significant (PS) vibration impact, and Mitigation Measure NOISE-3(a) would address this impact.

Operation

New transportation-related vibration sources (e.g., new or expanded transit systems) are discussed below under Transportation System Impacts. Implementation of the land use development pattern and strategies in the proposed Plan would not result in new vibration sources because the majority of the new development would occur as infill development, in accordance with the adopted land use plans and zoning ordinances of the cities and counties in the Plan area. Forecasted development under the proposed Plan would create more centralized residential areas and commercial centers and would not result in industrial uses that could generate operational vibration. New development built near or even above or adjacent to new or existing vibration sources would be constructed to higher standards, due to increasingly more stringent energy efficiency requirements with better insulation and materials, that reduce vibration exposure. The sea level rise adaptation infrastructure would not involve any construction or modification of operational sources of vibration and thus would not result in any long-term permanent increases in vibration levels. This impact would be less than significant (LTS).

Transportation System Impacts

Construction

Construction-related vibration impacts from transportation project implementation would be similar to those described above for land use and sea level rise adaptation infrastructure. This would be a potentially significant (PS) vibration impact, and Mitigation Measure NOISE-3(a) would address this impact.

Operation

Transit expansion projects would occur in multiple areas within the region but would occur primarily in urbanized areas and near existing transit facilities. Increases in transit-related vibration as a result of the proposed Plan could occur throughout the region as transit lines are expanded and service frequency increased. However, vibration levels would vary greatly depending on the type of transit facility and proximity to existing sensitive land uses. Because vibration impacts would vary depending on the local conditions, these impacts are addressed at the local level below. To assess long-term vibration impacts, the following criteria was used:

- Caltrans-recommended vibration levels for structural damage (0.1 to 0.6 PPV in/sec depending on building type);
- FTA vibration impact criteria for human annoyance (65 VdB to 80 VdB depending on event frequency); and

- for vibration levels already exceeding applicable thresholds (without the proposed Plan), a Plan-related increase in vibration level of 1.5 VdB would be considered significant.

Vibration can result in structural damage to buildings or disturbance to people at nearby sensitive land uses (e.g., residences, hospitals, offices). However, vibration levels dissipate rapidly from the source and typically are associated with short-term events (e.g., passing train). Therefore, vibration effects are limited to localized areas near the vibration source. Further, the smoothness of the running surface (e.g. road or rail) is correlated to the level of vibration from a moving vehicle. Smooth roadways for buses and smooth rail running surfaces for rail systems substantially reduce vibration. In addition, urbanized and developed areas where roads are paved and maintained regularly would be considered a smooth surface for bus transit. In these instances, transit over rail would be considered the primary ground vibration sources within the Plan area.

Extension of rail transit service to new locations, as well as boosts in existing transit frequency, in the Bay Area could result in vibration levels that exceed vibration significance thresholds (i.e., levels developed by the FTA as shown in **Table 3.12-4**). Such projects include:

- BART Silicon Valley Extension, Phase II – San Jose (Berryessa) to Santa Clara (Santa Clara County),
- Caltrain/California High-Speed Rail – Downtown San Francisco Extension (San Francisco),
- Capitol Corridor – South Bay Connect (Alameda County),
- Dumbarton Rail Group Rapid Transit (San Mateo County),
- Mineta San Jose International Airport Connector Automated People Mover (San Jose),
- SMART – Santa Rosa to Windsor (Sonoma County),
- Transbay Rail – New San Francisco–Oakland Crossing (San Francisco and Oakland), and
- Valley Link – Central Valley to Livermore (Alameda County).

The FTA Transit Noise and Vibration Impact Assessment Guidelines provide recommended vibration levels for various land use types based on the frequency of exposure from vibration events (i.e., number of trains passing by a sensitive land use). In some areas within the region, existing development could be exposed to frequent vibration events (i.e., more than 70 trains per day), occurring adjacent to new or expanded rail lines used by BART, Caltrain, or others. The FTA-recommended level for which human disturbance would occur is 72 VdB. Thus, based on the Generalized Ground Surface Vibration curves in the FTA guidance, receptors at developments within 200 feet of a railroad could be exposed to vibration exceeding the recommended threshold for human disturbance of 72 VdB for sensitive receptors that are exposed to a higher frequency of vibration events (i.e., 70 or more trains passing by in 1 day).

The degree of increased vibration exposure would depend upon the type (diesel or electric powered) and frequency of rail pass-by events and the existing soil conditions at the existing receptor. Expanding or building new transit lines in unserved areas would result in a new substantial vibration source that could result in vibration effects that exceed FTA-recommended levels (i.e., 72 VdB) within 200 feet of the source. In addition, because new or expanded rail lines could result in vibration levels that exceed applicable criteria (i.e., 72 VdB) within 200 feet, when compared to existing conditions where no rail currently exists, vibration levels would substantially increase (i.e., more than 1.5 VdB). Some of the rail extension projects identified above would result in potentially significant (PS) impacts resulting from excessive vibration exposure to existing sensitive receptors along the extended transit alignment and permanent substantial increases in vibration levels. This would be a potentially significant (PS) impact.

Conclusion

Construction of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation facilities could generate substantial vibration levels, and the potential exists for pile driving to occur within 50 feet of an older building, exceeding Caltrans-recommended levels for structural damage, and within 550 feet of an existing sensitive land use, exceeding FTA-recommended levels for vibration annoyance. Implementation of the proposed Plan's land use development pattern and sea level rise adaptation infrastructure would not result in substantial sources of operational vibration. However, new and expanded transit lines would result in new vibration sources and substantial increases in vibration depending on proximity to existing sensitive land uses. Thus, this would be a **potentially significant (PS)** impact. Mitigation Measures NOISE-3(a) and NOISE-3(b) address this impact and are described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below.

Mitigation Measure NOISE-3(a) To reduce construction vibration levels to acceptable levels (i.e., 65 VdB to 80 VdB depending on frequency of event and 0.1 to 0.6 PPV in/sec depending on building type), implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- To minimize disturbance of receptors within 550 feet of pile-driving activities, implement “quiet” pile-driving technology (such as predrilling of piles and the use of more than one pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions.

- To reduce structural damage, where pile driving is proposed within 50 feet of an older or historic building, engage a qualified geotechnical engineer and qualified historic preservation professional (for designated historic buildings only) and/or structural engineer to conduct a preconstruction assessment of existing subsurface conditions and the structural integrity of nearby (i.e., within 50 feet) historic structures that would be exposed to pile-driving activity. If recommended by the preconstruction assessment, for structures or facilities within 50 feet of pile-driving activities, the project sponsors shall require ground vibration monitoring of nearby historic structures. Such methods and technologies shall be based on the specific conditions at the construction site. Conditions will be determined through activities such as the preconstruction surveying of potentially affected historic structures and underpinning of foundations of potentially affected structures, as necessary. The preconstruction assessment shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of pile-driving activities and identify corrective measures to be taken should monitored vibration levels indicate the potential for building damage. In the event of unacceptable ground movement with the potential to cause structural damage, all impact work shall cease, and corrective measures shall be implemented to minimize the risk to the subject, or adjacent, historic structure.

- Use cushion blocks to dampen impact noise from pile driving.

Mitigation Measure NOISE-3(b) To reduce vibration effects from rail operations, implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Ensure that project sponsors apply the following mitigation measures to achieve FTA-recommended vibration levels of 72 VdB at residential land uses, or other applicable standard, for rail extension projects:
  - Use high-resilience (soft) direct fixation fasteners for embedded track.
  - Install ballast mat, or other approved technology for the purpose of reducing vibration, for ballast and tie track.
  - Conduct regular rail maintenance, including rail grinding and wheel truing to recontour wheels, to provide smooth running surfaces.

Significance after Mitigation

Implementation of Mitigation Measure NOISE-3(a) would reduce vibration impacts by requiring the use of quieter pile-driving technology and ensuring that the proper actions are taken to minimize vibration impacts to adjacent structures. Implementation of the Mitigation Measure NOISE-3(b) could provide a reduction of 15–20 VdB (FTA 2018), which would be adequate to reduce vibration levels to below 72 VdB within 200 feet. To the extent that a lead agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M).

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact NOISE-4: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels (PS)

This analysis considers the following thresholds of significance:

- California Airport Noise Standards, Title 21, Section 5000: 65 dBA CNEL and
- Federal Interagency Committee on Aviation Noise: 65 dBA (interior) single-event noise levels.

Land Use Impacts

Public airports typically service entire regions, whereas smaller private airports or airstrips tend to serve local users. However, like other noise sources, noise from airports and aircraft flight events have the greatest effect on nearby land uses. There are 25 public use airports in the Bay Area that serve commercial and general aviation users (see **Table 3.9-2** and **Figure 3.9-3** in Section 3.9, "Hazards and Wildfire"). Many of the public airports are in urbanized areas where the proposed Plan envisions land use development projects. Specifically, the following airports are located immediately adjacent to TPAs identified in the proposed Plan:

- Oakland International Airport,
- San Francisco International Airport,
- San Jose International Airport,
- Reid-Hillview Municipal Airport (San Jose),

- Moffett Federal Airfield (Mountain View),
- Travis Air Force Base (Fairfield),
- Livermore Municipal Airport, and
- Buchanan Field (Concord).

Most of these airports and airfields have an active Airport Land Use Compatibility Plan (ALUCP) (or the equivalent) to discourage incompatible land uses within the vicinity of the airport. The FAA Part 150 program encourages airports to prepare noise exposure maps that show land uses that are incompatible with high noise levels, and these are often included within the ALUCP. For example, the ALUCP for San Francisco International Airport includes information on the number of housing opportunity sites within the 70-CNEL contour for airport operations. In addition, noise contours identified in the Oakland International ALUCP indicate that the 65 dBA CNEL is close to existing development. Thus, the potential exists for forecasted development pursuant to the proposed Plan to occur in areas of 65 dBA CNEL or 70 dBA CNEL, exceeding recommended airport noise thresholds of 65 dBA CNEL for residential land uses and the project-specific land use compatibility thresholds of 70 dBA CNEL.

In addition to consideration of exterior CNEL noise levels, increases in interior noise levels near airports have the potential to result in sleep disturbance at nearby sensitive land uses. In accordance with FICAN guidance, aircraft-generated interior single-event noise levels of 65 dBA could result in a 5-percent or less chance of awakening someone.

Local land use compatibility standards contained in city and county general plans would typically dictate whether specific site review was required for construction of sensitive land uses in areas potentially affected by aircraft noise. However, given the regional scale of the proposed Plan and the high level of projected development throughout the region, it is possible that the Plan's forecasted land use development pattern could result in exposure to exterior and interior noise levels from existing airports or airstrips that exceed applicable thresholds. There would be a potentially significant (PS) impact resulting from excessive airport noise levels if projected development were to occur in close proximity to existing airports or airstrips that would require mitigation.

Sea Level Rise Adaptation Impacts

The proposed Plan includes sea level rise adaptation infrastructure that would include construction of a variety of levees, seawalls, elevated roadways, marsh restoration, and tidal gates. The adaptation infrastructure could potentially be located in areas close to existing airports or airstrips, specifically Oakland and San Francisco International Airports; however, they would not consist of habitable structures. Thus, no receptors would be exposed to excessive noise levels generated by nearby aircraft, and this impact would be less than significant (LTS).

Transportation System Impacts

There are no airport-related transportation projects identified in the proposed Plan. The transportation projects could potentially be located in areas close to existing airports or airstrips, specifically Oakland and San Francisco International Airports; however, they would not consist of habitable structures. Thus, no receptors would be exposed to excessive noise levels generated by nearby aircraft, and this impact would be less than significant Consequently, this would be a less-than-significant impact (LTS).

Conclusion

Because implementation of the proposed Plan's land use development pattern could potentially result in land use development being located in close proximity to existing airports such that

applicable exterior and interior noise thresholds would be exceeded. this would be a **potentially significant (PS)** impact. Mitigation Measure NOISE-4 addresses this impact and is described below.

Mitigation Measures

Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below.

Mitigation Measure NOISE-4 Local lead agencies for all new development proposed to be located within an existing airport influence zone, as defined by the locally adopted airport land use compatibility plan or local general plan, shall require a site-specific noise compatibility study. The study shall consider and evaluate existing aircraft noise, based on specific aircraft activity data for the airport in question, and shall include recommendations for site design and building construction to ensure compliance with interior noise levels of 45 dBA CNEL, such that the potential for sleep disturbance is minimized.

Significance after Mitigation

To the extent that a local agency requires an individual project to implement the feasible mitigation measure described above, the appropriate design and building construction would ensure interior noise levels of 45 dBA CNEL, and this impact would be less than significant with mitigation (LTS-M).

Projects taking advantage of the CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

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3.13 PUBLIC SERVICES AND RECREATION

This section evaluates the potential impacts on schools, police protection, fire protection, emergency medical response, recreation facilities, and other government services (e.g., libraries, prisons, social services) that could result from the implementation of the proposed Plan.

Comments received in response to the Notice of Preparation (NOP) expressed concerns about the capacity of police, fire protection, public health and safety, wildfire risk, and recreational resources to serve Planned Development Areas (PDAs). Comments also expressed concern regarding the potential effects of locating active recreational resources near wildlife areas.

The effects on wildfire risk are addressed in Section 3.9, "Hazards and Wildfire." For a discussion of the effects on biological resources, see Section 3.5, "Biological Resources."

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important" (CEQA Guidelines Section 15083). Neither the CEQA Guidelines nor the statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received on the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.13.1Environmental Setting

SCHOOLS

Although the California public school system is under the policy direction of the State Legislature, the California Department of Education relies on local control for the management of school districts. School district governing boards and district administrators allocate resources among the schools of the district and set educational priorities for their schools. Each jurisdiction in the nine-county region of the Bay Area provides residents with local public education facilities and services, including elementary, middle, secondary, and postsecondary schools, as well as special and adult education.

As of the 2018-2019 school year, there were 1,764 public and charter schools in the Bay Area, with 1,051,744 enrolled students, and 53,174 teachers. **Table 3.13-1** lists the number of K-12 public and charter schools within each county.

Table 3.13-1: Bay Area Public Schools and Enrollment by County, 2018-2019

Area[1]	K-12 Schools	K-12 Enrollment	K-12 Teachers[2]
Alameda County	381	236,076	11,543
Contra Costa County	274	175,040	8,597
Marin County	75	34,333	1,875
Napa County	41	20,742	1,090
San Francisco County	129	74,884	4,690
San Mateo County	171	97,275	5,089
Santa Clara County	411	276,637	13,281

Area[1]	K-12 Schools	K-12 Enrollment	K-12 Teachers[2]
Solano County	104	66,140	3,063
Sonoma County	178	70,617	3,946
Regional Total	1,764	1,051,744	53,174

[1] Includes both incorporated cities and unincorporated areas of the county.
[2] Full-Time Equivalent Teachers, which include those assigned to a particular type of school; district and county office of education teachers not associated with a school are excluded. Most recent data available from 2018–2019.
Source: Education Data Partnership 2020

EMERGENCY SERVICES

This section provides information on emergency services in the Bay Area, including existing police protection, fire protection, and emergency medical services (e.g., paramedics, emergency medical technicians).

Police Protection

Police services are provided on the State, county, and local levels. Police services provide law enforcement in areas such as crime prevention, traffic and congestion control, safety management, emergency response, and homeland security.

The California Highway Patrol (CHP) is responsible for police protection along the sections of the interstate highway system that traverse the Bay Area. It provides services for the management of traffic, emergency accident response, and protection of the highway system through safety enforcement on interstate roads. CHP services also include various programs and initiatives aimed at improving road safety and awareness for many categories of drivers. Through collaboration with local, State, and federal public safety agencies, its purpose is to minimize exposure of the public to unsafe conditions resulting from emergency accidents and highway impediments (CHP 2020).

Each of the nine counties in the Bay Area has its own sheriff's department responsible for police protection in unincorporated areas of each county. Additionally, each incorporated city and town has a police department responsible for police protection within its own jurisdiction. Unincorporated areas or areas such as transit districts may also contract with county sheriff departments for police services instead of providing their own. Cities and towns may also contract with the county sheriff department to provide law enforcement services.

Police service performances vary by jurisdiction but are typically measured in terms of response times, calculated in the number of minutes it takes a police officer to respond to an incident.

Fire Protection

The Bay Area faces a number of fire threats, including urban, wildland-urban interface, and wildland fires. According to the California Department of Forestry and Fire Protection (CAL FIRE), fire threat in the region ranges from low to extreme depending on factors such as fuel rank, topography, presence of urban development, and expected fire frequency (CAL FIRE 2020). For a detailed discussion of fire hazard risk in the Bay Area, see Section 3.9, "Hazards and Wildfire."

Fire protection services are managed at the local level, typically by municipalities, counties, fire protection districts, or volunteer fire companies. California Government Code Section 38611 states that general law cities must establish a fire department unless it is included within the boundaries of an established fire protection district. State and federal lands are generally served by State and federal fire agencies (e.g., CAL FIRE, National Park Service), and in some cases, businesses and native tribes manage their own fire departments. Each fire protection agency is responsible for serving its own

prescribed area, but mutual aid agreements are in wide use across the region such that agencies can rely on assistance from neighboring agencies in the case of overwhelming demand. In an effort to prevent fire-related emergencies altogether, most fire departments and agencies sponsor prevention programs (e.g., public education, vegetation clearance) and enforce fire code regulations in built structures.

Fire protection service performance is typically measured by emergency response times or the ratio of service personnel to service area population. Because of the varying needs and challenges of each jurisdiction, however, performance measures differ among agencies, particularly when comparing urban and rural agencies. Fire departments are assigned a Public Protection Classification from the International Organization for Standardization (ISO), a private company that provides information about insurance risk. To assess fire protection agencies, ISO uses information about emergency dispatch; the number and location of engine companies; the amount of water needed to fight a fire; and local water supply, pressure, and flow. Local fire departments receive a classification from 1 to 10; a classification of 1 is the highest, and a classification of 10 indicates that fire suppression capabilities do not meet ISO's minimum standard.

Emergency Medical Services

Each county of the nine counties in the Bay Area, including incorporated cities and towns within those counties, provides emergency medical services to its residents through the training and certification of paramedics and emergency medical technicians. The various departments charged with administering emergency medical services (e.g., Napa County Emergency Medical Services Agency, San Francisco County Department of Emergency Management) contract with private ambulance services and local fire departments to deploy emergency medical services within their service areas.

LIBRARIES

The San Francisco Bay region is served by several public libraries, including the Alameda Free Library, Alameda County Library, Berkeley Public Library, Contra Costa County Library, Livermore Public Library, Oakland Public Library, Pleasanton Public Library, Richmond Public Library, San Francisco Public Library, and Sonoma County Library. Publicly funded libraries in California are required to maintain a certain amount of local funding depending on the population of a library's service area; however, there are no established standards with which California public libraries must comply (California State Library 2020).

SOCIAL SERVICES

Social services are provided by government agencies, private nonprofit organizations, and private for-profit organizations. The following types of social services are currently available in the proposed Plan area:

- **Alcohol, Drug, and Mental Health Services** provide alcohol and drug abuse prevention and treatment services to adults and juveniles and mental health services to seriously mentally ill adults, youths, and families.
- **Adult Education and Job Training** provide educational and job training opportunities to give adult students the knowledge and skills necessary to participate effectively as citizens, employees, parents, and family members.
- **Child Support Services** determine parentage, establish orders for support and medical coverage, and collect and distribute funds from absent parents who have a financial responsibility to support their children.

- **Civic Buildings and Community Centers** include libraries, community centers, and other public buildings not otherwise classified.
- **Courts and Parole Officers** hear and give rulings on the following types of court cases: appeals, civil, criminal, family and children, juvenile, and traffic. Parole officers coordinate parole hearings and supervise defendants not yet sentenced to a term of incarceration and offenders released from incarceration.
- **Health and Disabled Services** provide programs for the medically indigent, older adults, those with disabilities, and detainees; communicable disease prevention and control; protection of food and water; waste and vector control; vital records; nutrition and safety education; and public health nursing services.
- **Homeless and Housing Assistance** provides temporary shelter; food assistance; mental health services; and transitional housing assistance to adults, juveniles, and families.
- **Human Assistance** administers various federal, State, and local government programs designed to provide cash assistance, food stamps, and other social services not otherwise classified.
- **Veteran Affairs** provide medical, mental health, vocational rehabilitation, and employment assistance, educational and other training to veterans.

RECREATION

- The Bay Area contains over 1 million acres of parks and open space across its nine counties (see **Table 3.13-2**, below, and **Figure 3.11-4** in Section 3.11, "Land Use, Population, and Housing"). According to the Bay Area Protected Areas Database compiled by the Bay Area Open Space Council, about 140,000 acres of open space were permanently conserved between 2010 and 2018 (the most recent year for which a full dataset is available) (Bay Area Open Space Council 2019). While access by the general public to these reserve areas is restricted, the areas are important for the preservation of wildlife habitats and the protection of the environmental and rural characteristics of various parts of the region.

Table 3.13-2: Acreage of Bay Area Parks and Open Space

Location	Parks and Open Space (acres)[1]
Alameda County[2]	128,600
Contra Costa County[2]	153,400
Marin County[2]	201,600
Napa County[2]	156,700
San Francisco County[2]	5,200
San Mateo County[2]	124,900
Santa Clara County[2]	266,600
Solano County[2]	81,800
Sonoma County[2]	265,100
Regional Total	**1,384,000**

Note: Figures may not sum because of independent rounding.

[1] Includes publicly owned lands and privately owned lands that are accessible to the public. The most recent year that a full dataset is available is 2013.

[2] Includes both incorporated cities and unincorporated areas of the county.

Source: Bay Area Open Space Council 2019

Parks and open space are generally categorized according to their size and amenities. Smaller parks, such as pocket parks, neighborhood parks, community parks, urban forests, and community gardens, serve local communities, typically are located in urbanized areas, and often include a wide range of improvements from playing fields and picnic areas to playgrounds and fitness trails. These parks are most often managed by local park districts or municipalities, which typically set minimum standards for park acreage based on their population. Larger open space areas, such as regional parks, greenbelts, trails and pathways, natural and wildlife preserves, some private farmlands, some public rangelands, State parks, and federal parks, serve a broader geographic range, typically are located outside of major urbanized areas, and generally include fewer improvements. Management of these parks is divided among a range of organizations and agencies, including regional park districts, State and federal government, private individuals, and nonprofit land trusts.

As noted in Section 3.11, "Land Use, Population, and Housing," the California Coastal Commission and the Bay Conservation and Development Commission (BCDC) regulate land use near the coastline and along the bay, respectively, to protect and enhance the coastline and to promote public access within the coastal zone of California. On land, the coastal zone varies in width from several hundred feet in highly urbanized areas to up to 5 miles in certain rural areas, and offshore, the coastal zone extends along a 3-mile-wide band of ocean. The coastal zone established by the California Coastal Act does not include San Francisco Bay, where development is regulated by BCDC.

3.13.2 Regulatory Setting

FEDERAL REGULATIONS

Executive Order 12148

Executive Order 12148 was enacted by President Jimmy Carter on July 20, 1979, to merge many of the separate disaster-related responsibilities into the Federal Emergency Management Agency (FEMA). FEMA includes the Federal Insurance Administration, the National Fire Prevention and Control Administration, the National Weather Service Community Preparedness Program, the Federal Preparedness Agency of the General Services Administration, and other emergency-related programs. In March 2003, FEMA joined 22 other federal agencies, programs, and offices to become the U.S. Department of Homeland Security. FEMA's continuing mission within the new department is to lead the effort to prepare the nation for all hazards and effectively manage federal response and recovery efforts following any national incident. FEMA also initiates proactive mitigation activities, trains first responders, and manages the National Flood Insurance Program and the U.S. Fire Administration.

Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 (DMA 2000) (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for state, local, and Indian tribal governments as a condition of mitigation grant assistance. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous mitigation planning provisions and replacing them with a new set of requirements that emphasize the need for state, local, and Indian tribal entities to closely coordinate mitigation planning and implementation efforts. The requirement for a state mitigation plan is continued as a condition of disaster assistance, adding incentives for increased coordination and integration of mitigation activities at the state level through the establishment of requirements for two different levels of state plans. DMA 2000 also established a new requirement for

local mitigation plans and authorized up to 7 percent of Hazard Mitigation Grant Program funds available to a state for development of state, local, and Indian tribal mitigation plans.

U.S. Department of Transportation Act of 1966, Section 4(f) (Amended 2005)

The U.S. Department of Transportation Act (DOT Act) of 1966 included a special provision—Section 4(f)—that stipulated that the Federal Highway Administration and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless:

- there is no feasible and prudent alternative to the use of land, and
- the action includes all possible planning to minimize harm to the property resulting from use.

The first substantive revision to Section 4(f) since enactment of the DOT Act was made in 2005; it simplified the process and approval of projects that have only minimal impacts on lands protected by Section 4(f). Under the new provisions, once DOT determines that a transportation use of Section 4(f) property results in a minimal impact, analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete.

Land and Water Conservation Fund Act, Section 6(f)(3)

Section 6(f)(3) of the Land and Water Conservation Fund Act (LWCF Act) of 1965 (16 U.S. Code Section 460l et seq.) contains provisions to protect federal investments in park and recreation resources and the quality of those assisted resources. The law recognizes the likelihood that changes in land use or development may make park use of some areas purchased with LWCF Act funds obsolete over time, particularly in rapidly changing urban areas, and provides for conversion to other use pursuant to certain specific conditions.

Section 6(f)(3) states that no property acquired or developed with assistance under Section 6(f)(3) shall, without the approval of the Secretary of the Department of Interior, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he or she finds it to be in accordance with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he or she deems necessary to ensure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location.

This requirement applies to all parks and other sites that have been the subject of LWCF Act grants of any type and includes acquisition of parkland and development or rehabilitation of park facilities. If a transportation project would have an effect upon a park or site that has received LWCF Act funds, the requirements of Section 6(f)(3) would apply.

STATE REGULATIONS

California Government Code Section 65995

California Government Code Section 65995 is found in Title 7, Chapter 4.9 of the California Government Code and authorizes school districts to collect impact fees from developers of new residential and commercial/industrial building space. Senate Bill 50, discussed below, amended Government Code Section 65995 in 1998.

Senate Bill 50 (Leroy Greene School Facilities Act of 1998)

The Leroy Greene School Facilities Act of 1998 (Education Code Sections 17070.10–17079.30) eliminated the ability of cities and counties to require full mitigation of school impacts and replaced it with the ability of school districts to assess fees directly to offset the costs associated with increasing school

capacity as a result of new development. The act states that payment of developer fees is "deemed to be complete and full mitigation" of the impacts related to planning, new development, or change in government organization relating to educational facilities.

Assembly Bill 2926

In 1986, Assembly Bill No. 2926 (Statutes of 1986, Chapter 887) (AB 2926) authorized the levy of statutory development fees, as well as placed a cap on the number of fees that could be levied, on new residential and commercial/industrial development in order to pay for school facilities. Its overall purpose was to enable school districts to impose developer fees to pay for new school construction (Government Code 53080).

Class Size Reduction Kindergarten-University Public Education Facilities Bond Act of 1998

Proposition 1A, the Class Size Reduction Kindergarten-University Public Education Facilities Bond Act of 1998 (Education Code Sections 100400–100405), is a school construction funding measure that was approved by the voters on the November 3, 1998, ballot. The act created the School Facility Program that allowed eligible school districts to obtain State bond funds for the construction and modernization of educational facilities and accommodate for growth and overcrowding in educational facilities.

California Education Code

School facilities and services in California are subject to the rules and regulations of the California Education Code and governance of the State Board of Education (SBE). SBE is the 11-member governing and policy-making body of the California Department of Education (CDE) that sets K-12 education policy relating to standards, instructional materials, assessment, and accountability. CDE and the State Superintendent of Public Instruction are responsible for enforcing education law and regulations and for continuing to reform and improve public elementary school, secondary school, and childcare programs, as well as adult education and some preschool programs. CDE's mission is to provide leadership, assistance, oversight, and resources so that every Californian has access to an education that meets world-class standards (CDE 2020). The core purpose of CDE is to lead and support the continuous improvement of student achievement, with a specific focus on closing achievement gaps (CDE 2019).

California Emergency Services Act

In 2008, Governor Schwarzenegger signed AB 38, the California Emergency Services Act, which merged the duties, powers, purposes, and responsibilities of the Governor's Office of Emergency Services and the Governor's Office of Homeland Security into a new cabinet-level agency, the California Emergency Management Agency (Cal EMA). In 2013, Governor Edmund G. Brown Jr. merged the California Emergency Management Agency with the Office of Public Safety Communications and renamed the organization the California Governor's Office of Emergency Services (Cal OES) CAL OES is responsible for overseeing and coordinating emergency preparedness, response, recovery, and homeland security activities within the California. Section 8687.7 of the California Disaster Assistance Act required the development of a Standard Emergency Management System (SEMS) program, for managing multiagency and multijurisdictional responses to emergencies in California. The Cal OES Emergency Management Systems Unit is a multi-agency group charged with methodical review, evaluation, and approval of needed improvements to SEMS. State agencies are required to use SEMS and local government entities must use SEMS in order to be eligible for any reimbursement of response-related costs under the State's disaster assistance programs.

Cal OES serves as the lead State agency for emergency management and coordinates the State response to major emergencies in support of local government. The primary responsibility for emergency management resides with local government. SEMS provides the mechanism by which local government requests assistance from Cal OES, and Cal OES maintains oversight of the State's mutual aid system. Cal OES may task State agencies to perform work outside their day-today and statutory responsibilities and serves as the lead agency for obtaining federal resources.

California Fire Code

Title 24, Part 9 of the CCR is the California Fire Code, which sets forth regulations regarding building standards, fire protection and notification systems, fire protection devices such as fire extinguishers and smoke alarms, high-rise building standards, and fire suppression training. The most recent California Building Standards Code was released in 2016 and became effective on January 1, 2017. The general purpose of the update is principally to update and codify a new edition of the California Building Standards Code (CCR Title 24) that adopts by reference more current editions of the model codes. Development under the proposed Plan would be subject to applicable regulations of the California Fire Code.

Title 8 California Code of Regulations Sections 1270 and 6773

In accordance with C.C.R., Title 8 Sections 1270 "Fire Prevention" and 6773 "Fire Protection and Fire Equipment," the California Occupational Safety and Health Administration (Cal OSHA) has established minimum standards for fire suppression and emergency medical services. The standards include, but are not limited to, guidelines on the handling of highly combustible materials, fire hose sizing requirements, restrictions on the use of compressed air, access roads, and the testing, maintenance, and use of all firefighting and emergency medical equipment.

Quimby Act

The 1975 Quimby Act (California Government Code Section 66477) authorized cities and counties to pass ordinances requiring that developers set aside land, donate conservation easements, or pay fees for park improvements. The act states that the dedication requirement of parkland can be a minimum of 3 acres per thousand residents or more and up to 5 acres per thousand residents if the existing ratio is greater than the minimum standard. Revenues generated through in lieu fees collected under the Quimby Act cannot be used for the operation and maintenance of park facilities. In 1982, the act was substantially amended. The amendments further defined acceptable uses of or restrictions on Quimby funds, provided acreage/population standards and formulas for determining the exaction, and indicated that the exactions must be closely tied (nexus) to a project's impacts as identified through studies required by CEQA.

State Open Space Standards

State planning law (Government Code Section 65560) provides a structure for the preservation of open space by requiring every city and county in the State to prepare, adopt, and submit to the Secretary of the Resources Agency a "local open-space plan for the comprehensive and long-range preservation and conservation of open-space land within its jurisdiction." The following open space categories are identified for preservation:

- *open space for public health and safety,* including, but not limited to, areas that require special management or regulation because of hazardous or special conditions;
- *open space for the preservation of natural resources,* including, but not limited to, natural vegetation, fish and wildlife, and water resources;

- *open space for resource management and production,* including, but not limited to, agricultural and mineral resources, forests, rangeland, and areas required for the recharge of groundwater basins;
- *open space for outdoor recreation,* including, but not limited to, parks and recreational facilities, areas that serve as links between major recreation and open space reservations (such as trails, easements, and scenic roadways), and areas of outstanding scenic and cultural value; and
- *open space for the protection of Native American sites,* including, but not limited to, places, features, and objects of historical, cultural, or sacred significance, such as Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines located on public property (further defined in PRC Sections 5097.9 and 5097.993).

State Public Park Preservation Act of 1971

The primary instrument for protecting and preserving parkland is the State Public Park Preservation Act of 1971 (PRC Sections 5400–5409). Under the act, cities and counties may not acquire any real property that is in use as a public park for any nonpark use unless compensation or land, or both, are provided to replace the parkland acquired. This ensures no net loss of parkland and facilities.

McAteer-Petris Act

BCDC is dedicated to the protection and enhancement of San Francisco Bay and the Suisun Marsh and to the encouragement of their responsible use. As the other designated coastal zone management agency, and pursuant to the McAteer-Petris Act, BCDC is designated as the agency responsible for the protection of the bay and its natural resources and for the regulation of the development of the bay and shoreline to their highest potential with a minimum of bay fill. For development projects, including transportation projects, BCDC jurisdiction includes the bay itself (including San Pablo and Suisun Bays, sloughs, and certain creeks) and, in general, a 100-foot band along the bay shoreline.

The McAteer-Petris Act further specifies that certain water-oriented land uses should be permitted on the shoreline, including ports, water-related industries, airports, wildlife refuges, water-oriented recreation and public assembly, desalinization plants, and power plants requiring large amounts of water for cooling purposes. Priority Use Areas (PUAs) designated for such uses in the proposed Plan are to be reserved for them to minimize the need for future filling in the bay for such uses. It is necessary to obtain BCDC approval before undertaking any work within 100 feet of the bay shoreline (including grading); filling of the bay or certain tributaries of the bay; dredging; implementing Suisun Marsh projects; performing any filling, new construction, or major remodeling; or otherwise making any substantial change in use, and many land subdivisions in the bay, along the shoreline, in salt ponds, duck hunting preserves, or other managed wetlands adjacent to the bay.

REGIONAL AND LOCAL REGULATIONS

City and County General Plans

State law requires every city and county to adopt a general plan that expresses the community's development goals and embodies public policy relative to the distribution of future land uses, both public and private (OPR 2017). Included in the general plan are potential hazards, policies, and mitigation measures related to recreation, as well as public services and safety. The elements contained in the general plan are intended to promote the highest quality of life in a given jurisdiction.

Each general plan is required to have an open space element that guides the comprehensive and long-range preservation and conservation of "open space land." A wide range of topics are addressed

in the open space element, including open space for the preservation of natural resources, open space used for the managed production of resources, open space for outdoor recreation, open space for public health and safety, demands for trail-oriented recreational use, the retention of all publicly owned corridors for future use, and the feasibility of integrating city and county trail routes with appropriate segments of the California Recreational Trails System. Policies and strategies for parks and recreation may include standards for park acreage and requirements for the provision of parks in new residential developments.

Each general plan is also required to have a safety element, which describes plans to promote safety within the jurisdiction, as well as the services available to maintain safety. The purpose of the safety element is to reduce the possible risks related to death, injuries, property damage, and economic and social dislocation resulting from fires, floods, earthquakes, landslides, and other hazards. Included in the safety element is the emergency response section, which describes the service areas of emergency services, including fire, police, and medical, and an evaluation of the adequacy of the existing service and the demand for additional emergency services.

In addition, CCR Section 65302(g) states that a city may adopt a county's safety element "to the extent that the county's safety element is sufficiently detailed and contains appropriate programs and policies for adoption by a city."

General plan policies relating to library services may involve the library level of service, capital facility funding, and library siting. In addition, general plans can evaluate proposed library facilities for consistency with library master plans and explore methods for financing new, expanded, or upgraded library facilities.

Emergency Operations Plans

Local jurisdictions maintain emergency operations plans that detail how emergency and disaster situations are to be handled within that jurisdiction. Jurisdictions may also have Multi-Hazard Emergency Plans that address various threats to the jurisdiction.

Fire District Master Plans

Many jurisdictions and fire districts in the region have adopted or are planning to adopt Fire Department (District) Master Plans. A master plan addresses staffing needs, facility needs, and service goals for the service area and serves as a guiding document for the organization and daily functions of the department.

Recreation and Park Master Plans

Recreation and park master plans outline projected recreation facility needs and strategies for fulfilling those needs. The main purpose of the plans is to provide guidance for addressing preservation, use, development, and administration of recreation facilities. These policy and action documents ensure the preservation of the naturalistic environment while providing developments to facilitate human enjoyment of the parks and recreation areas. Plans can target goals and future actions for a specific park or be generalized to a collection of parks in a larger system.

3.13.3 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the Plan Bay Area 2040 EIR (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- result in substantial adverse physical impacts associated with the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, and other public facilities (Criterion PSR-1) or
- increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated or include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment (Criterion PSR-2).

METHOD OF ANALYSIS

This program-level analysis includes a qualitative assessment of impacts related to the need for construction of new or modification/expansion of existing facilities to maintain adequate service ratios, response times, or other performance objective for schools, police and fire protection, emergency medical, other public facilities, and park and recreation services as a result of implementation of the proposed Plan. The analysis assesses the amount and location of assumed land uses, resiliency projects, and transportation projects under the proposed Plan, as compared to existing conditions, and considers how that development pattern might affect the provision of services as it relates to requiring new or modified/expanded facilities. The baseline for existing services and recreational facilities in the following analysis is the date of NOP release in September of 2020. The discussion of projected increases in residents, jobs, and households is based on the data included in Chapter 2, "Project Description," which calculates future growth against a baseline year of 2015. Generally, the analysis in this section is qualitative in nature, addressing generally the types of impacts (not site specific) that could result from construction or modification of facilities needed to meet local service levels. The analysis also considers potential impacts from increased use of existing parks and recreational facilities that could be caused by change in development patterns under the proposed Plan.

IMPACTS AND MITIGATION MEASURES

Impact PSR-1: Result in substantial adverse physical impacts associated with the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, and other public facilities (PS)

Land Use Impacts

Construction and Operation

As described in Chapter 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.7 million residents and 1.4 million jobs, resulting

in 1.4 million new households. The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that results in focused housing and job growth concentrated primarily in or adjacent to already developed areas and along existing transit corridors. The proposed Plan was designed to accommodate the people, households, and jobs identified in the regional growth forecast. The overall growth would result in increased demand for services. As the number of households grows, demand for schools and other general government services and facilities (e.g., libraries) would increase. Increases in residential and nonresidential land uses would also increase the number of service calls for emergency services and police and fire protection.

The proposed Plan also includes land use strategies that would allow for denser or more compact development in designated growth geographies. These strategies would allow greater densities for new commercial development in select PDAs, PPAs, and select transit-rich areas and provide incentives to employers to shift jobs to housing-rich areas well served by transit. Therefore, service areas for existing service providers may not substantially expand. Implementation of the proposed Plan would result in more dense and intense development than existing conditions, largely as infill development. This type of growth pattern would allow jurisdictions to leverage existing facilities and absorb some of the increased demand more efficiently than if new development were more dispersed.

Overall, with implementation of the Plan, the higher density and intensity of new growth in the region, particularly in developed areas, would limit the need to expand service boundaries for law enforcement and fire protection. As a function of distance, these services would not need to expand. However, as function of response time, Plan implementation could result in the need to expand services. As noted in Section 3.9, "Hazards and Wildfire," development that proposes large concentrations of people (such as a job center) or that would site individuals who require special assistance (such as a hospital or senior facility) in an area with identified hazards could cause adverse effects related to the implementation of countywide and jurisdictional emergency plans because there would be more individuals potentially subject to these hazards requiring response from emergency services. As shown in Table 2-9 in Section 2, "Project Description," roadway capacity would be increased, but the increase in population and employment would result in an increase in the average trip time of 10 percent (see Table 2-14), suggesting an overall increase in congestion. In order to maintain adequate response times, existing emergency service providers may need to expand their capacity and increase their equipment, including ambulances, police cars, fire trucks, and other emergency-related resources (e.g., lifeboats, helicopters) if additional population growth results in substantial increases in the volume of requests for services or a decrease in response times. In cases where future demand exceeds capacity, new facilities may be required. In many cases, particularly police, fire, and emergency medical, adequate service includes consideration of response times, in addition to service ratios.

With respect to increased demand for school-related services, the composition of residential land uses (e.g., single-family residences, multifamily residences) from proposed changes in land use would vary as future development occurs. The generation of additional primary and secondary school-age children and the ability of individual schools to accommodate them is dependent on the type of housing, demographics, and the available capacity of the elementary, middle, and high schools that would accommodate them. This is a dynamic condition that changes over time as population characteristics and other variables change. Therefore, it would be speculative at this time to estimate the number of additional students that would be assigned to individual schools. In the cases where increased growth exceeds the capacity of schools and other government-related services and facilities, implementation of the proposed Plan could require additional or modified facilities to ensure acceptable levels of service.

At the regional scale, it is not feasible to quantify separate effects on each public service in separate jurisdictions because of the large number of jurisdictions (nine counties, over 100 cities) in the Plan area and the differing service standards for each service across jurisdictions and lack of site-specific detail for future land use development. Public service standards, performance measures, and policies related to police, fire, emergency protection, and other governmental facilities and services are established by local jurisdictions and agencies. For schools, standards relating to class size are primarily determined by State policy, although local school districts are responsible for the planning and construction of school facilities, and some schools diverge from State policy under overcrowding and scarce funding scenarios.

The following public service standards, performance measures, and related policies are representative of the standards applicable throughout the region:

- **Schools:** School standards related to class size are predominately set at the State level, with school districts also planning for school facilities. Funding for new school construction is provided through State and local revenue sources in the form of development fees. Senate Bill (SB) 50 (1998) governs impact fees from new development for school funding. Payment of fees authorized by this legislation is deemed "full and complete mitigation"; therefore, local agencies cannot require additional mitigation for any school impacts. School impacts fees would be used in combination with State and other funds to construct new schools. Therefore, SB 50 restricts the ability of local agencies to apply local standards for school impacts, deny project approvals based on school impacts, or require mitigation on the basis that public school facilities are inadequate.

- **Police Protection, Fire Protection, and Emergency Medical Services Response:** Level of service standards for emergency services usually include average response times for service calls and personnel ratios per 1,000 residents. Some individual jurisdictions adopt fire or police master plans that include additional information supporting these goals and policies.

- **Libraries:** Library facilities typically use a service standard of facility feet or acres per capita or per 1,000 residents.

- **Social Services:** Performance measures for social services are subjective, and service standards vary depending on the type of service offered and the jurisdiction where services are provided.

The proposed Plan forecasts the general location of future land uses, and future residential densities and building intensities in the region consistent with the proposed Plan beyond the horizon year of most local general plans in the Plan Area (2050). The regional growth forecast could result in increases in demand for public services that exceed existing service capabilities. To meet increased demand for these facilities, existing facilities could require additional personnel and equipment to maintain adequate service levels. In some cases, it would be necessary to construct new facilities or modify existing facilities to maintain adequate capital capacity, equipment, and personnel. Because MTC and ABAG do not have land use authority to adopt local land use plans or approve local land use development projects, land use development projects are ultimately controlled by local jurisdictions throughout the Plan area. Future land use development projects would be required to undergo an evaluation of their contribution to demand on public services prior to approval. In cases where a project results in increased demand, many jurisdictions require developers to pay impact fees to fund increased demand for public services; however, the amount and extent to which a project must mitigate additional demand would differ on a project-by-project basis depending on size and location and would be the responsibility of the implementing agency/project applicant.

In cases where the proposed Plan's forecasted development pattern results in the need for new facilities to meet increased demand, short-term construction impacts could occur on a project-by-project basis. For example, the construction of a new school may cause adverse short-term traffic impacts or short-term air quality and noise impacts associated with the use of heavy-duty equipment. If construction occurs on previously undeveloped land, it could have additional impacts including increased stormwater runoff, loss of habitat, effects on cultural/tribal cultural resources, and effects on visual resources. These potential impacts would be evaluated on a project-by-project basis prior to initiating construction activities. Environmental review would be conducted by the appropriate lead agency, and mitigation would be incorporated as needed. For the purposes of this analysis, it is assumed that the construction of new or modified public service facilities resulting from the implementation of the proposed Plan could result in adverse environmental effects; however, there is inherent uncertainty surrounding the location and size of future facilities.

Therefore, impacts related to new or expanded school, police, fire, emergency medical, and other government service facilities would be potentially significant (PS). Please see Impact PSR-2 for a discussion of impacts on parks and recreational facilities.

Transportation System and Sea Level Rise Adaptation Impacts

Construction and Operation

Implementation of the proposed Plan would include transportation projects that would maintain and optimize the existing transportation system, create healthy and safe streets, and build a next generation transit network. Sea level rise adaptation infrastructure could result in the construction of levees, sea walls, elevated roadways, marsh restoration projects, and tidal gates. Construction and operation of transportation projects and sea level rise adaptation infrastructure would not directly result in an increase in residents that would generate new students in the community or new residents that would require new or expanded public service facilities. Further, schools, libraries, parks, and social services would not be needed to support the transportation facilities or sea level rise adaptation infrastructure. Therefore, impacts on public services as a result of transportation projects and sea level rise adaptation improvements in the proposed Plan would be less than significant (LTS).

Conclusion

While impacts from sea level rise adaptation infrastructure and transportation projects are expected to be less than significant, the Plan's land use development pattern to accommodate forecasted regional growth could result in **potentially significant (PS)** impacts related to new or expanded public service facilities. Please see Impact PSR-2 for a discussion of impacts related to parks and recreational facilities. Mitigation Measure PSR-1 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure PSR-1(a) Implementing agencies and/or project sponsors shall implement the following measure, where feasible and necessary based on project- and site-specific considerations:

- Prior to approval of new development projects, local agencies shall ensure that adequate public services, and related infrastructure and utilities, will be available to meet or satisfy levels identified in the applicable local general plan or service master plan, through compliance with existing local policies related to minimum levels of service for schools, police protection, fire protection, medical emergency services, and other government services (e.g., libraries, prisons, social services). Compliance may include requiring projects to either provide the additional services required to meet service levels or pay fees toward the project's fair share portion of the required services pursuant to adopted fee programs and State law.

Mitigation Measure PSR-1(b) Implementing agencies and/or project sponsors shall implement the following measure, where feasible and necessary based on project- and site-specific considerations:

- For projects that could increase demand for public services facilities, implementing agencies and/or project sponsors shall coordinate with relevant service providers to ensure that the existing public services could accommodate the increase in demand. If existing facilities are found to be inadequate to maintain adequate capital capacity, equipment, personnel, and/or response times, facility improvements for the appropriate public service shall be identified in each project's CEQA documentation. Implementing agencies and/or project sponsors shall implement, where feasible and necessary, the mitigation measures described throughout this EIR to address the environmental effects related to the construction of new or expanded public service facilities:

  - Mitigation Measures AES-1 through AES-4
  - Mitigation Measures AGF-1 through AGF-3
  - Mitigation Measures AQ-2 through AQ-4
  - Mitigation Measures BIO-1 through BIO-3 and BIO-5
  - Mitigation Measures GHG-1 and GHG-3
  - Mitigation Measures CUL/TCR-1, CUL/TCR-2, and CUL/TCR-4
  - Mitigation Measure GEO-7
  - Mitigation Measures HAZ-4, HAZ-6 and HAZ-7
  - Mitigation Measures LU-1, LU-2, and LU-4
  - Mitigation Measures NOISE-1 through Noise-4
  - Mitigation Measures PSR-2
  - Mitigation Measures PUF-1 through PUF-4
  - Mitigation Measure TRA-2

Significance after Mitigation

To the extent that an individual project adopts and implements Mitigation Measure PSR-1 described above, the severity of the impact would be reduced. Mitigation Measure PSR-1(a) would reduce impacts on the provision of services to less than significant with mitigation (LTS-M) because it would require project-specific evaluations of public services in order to meet additional demand with the provision of additional services or a project's contribution toward provisions of additional services. Mitigation Measure PSR-1(b) would reduce the severity of impacts from construction of new or expanded facilities because it would include implementation of measures to offset the impacts of construction of new or physically altered facilities. However, the measures would not reduce this impact to a less-than-significant level, as discussed in the appropriate sections of this EIR. Therefore, this impact would be significant and unavoidable **(SU)**.

Projects taking advantage of CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure described above to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measure, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact PSR-2: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated or include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment (PS)

Land Use Impacts

Construction and Operation

Currently, the nine-county Bay Area contains approximately 1.4 million acres of parks and open space containing networks of trails, as well as approximately 7.7 million people, resulting in about 180 acres of parks and open space per thousand residents. Open space resources, however, are variable and some (such as large open space reserves in Marin, Napa, and San Mateo Counties) serve residents from throughout the region. Smaller parks and playgrounds are intended, on the other hand, to serve immediate neighborhoods. Implementation of the proposed Plan would increase the number of residents making use of existing parkland and could cause accelerated physical deterioration of parks, trails, and recreational facilities as a result. Most local jurisdictions have their own goals and standards for acceptable amounts of parkland, typically in terms of acres per 1,000 residents (e.g., 5 acres per thousand population) or per capita. Often, park acreage requirements are established with variable amounts dedicated to local parks, regional parks, and regional open spaces. Local jurisdictions strive to ensure that new developments make adequate provisions for new parkland.

The proposed Plan's environmental strategies encourage future Bay Area development focused within existing developed areas, ringed by natural lands that are well-maintained and dotted with parks and trails that provide easy access to open space. Support for locally adopted land use policies that limit new construction outside of the existing footprint, combined with investments in natural lands that serve vital ecological purposes and parks and recreation facilities essential to population health and wellbeing are included, with a specific emphasis on improving access to parks and open space and promoting a sustainable development pattern.

The proposed Plan also includes strategies to protect open space lands and concentrate development within already developed areas. Specifically, Strategy EN4 directs new growth to be located within the region's existing urban footprint or growth boundaries. This strategy would confine new development within areas of existing development and areas that are suitable for growth, as established by local jurisdictions. Strategy EN5 would provide funds to help conserve and manage high-priority agricultural and open space lands that support recreation opportunities, biodiversity, natural resources, and priority conservation areas. Implementation of Strategies EN4 and EN5 would protect existing recreation resources located within high-priority agricultural and open space lands. Further, Strategy EN6 would fund enhancements to regional and local parks, development and maintenance of parks and recreation facilities, acquisition of new open space, and construction of cross-jurisdictional trails and greenways with an emphasis on expanding recreation opportunities in Communities of Concern and other underserved areas. Funding for new parks and trails may also be generated at the local level through in-lieu fees collected pursuant to applicable policies and regulations (described above in Section 3.13.2, "Regulatory Setting"). The timing, siting, and project-specific details of individual development projects would dictate the necessity of increasing recreational services in existing service areas or expanding service to new areas. While land use development could increase demand on recreational services, existing State requirements regarding development of a complete general plan, including Open Space and Conservation Elements, require local jurisdictions to address impacts on recreational facilities. Thus, land use development under the proposed Plan would not have a significant impact on recreational resources.

However, implementation of the proposed Plan could result in impacts related to the construction or expansion of recreation facilities. As noted above under impact PSR-1, construction may cause adverse short-term traffic impacts or short-term air quality and noise impacts associated with the use of heavy-duty equipment. If construction occurs on previously undeveloped land, it could have additional impacts including increased stormwater runoff, loss of habitat, or damage to cultural/tribal cultural resources. Thus, this impact would be potentially significant (PS).

Transportation System and Sea Level Rise Adaptation Impacts

Construction and Operation

Implementation of the Proposed Plan would include transportation projects that would maintain and optimize the existing transportation system, create healthy and safe streets, and build a next generation transit network. Sea level rise adaptation infrastructure could result in the construction of levees, seawalls, elevated roadways, marsh restoration projects, and tidal gates. Construction and operation of transportation projects and sea level rise adaptation infrastructure would not contribute to population growth that would generate new residents who would require new or expanded parks or recreation facilities. Further, parks and recreation facilities would not be needed to support the transportation facilities or sea level rise adaptation infrastructure.

However, construction of sea level rise adaptation infrastructure, particularly elevated roadways, levees, and sea walls, would potentially constitute a barrier that would affect the ability of residents to access and utilize regionally important water-oriented uses, such as shoreline parks and trails, water-related recreation, ports, water-related industry, and wildlife refuges along the bay or coast. Implementation of the proposed Plan is intended to result in shoreline adaptation that maintains or provides access to shoreline PUAs. The majority of the new sea level rise adaptation footprint would occur within the BCDC shoreline band or the California Coastal Zone, requiring project consistency with the San Francisco Bay Plan and applicable Local Coastal Plan adopted policies, respectively. Individual sea level rise adaptation projects would be required to conform to land use restrictions detailed in the Bay Plan or applicable Local Coastal Plan or be consistent with Bay Plan requirements, if applicable, and in particular in relation to maintaining public access.

As noted in Section 3.11 and in Section 3.13.2, "Regulatory Setting," the Bay Plan identifies PUAs, which are reserved for water-oriented land uses, including ports, water-related industries, airports, wildlife refuges, water-oriented recreation and public assembly, desalinization plants, and power plants requiring large amounts of water for cooling purposes. Regionally, the extent of overlap between PUAs and the sea level rise adaptation footprint is approximately 1,300 acres. Individual projects that overlap with PUAs would be required to conform to land use restrictions detailed in the Bay Plan. Generally, implementation of the proposed Plan is intended to result in shoreline adaptation that maximizes use of green archetypes and maintains or provides access to shoreline PUAs. In cases where the projected footprint associated with sea level rise adaptation infrastructure overlaps with a PUA, the uses within the PUA must be consistent with Bay Plan requirements. Land use compatibility would be further addressed during subsequent environmental review as individual projects are implemented and detailed project design or specific plans resolve land use inconsistencies.

Construction activities could create short-term barriers along the shoreline that could result in access closures, detours, and/or project development and staging. For example, access to the bay trail may need to be temporarily disrupted during construction activities. These temporary effects would be minimized with the use of best practice strategies for construction activities, which would be prescribed by the entities described above. With implementation of the sea level rise adaptation infrastructure, access would be improved. In addition, new and expanded capacity roadway projects,

bicycle and pedestrian improvements, and increased transit service have the potential to improve access to existing neighborhood and regional parks or other recreational facilities for residents in the region. Therefore, impacts on recreational resources related to transportation and sea level rise adaptation infrastructure improvements would be less than significant (LTS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects have the potential to directly increase demand on recreational services associated with increases in regional growth. Transportation projects could improve access to recreational facilities. = These impacts would not be significant because impacts on open space and recreational facilities would be managed at the local level as required by State planning law and existing recreational areas and facilities located within priority conservation areas would not be subject to Plan-related development. However, the construction of new or expanded recreational facilities itself may result in significant environmental impacts. Therefore, this impact is **potentially significant (PS)**. Mitigation Measure PSR-2 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure PSR-2 Implementing agencies and/or project sponsors shall implement, where feasible and necessary, the mitigation measures described throughout this EIR to address the environmental effects related to the construction of new or expanded recreational facilities:

- Mitigation Measures AES-1 through AES-4
- Mitigation Measures AGF-1 through AGF-3
- Mitigation Measures AQ-2 through AQ-4
- Mitigation Measures BIO-1 through BIO-3 and BIO-5
- Mitigation Measures GHG-1 and GHG-3
- Mitigation Measures CUL/TCR-1, CUL/TCR-2, and CUL/TCR-4
- Mitigation Measure GEO-7
- Mitigation Measures HAZ-4, HAZ-6 and HAZ-7
- Mitigation Measures LU-1, LU-2, and LU-4
- Mitigation Measures NOISE-1 through Noise-4
- Mitigation Measures PSR-1
- Mitigation Measures PUF-1 through PUF-4
- Mitigation Measure TRA-2

Significance after Mitigation

Implementation of Mitigation Measure PSR-1(b) would reduce the severity of impacts from construction of new or expanded facilities because it would include implementation of measures to offset the impacts of construction of new or physically altered facilities. However, the measures would not reduce this impact to a less-than-significant level, as discussed in the appropriate sections of this EIR. Therefore, this impact would be significant and unavoidable **(SU)**.

Projects taking advantage of CEQA streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measure described above to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measure, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

3.14 PUBLIC UTILITIES AND FACILITIES

This section describes the environmental setting and assesses the potential for implementation of the proposed Plan to have an impact on public utilities, facilities, and services within the nine counties of the Bay Area. The public utilities, facilities, and services addressed in this EIR are water supply, wastewater (sanitary sewer), stormwater, solid waste, telecommunications, electric power, and natural gas. The analysis is focused on those areas where demand for services may increase as a result of implementation of the proposed Plan to accommodate forecasted growth in the region. For a discussion of water quality and flooding, see Section 3.10, "Hydrology and Water Quality."

Comments received in response to the Notice of Preparation (NOP) expressed concerns about the additional strain placed on existing water sources and infrastructure from the regional growth forecast. Water supply comments included requests to consider whether there is sufficient water supply to meet the regional growth forecast demands; new water supply sources are likely to have environmental impacts; existing water supplies are likely to be less reliable due to climate change; existing water distribution infrastructure is not appropriately sized to provide sufficient fire-fighting needs. The comments also included requests to include mitigation measures related to water conservation and grey water for landscaping. One comment requested the inclusion of water supply assessments.

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important" (CEQA Guidelines Section 15083). Neither the CEQA Guidelines nor the statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the impact analysis in this section. Appendix B includes all NOP comments received.

3.14.1 Environmental Setting

PHYSICAL SETTING

This section describes existing water, wastewater, stormwater, solid waste, telecommunications, electricity, and natural gas providers and infrastructure within the Plan area and provides some data regarding existing capacity.

Water Supply

Climatic conditions and annual precipitation are described in Section 3.10, "Hydrology and Water Quality."

San Francisco Bay Hydrologic Region

As defined by the San Francisco Bay Regional Water Quality Control Board (RWQCB), the San Francisco Bay Hydrologic Region (Bay Region) encompasses numerous individual watersheds that drain into the San Francisco Bay and directly into the Pacific Ocean. It covers approximately 4,550 square miles and includes portions of all nine Bay Area counties, as well as Santa Cruz County. Bay Region watersheds are listed in **Table 3.14-1**, and the largest watersheds are depicted in **Figure 3.14-1**.

Table 3.14-1: Watersheds of the San Francisco Bay Hydrologic Region

Sub Region	Watershed
North Bay	Mendocino Coast, Russian River, Bodega, Marin Coastal, **San Pablo**, **Bay Bridges**, Upper Elmira, Putah Creek, **Suisun**, Valley Putach-Cache, Sacramento Delta
East Bay	**Bay Bridges**, **San Pablo**, **Suisun**, San Joaquin Delta, North Diablo Range, **South Bay**, **Santa Clara**
South Bay	Santa Clara, South Bay, Pajaro River
West Bay	**Bay Bridges**, San Mateo, **South Bay**, Big Basin

Note: Bold type indicates watersheds that span multiple Bay Area subregions.
Source: Data compiled by MTC and ABAG based on data from DWR 2004

Water Supply Agencies

Water supply for each county is provided by its respective water supply department or a collection of agencies or companies. Most counties contain several water providers. The focus of this EIR is on a regional analysis of water supply. According to the 2019 San Francisco Bay Integrated Regional Water Management Plan, the agencies and departments included in this description are the major contributors to the water sources in each Bay Area county (SFPUC 2019).

Alameda County Water District

The Alameda County Water District (ACWD) serves the Cities of Fremont, Newark, and Union City and the southern portion of the City of Hayward. ACWD is a retail water purveyor that allocates 67 percent of its water to residential customers and approximately 33 percent to commercial, industrial, institutional, and large landscape customers. In the 2014-2015 fiscal year, it provided water for a total of 83,007 customers, or over 344,300 individuals (ACWD 2016). ACWD also manages groundwater through comprehensive programs that protect and improve water supplies. ACWD is the exclusive Groundwater Sustainability Agency for the portion of the Niles Cone Groundwater Basin that underlies ACWD's statutory area.

Bay Area Water Supply & Conservation Agency

The Bay Area Water Supply & Conservation Agency (BAWSCA) was created on May 7, 2003, and represents 26 water suppliers that purchase water from the San Francisco Regional Water System on a wholesale basis and deliver water to people, businesses, and community organizations in San Mateo, Santa Clara, and Alameda Counties. BAWSCA's goals are to ensure a reliable water supply, high-quality water, and a fair price for its customers. BAWSCA has the authority to coordinate water conservation, supply, and recycling activities for its agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the regional water system; and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes. It should be noted that the other water agencies discussed herein contain members of BAWSCA.

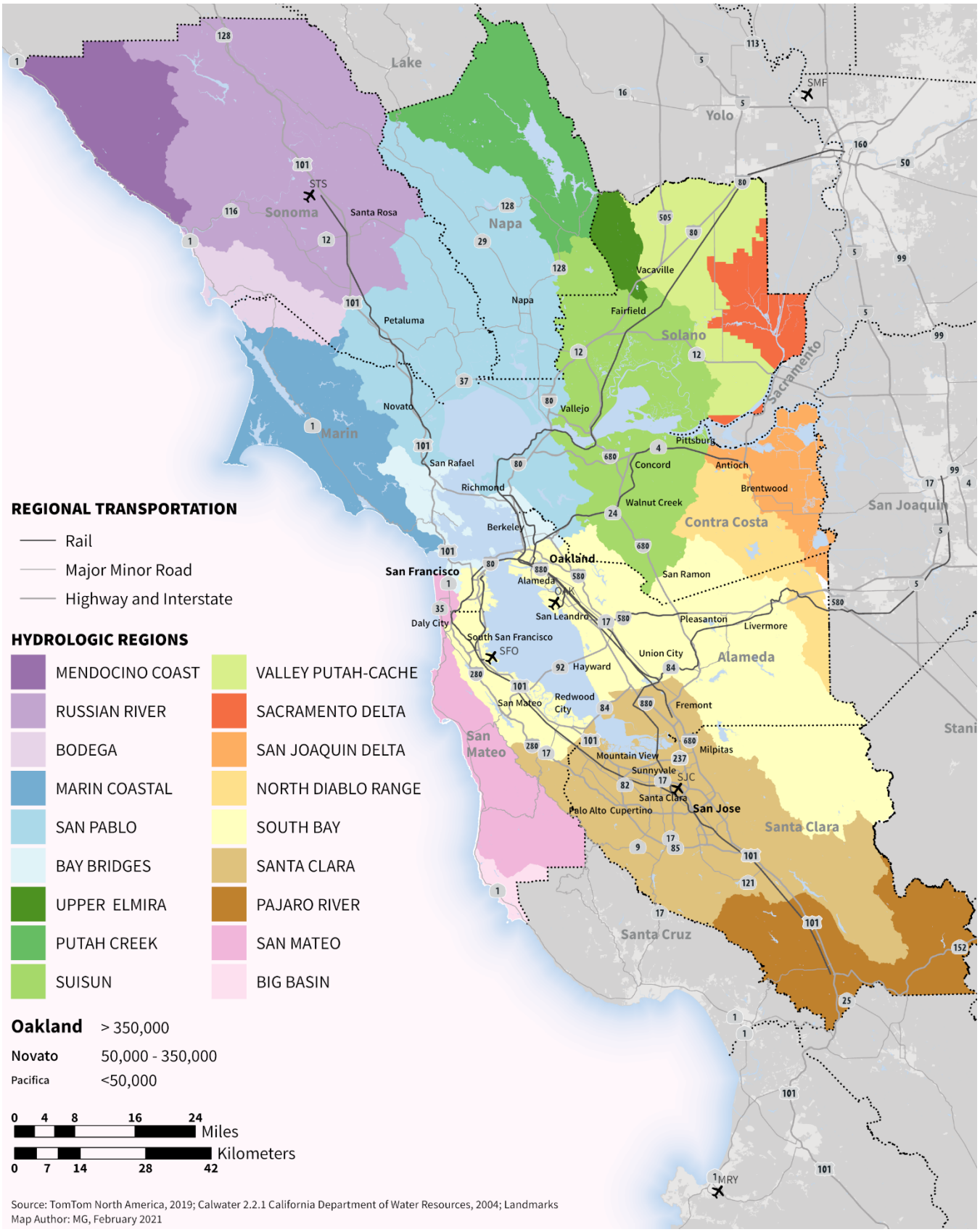


Figure 3.14-1: Major Local Watersheds in the San Francisco Bay Hydrologic Region

Contra Costa Water District

The Contra Costa Water District (CCWD) provides water to approximately 520,000 people in Contra Costa County, covering a total area of 140,000 acres. It operates and maintains a complex system of water transmission, treatment, and storage facilities to supply both treated and untreated (raw) water to its customers. It provides treated water to approximately 200,000 customers in Clayton, Clyde, Concord, Pacheco, Port Costa and parts of Martinez, Pleasant Hill, and Walnut Creek. In addition, CCWD provides wholesale treated water to the City of Antioch, the Golden State Water Company in Bay Point, the Diablo Water District in Oakley, and the City of Brentwood. It also sells untreated water to the Cities of Antioch, Martinez, and Pittsburg, as well as to industrial and irrigation customers. CCWD pumps water from four intakes in the Sacramento–San Joaquin Delta (Delta). The intakes are located at Rock Slough, on Old River, on Victoria Canal, and at Mallard Slough. The backbone of the district's water conveyance system is the 48-mile Contra Costa Canal, which starts at Rock Slough and ends at the Martinez Reservoir. In 2015, CCWD served approximately 119,000 acre-feet of water to its customers (CCWD 2016).

East Bay Municipal Utility District

The East Bay Municipal Utility District (EBMUD) serves Alameda, Alamo, Albany, Berkeley, Castro Valley, Crockett, Danville, Diablo, El Cerrito, El Sobrante, Emeryville, Hayward, Hercules, Kensington, Lafayette, Moraga, Oakland, Orinda, Piedmont, Pinole, Pleasant Hill, Richmond, Rodeo, San Leandro, San Lorenzo, San Pablo, San Ramon, Selby, and Walnut Creek. EBMUD's principal water source is the Mokelumne River Basin in the Sierra Nevada. EBMUD has water rights and facilities to divert up to 325 million gallons per day (mgd) from the Mokelumne River, which makes up approximately 90 percent of the agency's water supply. The other 10 percent originates as runoff from the watershed lands in the East Bay Area. EBMUD's Mokelumne River facilities include Pardee Dam and Reservoir, located near Valley Springs, and Camanche Dam and Reservoir, located 10 miles downstream of Pardee. Snowmelt from Alpine, Calaveras, and Amador Counties that feeds the upper Mokelumne River is collected in Pardee and Camanche Reservoirs, where it is stored for use by EBMUD. Overall, the basin serves approximately 1.4 million people throughout areas of Alameda and Contra Costa Counties, including services to residential, industrial, commercial, institutional, and irrigation waters (EBMUD 2016).

Marin Municipal Water District

The Marin Municipal Water District (MMWD) serves the populous eastern corridor of Marin from the Golden Gate Bridge northward up to, but not including, Novato, and is bounded by the San Francisco Bay on the east and stretches through the San Geronimo Valley in the west. The incorporated cities and towns of San Rafael, Mill Valley, Fairfax, San Anselmo, Ross, Larkspur, Corte Madera, Tiburon, Belvedere, and Sausalito are within the district's service area. The service area covers approximately 147 square miles, and MMWD serves a population of approximately 190,000 through about 61,000 service connections. MMWD's potable water distribution system includes approximately 941 miles of water mains, 90 pump stations, and 124 treated water storage tanks with a total storage capacity of 82 million gallons. Demand for potable and raw water was 22,610 acre-feet of water per year in the most recent Urban Water Management Plan (afy) (MMWD 2016).

City of Napa Water Department

The City of Napa is a major water supply source in Napa County, receiving its annual State Water Project (SWP) entitlement through the Napa County Flood Control and Water Conservation District, which is the contract administrator. The designated water service areas include most of the lower Napa Valley, encompassing all areas within the city limits of the City of Napa and extending up the foothills on the east and west sides of the valley. The city exports water to the Cities of American

Canyon, St. Helena, and Calistoga; the Town of Yountville; and the California Veterans Home. The predominant use of land in the area is residential development. As of 2015, the population served by the City of Napa Water Department was 87,615. In the City of Napa Urban Water Management Plan the demand is met by supplying water from three major sources: Lake Hennessey, the Milliken Reservoir, and the SWP, as delivered through the North Bay Aqueduct (City of Napa 2017).

San Francisco Public Utilities Commission

The San Francisco Public Utilities Commission (SFPUC) operates the Regional Water System, which provides water to nearly 2.6 million people within San Francisco, San Mateo, Santa Clara, Alameda, and Tuolumne Counties. The Regional Water System consists of more than 280 miles of pipeline and 60 miles of tunnels, 11 reservoirs, five pump stations, and two water treatment plans. The SFPUC provides water to both retail and wholesale customers (approximately 35 and 65 percent, respectively) (SFPUC 2016).

The Tuolumne River watershed on the western slope of the central Sierra Nevada, which provides water to the Regional Water System, has three regional water supply and conveyance systems: the Hetch Hetchy System, the Alameda System, and the Peninsula System. The amount of Tuolumne River supplies delivered depends on annual water conditions. In normal years, approximately 85 percent of SFPUC water supply is provided by runoff from the upper Tuolumne River watershed (SFPUC 2016). This percentage may increase up to 93 percent in dry years, based on the severity and timing of drought conditions. Three major reservoirs collect runoff: Hetch Hetchy Reservoir, Lake Lloyd, and Lake Eleanor. Water is diverted from the Hetch Hetchy Reservoir into a series of tunnels, aqueducts, and pipelines (the Hetch Hetchy System) that cross the San Joaquin Valley to facilities located in Alameda County (the Alameda System). The Alameda System includes conveyance facilities that connect the Hetch Hetchy System to facilities located in the San Francisco Peninsula (the Peninsula System), which also connects to the City and County of San Francisco's distribution system. This water supply serves customers in San Francisco, as well as 28 wholesale customers located in Alameda, Santa Clara, and San Mateo Counties.

Reservoirs and tanks within San Francisco have the capacity to hold approximately 413 million gallons of water. The SFPUC estimates this capacity to be a 5-day supply at the current average water consumption rate for the city. In addition, there is an emergency supply of existing non-potable water immediately available within the city at Lake Merced, which currently holds approximately 1.9 billion gallons of water. In 2015, the total retail demand for water in the city was 65.6 mgd, and the nonresidential demand was 23.6 mgd (SFPUC 2016).

The primary water source for San Mateo County is SFPUC's Regional Water System. In addition to supplies from Hetch Hetchy, the system uses two reservoirs in San Mateo County, Crystal Springs and San Andreas, which collect runoff from the San Mateo Creek watershed. Crystal Springs Reservoir also receives water from the Hetch Hetchy System. Water from the Pilarcitos Reservoir, on Pilarcitos Creek, directly serves one of the wholesale customers, the Coastside County Water District (which serves Half Moon Bay, Miramar, Princeton by the Sea, and El Granada) and can also deliver water to Crystal Springs and San Andreas Reservoirs. San Mateo County wholesale customers of the SFPUC include the Cities of Brisbane, Burlingame, Daly City, East Palo Alto, Menlo Park, Millbrae, San Bruno, and Redwood City; the Town of Hillsborough; the Coastside County Water District; the Cordilleras Mutual Water Association; the Estero Municipal Improvement District; the Guadalupe Valley Municipal Improvement District; the Mid-Peninsula Water District; the North Coast County Water District; and the Westborough Water District. The SFPUC also serves the California Water Service Company Bear Gulch and Bayshore Districts.

Santa Clara Valley Water District

The Santa Clara Valley Water District (SCVWD) is the county's primary water provider, serving Santa Clara County's population of 1,927,852 (U.S. Census 2019). Notably, the SCVWD and SFPUC's wholesale service areas overlap. The SCVWD service area encompasses all the county's 1,300 square miles, and SCVWD serves its 15 cities. Eight retailers in Santa Clara County have contracts with SFPUC to receive water from the SPFUC Regional Water System. The eight retailers, considered to be wholesale customers of SFPUC are the Cities of Palo Alto, Mountain View, Sunnyvale, Santa Clara, San Jose, and Milpitas; Purissima Hills Water District; and Stanford University. SCVWD does not control or administer SFPUC supplies in the county, but the supply reduces the demands on SCVWD sources of water supply. These eight retailers, however, benefit from the comprehensive water management programs and services provided by SCVWD.

The SCVWD manages groundwater and provides comprehensive water management as authorized by the Santa Clara Valley District Act. SCVWD's water supply system comprises storage, conveyance, recharge, treatment, and distribution facilities that include 11 local reservoirs, the groundwater basin, groundwater recharge facilities, treatment plants, imported supply, and raw treated water conveyance facilities. The primary source of water for SCVWD is groundwater and surface water stored in the reservoirs. The reservoirs store up to 25 percent of Santa Clara County's water supply. The capacity of all the local reservoirs of SCVWD is 169,009 acre-feet, with 122, 924 acre-feet of restricted capacity (SCVWD 2016).

About half of the county's water supply currently comes from local sources, and about half comes from imported water sources. Groundwater pumping provides up to half of the county's water supply during normal years. SCVWD uses conjunctive use methods—the practice of storing surface water in a groundwater basin in wet years and withdrawing from the basin in the dry years—to ensure proper protection of groundwater aquifers in Santa Clara County. SCVWD manages two groundwater subbasins that transmit, filter, and store water: the Santa Clara Subbasin and the Llagas Subbasin. Santa Clara County also imports water supplies from the Delta through three main pipelines: the South Bay Aqueduct, which carries water from the SWP, and the Santa Clara Conduit and Pacheco Conduit, both of which bring water from the federal Central Valley Project (CVP). SCVWD is contracted to import 152,500 afy and 100,000 afy from the CVP and SWP, respectively (SCVWD 2016).

Solano County Water Agency

The Solano County Water Agency (SCWA) is a wholesale water agency that provides untreated water to cities and agricultural districts in Solano County and parts of Yolo County from the federal Solano Project and the North Bay Aqueduct of the SWP. SCWA's service area population in 2015 was 429,400. It has water contracts to deliver water to Fairfield; Suisun City; Vacaville; Vallejo; Solano Irrigation District; Maine Prairie Water District; the University of California, Davis; and the California State Prison in Solano. The SWP has rights to water originating from the Sacramento and San Joaquin Rivers, and it stores water on Lake Oroville on the Feather River. The SWP provides water to the SCWA through the North Bay Aqueduct, a 27-mile-long pipeline that delivers untreated municipal water from Barker Slough in the Delta to Napa and Solano Counties.

The major facilities of the Solano Project are the Monticello Dam, which captures water from Putah Creek in Lake Berryessa; the Putah Diversion Dam, which diverts water out of lower Putah Creek; and the Putah South Canal, which delivers water to local agencies. The Putah South Canal is 33 miles long.

SCWA has contracted with the California Department of Water Resources (DWR) for an ultimate allocation of 47,756 afy from the SWP. In 2015, SCWA delivered a total of 206,030 acre-feet of water to its respective agencies (SCWA 2016).

Sonoma Water

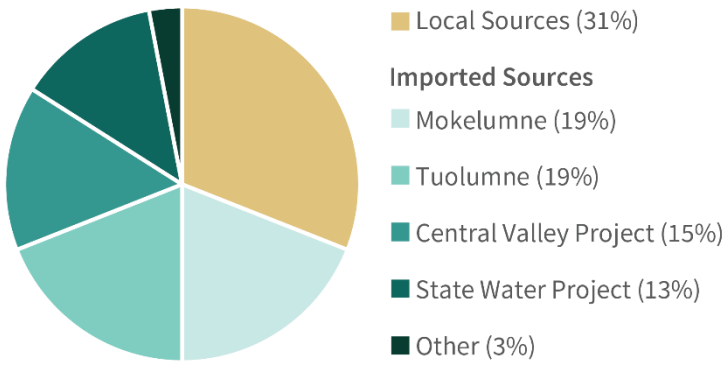
Sonoma Water, formerly known as the Sonoma County Water Agency, serves a large portion of Sonoma County, as well as the northern portion of Marin County. The primary water source for Sonoma Water is the Russian River. The Russian River originates in central Mendocino County and discharges into the Pacific Ocean near Jenner, about 20 miles west of Santa Rosa, and it is approximately 110 miles in length. Additionally, the Santa Rosa Plain provides groundwater. Groundwater is an important source of water in Sonoma County because it provides the domestic water supply for most of the unincorporated portion of the county and is a primary source of water for agricultural users. Three water agency wells located along the Russian River- Cotati Intertie Pipeline in the Santa Rosa Plain also provide a portion of the agency's water supply. Sonoma Water diverts water from the Russian River and delivers it to customers through a transmission system. The transmission system consists of six radial collector wells at the Wohler and Mirabel production facilities adjacent to the Russian River. In 2015, Sonoma Water provided 44,733 afy to its customers and contractors (including surplus and non-surplus customers) (Sonoma County Water Agency 2016).

Zone 7 Water Agency

The Zone 7 Water Agency (Zone 7) water service area, located about 40 miles southeast of San Francisco, encompasses an area of approximately 425 square miles of the eastern portion of Alameda County, including the Livermore-Amador Valley, Sunol Valley, and portions of the Diablo Range. The Zone 7 service area also overlies the Alameda Creek watershed. This watershed encompasses almost 700 square miles and extends from Altamont Pass to the east, San Francisco Bay to the west, Mount Diablo to the north, and Mount Hamilton to the south. Zone 7 is the water wholesaler for the Livermore-Amador Valley, as well as the area's flood control agency. It supplies untreated water for agriculture and treated drinking water to the California Water Service Company, Dublin San Ramon Services District, the City of Livermore, and the City of Pleasanton (Zone 7 Water Agency 2016).

Water Supply Sources

To service the region's residential, commercial, and agricultural water needs, Bay Area water agencies must manage diverse water supplies. These include supplies from local and imported sources, as well as through methods such as desalination and the use of recycled water. **Figure 3.14-2** shows the breakdown of typical Bay Area water use by source of supply.



Source: San Francisco Bay Area Integrated Regional Water Management Plan, 2019

Figure 3.14-2: Bay Area Water Use by Supply Source

Local Water

Local water supplies come from two interconnected sources: surface water and groundwater. Surface water is water that collects above ground in a stream, river, lake, reservoir, wetland, or ocean. Groundwater is water that has infiltrated into the subsurface that completely fills (saturates) the void space of rocks or sediment. They are physically connected in the hydrologic cycle when, at certain locations or times of the year, water infiltrates the bed of a stream to recharge groundwater or, at others, groundwater discharges, contributing to the base flow of a stream.

A long-term threat to groundwater sources is overdraft. Overdraft is the condition of a groundwater basin in which the amount of water withdrawn by pumping over the long term exceeds the amount of water that recharges the basin. Overdraft is characterized by groundwater levels that decline over a period of years and never fully recover, even in wet years. Overdraft can lead to increased extraction costs, land subsidence, water quality degradation, and environmental impacts. Although the Bay Region was not identified in DWR's last Statewide report on groundwater sources in 2020 as an area that is at short-term risk for widespread overdraft conditions (DWR 2021), many strategies identified in the *Bay Area Integrated Regional Water Management Plan* seek to reduce the likelihood of overdraft (SFPUC 2019).

Together, surface water and groundwater currently supply approximately 31 percent of Bay Area water (SFPUC 2019). Surface water from local rivers and streams (including the Delta) is an important source for all Bay Area water agencies but particularly so in the North Bay counties, where access to imported water is more limited because of infrastructure limitations. The Bay Area has 28 identified groundwater basins, which underlie approximately 30 percent of the region (see **Figure 3.14-3**). The basins that are most intensively used for water supply are the Santa Clara Valley, Napa-Sonoma Valley, Petaluma Valley, Livermore Valley, and Westside (on San Francisco Peninsula) basins (SFPUC 2019). Groundwater is also an important local supply source for ACWD, BAWSCA member agencies, SCVWD, SFPUC, and Sonoma Water.

Imported Water

The greatest proportion of Bay Area water is imported from Sierra Nevada and Delta sources, which make up approximately 66 percent of supply. As described for SFPUC and EBMUD above, the primary Sierra Nevada sources are the Mokelumne River and Tuolumne River watersheds. Several Bay Area water agencies receive Delta water through the SWP and CVP, which have a vast network of canals and aqueducts for the delivery of water throughout the Bay Area and the Central Valley. Major water conveyance infrastructure delivering water through the SWP and CVP is described in the "Water Supply Infrastructure" section, below.

Recycled Water

In the 1990s, a number of local agencies joined with DWR and the U.S. Bureau of Reclamation to study the feasibility of using high-quality recycled water to augment water supplies and help the Bay-Delta ecosystem. This cooperative effort, known as the Bay Area Regional Water Recycling Program, produced a master plan for regional water recycling in 1999 for the five counties south of the bay. Since then, local water agencies have built a number of projects consistent with the program, and recycled water has come to be widely used in the Bay Area for a number of applications, including landscape irrigation, agricultural needs, commercial and industrial purposes, and as a supply to the area's wetlands. A similar effort for North Bay counties was organized by the North Bay Regional Water Recycling Feasibility Study and Program. Together, these planning efforts have resulted in over 30 agencies in the region developing recycled water programs. In 2015, the Bay Area recycled 58,000 afy, almost 10 percent of the wastewater effluent generated, and supply is expected to more than double over the next 20 years (SFPUC 2019).

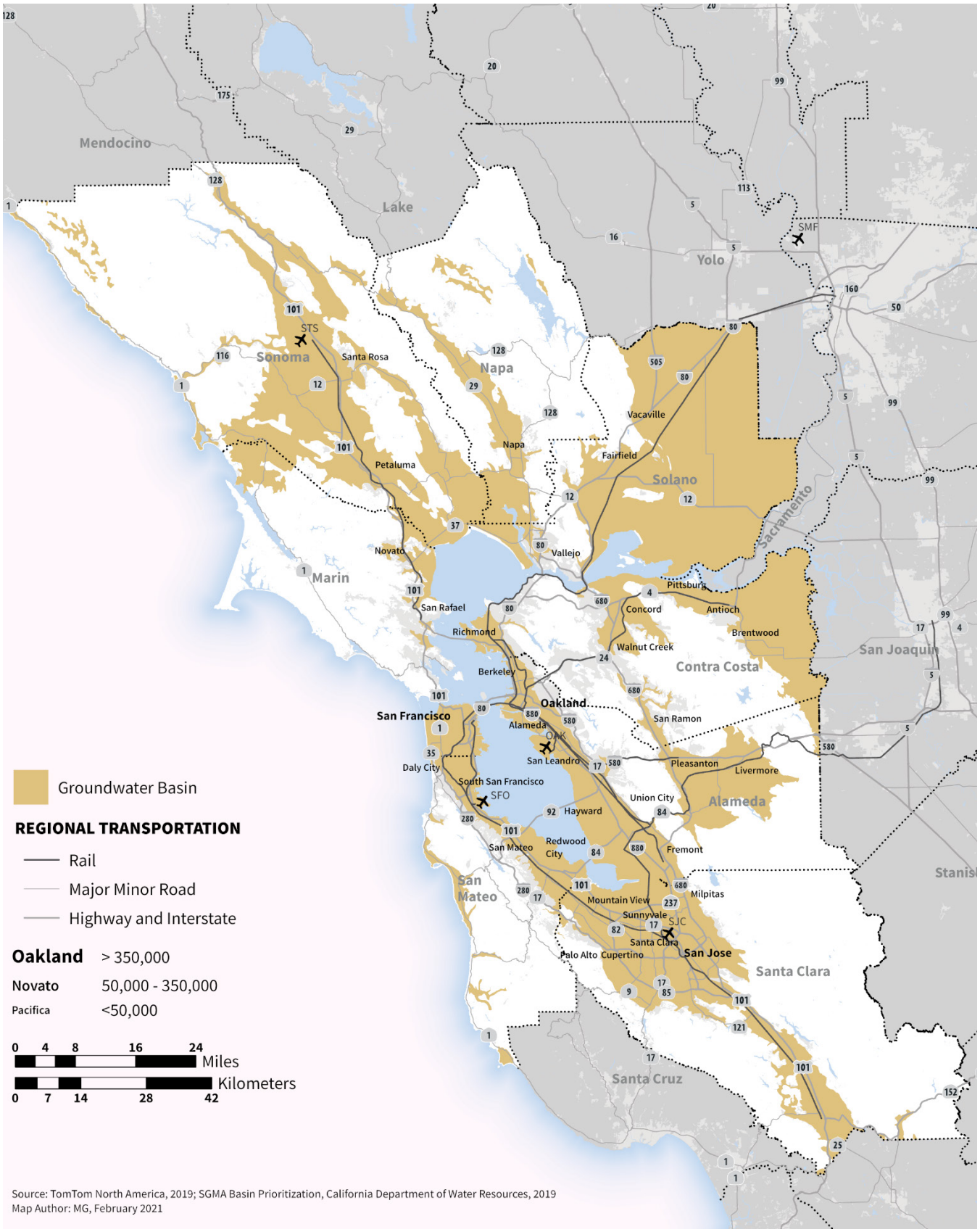


Figure 3.14-3: Bay Area Groundwater Basins

Desalination

Bay Area agencies have explored desalination as an alternative source of drinking water. In 2003, a number of water agencies formed the Northern California Salinity Coalition to formally join together to research and identify regional approaches for addressing salinity impacts, as well as the use and application of desalination (BARDP 2020). In 2005–2006, MMWD operated a desalination pilot plant, enabling it to conduct environmental studies, test equipment, refine operating costs, and demonstrate the technology to MMWD customers. The agency used the results of the pilot plant operations to refine the design requirements and costs of a full-scale desalination facility. This project is not currently being pursued; other measures like water efficiency, recycled water, and interties are being pursued to increase water reliability with lower costs.

In 2003, ACWD opened the Newark Desalination Facility, the first brackish water desalination facility in northern California, with a capacity of 5 mgd, and it doubled the production to 10 mgd for a total blended production of 12.5 mgd to the distribution system. Eight water agencies in the Bay Area (ACWD, BAWSCA, CCWD, EBMUD, MMWD, SFPUC, SCVWD, and Zone 7 Water Agency) are working together to investigate opportunities for collaboration. The purpose of this planning effort, known as Bay Area Regional Reliability (BARR), is to identify projects and processes to enhance water supply reliability across the region, leverage existing infrastructure investments, facilitate water transfers during critical shortages, and improve climate change resiliency. Projects to be considered will include interagency interties and pipelines, treatment plan improvements and expansion, groundwater management and recharge, potable reuse, desalination, and water transfers. While no specific capacity or supply has been identified, this program may result in addition of future supplies that would benefit Bay Area Customers (Brown and Caldwell 2017).

Water Transfers

Water transfers allow suppliers with excess water supplies to sell their water to those agencies in need. In addition, agriculture-to-urban transfers can allow agricultural districts with marginal lands to be fallowed (taken out of production). Water transfers also provide reduced vulnerability to water shortages resulting from drought, catastrophic events, and system security breaches. Several Bay Area regional water agencies, including ACWD, CCWD, EBMUD, SCVWD, SFPUC, Solano CWA, and Zone 7, have participated in various types of water transfers to supplement their existing water supplies. Historic and existing water transfer arrangements occurring in the region include, but are not limited to, the following:

- **CCWD Long-Term and Short-Term Water Transfers**. CCWD has long-term agreements that enable it to purchase up to 12,000 acre feet per year (AFY) from East Contra Costa Irrigation District (ECCID) during droughts.
- **SFPUC Water Transfers**. The SFPUC participated in the DWR Drought Bank to help meet demands during the 1987–1992 drought and has also purchased water from the Kern County Water Bank. SFPUC is also investigating the possibility of a dry-year water transfer in the Tuolumne River basin with Modesto Irrigation District/Turlock Irrigation District for 2 mgd.
- **SCVWD Short-Term Water Transfers**. SCVWD participates in water transfers and exchanges on a routine basis. For example, in 2003 when CVP and SWP allocations initially were low, SCVWD purchased 28,000 acre-feet through six separate transactions.

In 2014, the BARR partnership developed a drought contingency plan and have since begun work on a Bay Area Shared Water Access Program (SWAP). The goal of SWAP is to develop a strategy report that will facilitate transfers to and exchanges within the Bay Area, leveraging existing infrastructure

and institutional agreements. The SWAP effort of seven of the eight Bay Area Regional Reliability partners will outline an implementation plan that will facilitate transfers to and exchanges within the Bay Area, leveraging existing infrastructure and institutional agreements (BARR 2020).

Water Conservation

Reducing water demand through conservation is a key component of improving water supply reliability in the Bay Area. All of the 11 major water agencies in the region are members of the California Water Efficiency Partnership, formally known as the California Urban Water Conservation Council, which promotes the development and implementation of conservation best management practices (BMPs), such as metering, public information programs, conservation pricing, and washing machine rebates. Many local water agencies are also implementing conservation projects and programs that extend beyond these baseline BMPs.

Water Supply Infrastructure

As noted above, approximately two-thirds of the water used by Bay Area water agencies comes from nonlocal sources. The Mokelumne, Tuolumne, San Joaquin (CVP), and Sacramento (SWP) Rivers all flow from out of region mountain ranges through the Delta. As a result, the region relies on a diverse network of water infrastructure, including the following aqueducts and storage facilities to convey supplies to its residents (SFPUC 2019):

- **Contra Costa Canal**. Originally constructed to serve agricultural needs, the Contra Costa Canal is now the backbone of the CCWD transmission system. The canal spans 48 miles, conveying water from the Delta to CCWD's treatment facilities and raw water customers.

- **Hetch Hetchy Aqueduct**. The 167-mile Hetch Hetchy Aqueduct roughly parallels the Tuolumne River, conveying SFPUC supplies from the Hetch Hetchy Reservoir across the San Joaquin River and San Francisco Bay. Upon reaching the Bay Area near the city of Fremont, the Hetch Hetchy Aqueduct splits into the four Bay Division Pipelines. Pipelines 1 and 2 cross the San Francisco Bay to the south of the Dumbarton Bridge, while pipelines 3 and 4 run to the south of the bay. Water from Hetch Hetchy is stored in local facilities including Calaveras Reservoir, Crystal Springs Reservoir, and San Antonio Reservoir. Hetch Hetchy provides water to 2.4 million residential, commercial, and industrial customers in San Francisco and the Greater Bay Area.

- **Mokelumne Aqueducts**. The three aqueducts that make up the Mokelumne Aqueduct System convey most of EBMUD's supply 87 miles, from Pardee Reservoir on the Mokelumne River to Walnut Creek.

- **North Bay Aqueduct**. The North Bay Aqueduct is an underground pipeline operated remotely by DWR. It extends from the Delta to Benicia, Vallejo, and Napa County. SCWA and the Napa County Flood Control Water and Conservation District, which includes the City of Napa as a member agency, receive Delta supplies through the North Bay Aqueduct.

- **Russian River Transmission Facilities**. Sonoma Water operates diversion facilities at the Russian River and an aqueduct system composed of pipelines, pumps, and storage tanks.

- **San Felipe Division**. A set of pipelines and pumps convey CVP water from San Luis Reservoir to Santa Clara and San Benito Counties. In Santa Clara County, the San Felipe Division terminates at Coyote Pumping Plant, where it connects with SCVWD's Cross-Valley Pipeline.

- **South Bay Aqueduct**. The South Bay Aqueduct conveys water from the Delta through over 40 miles of pipelines and canals. ACWD, Zone 7, and SCVWD receive SWP supplies conveyed through the South Bay Aqueduct.

In addition to pipelines and aqueducts, each Bay Area water agency has its own extensive network of surface water storage reservoirs, groundwater extraction wells, water treatment plants, and distribution pipelines.

Regional Demographics and Water Demand

While numerous factors influence water demand, including employment growth, socioeconomic characteristics, geographic distribution of the population, variation in local precipitation levels, and water conservation practices, overall population growth is the most important factor. In general, demand management strategies will allow Bay Area water agencies to continue to meet projected demand through 2040 in average years. To date, demand management and conservation programs have helped to keep the overall increase of water use in the Bay Area stable, despite an increasing population (see **Figure 3.14-4**).

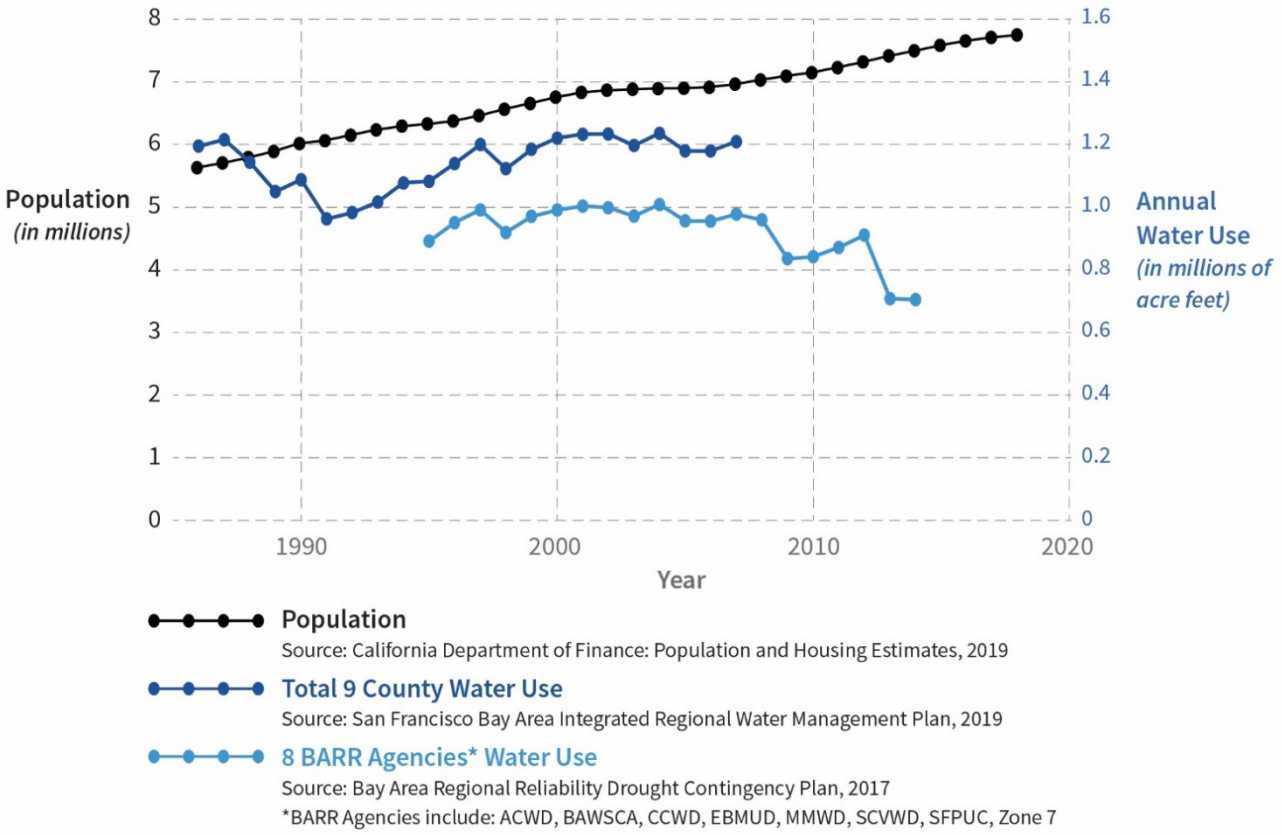


Figure 3.14-4: Population and Water Demand Trends

Table 3.14-2 shows the projected water supplies and demands from the most recent urban water management plans (UWMPs) for normal years in the near future (2020) and over the next 20 years (2035 or 2040). All the water districts, except for SCWA, will be able to provide adequate water supplies to meet projected demand in a year of normal precipitation, although doing so would require some districts to acquire additional supplies. It is possible that demand in the SCWA could exceed the county's supply, which would require the county to acquire additional sources from other counties in the region or elsewhere.

Table 3.14-2: Projected Normal Year Supply and Demand (Acre Feet/Year)

Agency	Current Supply	Current Demand	Future Supply	Future Demand
Alameda County Water District	77,000	63,000	76,000	70,000
Contra Costa Water District[1]	329,000	264,000	362,000	304,000
East Bay Municipal Utility District	217,000	217,000	230,000	230,000
Marin Municipal Water District	151,000	40,000	153,000	42,000
City of Napa[2]	32,000	15,000	33,000	17,000
San Francisco Public Utilities Commission[1]	280,000	280,000	295,000	295,000
Santa Clara Valley Water District	390,000	371,000	442,000	435,000
Solano County Water[1,2]	244,000	255,000	244,000	255,000
Sonoma Water	66,000	66,000	76,000	76,000
Zone 7 Water Agency[2]	79,000	72,000	100,000	93,000

Note: Numbers have been rounded to the nearest 1,000.

[1] Projected supply and demand include retail and wholesale customers (in SFPUC's case, including Bay Area Water Supply & Conservation Agency member agencies).

[2] Future supply and demand projections are for the year 2035.

Sources: Data compiled by MTC and ABAG based on data from ACWD 2016, CCWD 2016, EBMUD 2016, MMWD 2016, City of Napa 2017, SFPUC 2016, SCVWD 2016, SCWA 2016, Sonoma County Water Agency 2016, Zone 7 Water Agency 2016

Some Bay Area water agencies are projecting future water supply shortfalls in dry years, and some are already seeing such shortfalls, as shown in **Table 3.14-3**. Other agencies anticipate being able to handle a single dry year, largely because of reservoirs or other storage capacity. The severity and timing of dry year shortfalls differ greatly among the agencies because of the wide variation of supply sources, types of use, and climates within the region.

Table 3.14-3: Year of Projected Water Shortages (Single Dry Year)

Agency	First year in which demand is expected to outpace supply during single dry years	First year in which demand is expected to outpace supply during multiple dry years[1]
Alameda County Water District	2020	2025
Contra Costa Water District	none	none
East Bay Municipal Utility District	none	2025
Marin Municipal Water District	none	none
City of Napa Water Department[2]	none	none
San Francisco Public Utilities Commission	none	2040
Santa Clara Valley Water District	2040	2020
Solano County Water Agency[2]	2015	2015
Sonoma Water	2025	none
Zone 7 Water Agency[2]	none	none

[1] Agencies are required to analyze at least a 3-year dry period. Alameda County Water District and the City of Napa, respectively, studied 5- and 6-year dry periods with all others analyzing 3-year periods.

[2] Urban Water Management Plans projected water supply and demands to 2040, except for City of Napa, Solano County Water Agency, and Zone 7 which projected through 2035. For the City of Napa and Zone 7, demand does not outpace supply through 2035.

Sources: Data compiled by MTC and ABAG based on data from ACWD 2016, CCWD 2016, EBMUD 2016, MMWD 2016, City of Napa 2017, SFPUC 2016, SCVWD 2016, SCWA 2016, Sonoma County Water Agency 2016, Zone 7 Water Agency 2016

Drought

California has experienced several prolonged droughts, specifically (in recent times) in 1973, 1976 through 1977, 1987 through 1991, 2007 through 2009, and 2011 through 2016. During the most recent drought, the governor declared a state of emergency, calling on all Californians to reduce their water

usage by 20 percent characterizing it as the driest five years on record for the State (State of California 2014). The 2011–2017 drought eased in the winter of 2017, as many parts of California saw dramatically improved hydrologic conditions, with the governor lifting the Drought emergency with major State reservoirs above normal storage levels (State of California 2017).

In May 2015, the State Water Resources Control Board (SWRCB) adopted an emergency water conservation regulation in response to historic drought conditions and an executive order issued by the governor in April 2015. Under that regulation, SWRCB set specific conservation targets for large urban water suppliers, required reporting of water production information, prohibited wasteful water practices, and gave urban water agencies additional enforcement authority to prevent those practices. The regulations were adjusted in February of 2016 to further recognize regional differences and investments in new drinking water supplies. Public water use was reduced by 22 percent through 2017 as compared to 2013 (State of California 2017). In May 2016, new regulation allowed urban water suppliers to establish local conservation standards based on need and availability during continued drought.

In April 2017, Governor Brown ended the drought State of Emergency in most of California in Executive Order B-40-17, which lifted the drought emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne Counties. Executive Order B-40-17 also rescinds two emergency proclamations from January and April 2014 and four drought-related Executive Orders issued in 2014 and 2015. Further, on April 26, 2017, SWRCB rescinded the water supply stress test requirements and remaining mandatory conservation standards for urban water suppliers (State of California 2017).

Climate change is expected to increase the number and severity of future droughts (SCVWD 2021). For this reason, the State has continued to pursue making water conservation a California way of life, passing further legislation in 2018 to develop new standards for indoor and outdoor residential use, commercial, industrial, and institutional water use for landscape irrigation, and water loss (SWRCB 2021).

In March 2021, drought conditions returned to 90 percent of the State with 64 percent of the State in a severe drought status with portions of Napa, Solano, and Sonoma Counties in an extreme drought intensity (USDM 2021). In addition to the local drought conditions within the boundaries of the nine counties, shortages in precipitation in the Sierra Nevada can have pronounced effects on water supply in the Bay Area because of the reliance of the region of water from the Tuolumne and Mokelumne River watersheds, as well as the SWP and CVP, which rely on out-of-region watersheds.

Wastewater Treatment

Wastewater is generated by residential, commercial, and industrial sources throughout the Bay Area. Treatment of wastewater provides protection for human health and receiving water bodies, preservation of the health of aquatic and riparian species, and improved supply reliability through the removal of harmful pollutants from discharges.

Urbanized and unincorporated areas of cities and counties throughout the Bay Area provide wastewater treatment facilities. These facilities include systems made up of pipelines, pipe stations, interceptor stations and discharge stations. Treatment plants send wastewater through up to three treatment processes (primary, secondary, tertiary) depending on treatment requirements established by the pertinent RWQCB for the particular plant. The level of treatment is often dictated by where treated effluent is discharged (land, water body) and if there is an end use that requires higher treatment levels (recycling). Many of the Bay Area's wastewater treatment plants include primary and secondary treatment for wastewater, as well as recycled water programs that require tertiary

treatment. In many cases, secondary effluent is discharged into the San Francisco Bay, and wastewater from Solano County is pumped into the Delta. Wastewater is also recycled for other uses, such as agriculture, irrigation, or landscaping. Treatment requirements are promulgated by the RWQCB and are typically reviewed, along with treatment capacity, every 5 years. As a result of this process, planning and upgrading of treatment plants is an ongoing process for each plant.

Wastewater treatment in the Bay Area is provided by various agencies, as well as individual city and town wastewater treatment systems. Bay Area wastewater treatment facilities are listed in **Table 3.14-4**. Some treatment plants serve individual cities, while others serve multiple jurisdictions. More than 50 agencies provide wastewater treatment throughout the Bay Area. Each plant is typically sized to accommodate growth over a 15- to 20-year horizon. Because of the dynamic nature of treatment plant planning/upgrading/expansion, it is not practical, at this regional and programmatic level of analysis, to characterize treatment plant technology, flows, and capacity.

Table 3.14-4: Wastewater Treatment Facilities in the Region

Treatment Agency	Service Area
Alameda County	
City of Hayward	City of Hayward
City of Livermore	City of Livermore and surrounding unincorporated areas
City of San Leandro, Environmental Services Division	City of San Leandro
Dublin San Ramon Services District	Cities of Pleasanton and Dublin
East Bay Municipal Utility District	Cities of Alameda, Albany, Berkeley, Emeryville, Oakland, and Piedmont
Oro Loma Sanitary District	City of San Leandro, City of Hayward and unincorporated areas San Lorenzo, Ashland, Cherryland, Fairview, and portions of Castro Valley
Union Sanitary District	Cities of Fremont, Newark, and Union City
Contra Costa County	
Central Contra Costa Sanitary District	Cities of Clayton, Concord, Lafayette, Orinda, Pleasant Hill, San Ramon, Walnut Creek, Towns of Danville, Moraga, and unincorporated area of Alamo
City of Brentwood	City of Brentwood
City of Hercules / City of Pinole	City of Hercules
City of Richmond Municipal Services District	City of Richmond
Crockett-Valona Sanitary District	Unincorporated area of Crockett
Delta Diablo Sanitation District	Cities of Antioch, Pittsburg, and unincorporated Bay Point area
East Bay Municipal Utility District	Cities of El Cerrito, Richmond
Ironhorse Sanitary District	City of Oakley and unincorporated area of Bethel Island
Mt. View Sanitary Eastern District	City of Martinez and surrounding unincorporated areas
Rodeo Sanitary District	Unincorporated Rodeo area
West County Wastewater District	City of Richmond and unincorporated El Sobrante area
Marin County	
Central Marin Sanitation Agency	City San Rafael and Towns of Corte Madera and Fairfax
Las Gallinas Valley Sanitary District	City of San Rafael and surrounding unincorporated areas
Marin County Sanitary District #5	Town of Tiburon
Novato Sanitary District	City of Novato and unincorporated Bel Marin, Ignacio and Hamilton areas
Ross Valley Sanitation District	City of Larkspur, Town of San Anselmo, and surrounding unincorporated areas
Sausalito Marin City Sanitary District	City of Sausalito and unincorporated Marin City area
Sewerage Agency of Southern Marin	City of Mill Valley and surrounding unincorporated areas

Treatment Agency	Service Area
Napa County	
City of American Canyon	City of American Canyon
City of Calistoga	City of Calistoga
City of St. Helena	City of St. Helena
Napa Sanitation District	City of Napa and unincorporated surrounding areas
Town of Yountville	Town of Yountville
San Francisco	
San Francisco Public Utilities Commission	City and County of San Francisco
San Mateo County	
City of Burlingame	City of Burlingame, Town of Hillsborough and unincorporated Burlingame Hills area
City of Millbrae	City of Millbrae
City of Pacifica	City of Pacifica
City of San Mateo/ Estero Municipal Improvement District	Cities of San Mateo and Foster City
Cities of South San Francisco and San Bruno	Cities of South San Francisco, San Bruno, Daly City and Millbrae and Town of Colma
North San Mateo County Sanitation District	Cities of Daly City and South San Francisco
Sewer Authority Mid- Coastside	City of Half Moon Bay and unincorporated Granada, Moss Beach and Montero areas
San Francisco Public Utilities Commission	Cities of Brisbane and Daly City
Silicon Valley Clean Water	Cities of Belmont, San Carlos, Redwood City, Menlo Park and Towns of Atherton, Portola Valley, Woodside
Santa Clara County	
City of Sunnyvale Water Pollution Control Plant	City of Sunnyvale
Palo Alto Regional Water Quality Control Plant	Cities of East Palo Alto, Los Altos, Mountain View, Palo Alto, Town of Los Altos Hills and unincorporated Stanford University area
San José/ Santa Clara County Water Pollution Control Plant	Cities of San José, Campbell, Saratoga, Monte Sereno, Cupertino, Milpitas and Town of Los Gatos
South County Regional Waste Water Authority	Cities of Morgan Hill and Gilroy
Solano County	
City of Benicia	City of Benicia
City of Dixon	City of Dixon
City of Rio Vista	City of Rio Vista
City of Vacaville	City of Vacaville
Fairfield-Suisun Sewer District	Cities of Fairfield and Suisun City
Vallejo Sanitation and Flood Control District	City of Vallejo
Sonoma County	
City of Cloverdale	City of Cloverdale
City of Petaluma	City of Petaluma and unincorporated Pengrove area
Sonoma Water	Town of Sonoma and surrounding unincorporated areas
Santa Rosa Water	Cities of Santa Rosa, Rohnert Park, Sebastopol, Cotati, and surrounding unincorporated areas
Town of Windsor	Town of Windsor

Source: ABAG 2016

Stormwater Treatment

Stormwater has been identified as urban runoff by the U.S. Environmental Protection Agency (EPA). After a precipitation event, polluted runoff is discharged over land or through storm sewer systems, often untreated with direct flow into water bodies. If left uncontrolled, this polluted water can result in the destruction of wildlife and aquatic ecosystems and can threaten public health. The National Pollutant Discharge Elimination System (NPDES) permitting program provides implementation measures for reducing potentially harmful pollutants found in stormwater runoff from entering water bodies or affecting public health. Additionally, stormwater capture systems assist in maintaining flood protection and create opportunities for ecosystem protection and restoration.

The Bay Area regulates stormwater at the regional, county, and city level. In the early 1990s, the RWQCB issued countywide municipal stormwater permits to operators of municipal separate storm sewer systems (MS4s) serving populations over 100,000. Subsequently, in 2015, the RWQCB reissued these countywide municipal stormwater permits as one Municipal Regional Stormwater NPDES Permit to regulate stormwater discharges from municipalities and local agencies in Alameda, Contra Costa, San Mateo, and Santa Clara Counties, as well as the Cities of Fairfield, Suisun City, and Vallejo. MS4s are defined as conveyance systems that are owned by cities or other public entities, are designed to collect, or convey stormwater (including gutters, storm drains, pipes, and ditches), and are not part of a combined sewer or a publicly owned sewage treatment plant.

Additionally, a General Permit for Discharge of Stormwater from small MS4s regulates the discharge of stormwater for the following municipalities: Marin County and its cities, Napa County and its cities, the City and County of San Francisco, Solano County and the City of Benicia, and Sonoma County and the Cities of Petaluma and Sonoma.

Additionally, each county has its own storm water pollution prevention programs (SWPPPs), which are intended to facilitate compliance with State and federal regulations through coordination with local municipalities, residents, businesses, and schools. These programs provide initiatives for preventing stormwater pollution; protecting and enhancing water quality in watersheds, waterways, creeks, and wetlands; and preventing water pollution in the San Francisco Bay and Pacific Ocean.

Solid Waste Disposal

Each Bay Area county, plus the Cities of Berkeley, Pittsburg, and San Jose, has a local enforcement agency (LEA) covering all solid waste facilities in the region. LEAs are responsible for ensuring the correct operation and closure of solid waste facilities in the State, as well as for guaranteeing the proper storage and transportation of solid wastes. In concurrence with the California Department of Resources Recycling and Recovery (CalRecycle), LEAs issue operating permits to facilities, including landfills, transfer stations, material recovery, and composting facilities. Solid waste is the garbage, refuse, and other discarded solid materials generated by residential, commercial, and industrial activities. CalRecycle identifies 10 categories of wastes: paper, glass, metal, electronics, plastic, other organic, construction and demolition (C&D), household hazardous waste, special waste, and mixed residue. Solid waste generation is measured by disposal and diversion. PRC Section 40192 defines disposal as “the final deposition of solid wastes onto land, into the atmosphere, or into the waters of the state.” Solid waste that is disposed of in landfills is measured in volume (cubic yards) and weight (tons). Diversion includes programs and practices such as waste prevention and source reduction, recycling, reuse, and composting that reduce the total amount of waste that requires disposal.

Landfills

The Bay Area is currently served by 14 privately operated landfills and one operated by the Sonoma County Public Works Department. The 14 landfills have a total remaining capacity of 259,634,000 cubic yards, a total daily throughput of 40,254 tons per day, and an estimated average of 46 percent remaining capacity. **Table 3.14-5** shows the remaining capacity of landfills located in the Bay Area and their estimated date of closure.

Table 3.14-5: Active Bay Area Landfills

Site Name	SWIS Number	Estimated Closure Date	Max. Throughput (tons/day)	Capacity (Cu Yd)	Remaining Capacity (Cu Yd)	% Capacity Remaining
Altamont Landfill & Resource Recovery	01-AA-0009	12/01/2070	11,150	124,400,000	65,400,000	53%
Vasco Road Sanitary Landfill	01-AA-0010	12/31/2022	2,518	32,970,000	7,379,000	22%
Acme Landfill	07-AA-0002	07/01/2021	1,500	6,195,000	506,590	8%
Keller Canyon Landfill	07-AA-0032	12/31/2030	3,500	75,018,280	63,408,410	85%
USS-Posco Industries Waste Mgmt Unit II	07-AC-0042	01/01/2118	8	86,000	not available	not available
Redwood Landfill	21-AA-0001	07/01/2024	2,300	19,100,000	26,000,000	136%
Clover Flat Resource Recovery Park	28-AA-0002	01/01/2047	600	4,560,000	2,620,000	57%
Corinda Los Trancos Landfill (Ox Mtn)	41-AA-0002	01/01/2034	3,598	60,500,000	22,180,000	37%
Zanker Material Processing Facility	43-AN-0001	11/01/2025	350	640,000	640,000	100%
Newby Island Sanitary Landfill	43-AN-0003	01/01/2041	4,000	57,500,000	21,200,000	37%
Kirby Canyon Recycle.& Disp. Facility	43-AN-0008	12/31/2059	2,600	36,400,000	16,191,600	44%
Guadalupe Sanitary Landfill	43-AN-0015	01/01/2048	1,300	28,600,000	11,055,000	39%
Potrero Hills Landfill	48-AA-0075	02/14/2048	4,330	83,100,000	13,872,000	17%
Central Disposal Site	49-AA-0001	06/01/2043	2,500	32,650,000	9,181,519	28%
TOTAL			40,254	561,719,280	259,634,119	46%

Source: Raw data as reported by CalRecycle 2020

Collection, Transfer, Recycling, and Material Recovery Facilities

There are 57 transfer stations in the Bay Area that receive solid waste and transfer it into containers or vehicles before it is finally disposed of in a landfill or transformation facility. The total maximum combined daily throughput capacity of transfer stations in the Bay Area is 54,136 tons per day. **Table 3.14-6** identifies the daily throughput of transfer facilities in the region. Several of the listed facilities also handle recycling services.

Table 3.14-6: Active Bay Area Transfer/Processing Facilities

Facility	SWIS Number	Max. Throughput (tons/day)
Pleasanton Garbage Service SW TS	01-AA-0003	720
Davis Street Transfer Station	01-AA-0007	5,600
Alameda Co Industries Direct Trans. Fac.	01-AA-0290	412
Fremont Recycling and Transfer Station	01-AA-0297	2,400
Livermore Sanitation Recy. Materials T/F	01-AA-0301	385
Bee Green Recycling & Supply	01-AA-0302	360
Certified Blue Recycling, Inc. (CDI Op.)	01-AA-0315	174
Hayward Transfer Station LLC	01-AA-0318	174
California Waste Solutions (Wood St.)	01-AA-0323	100

Facility	SWIS Number	Max. Throughput (tons/day)
California Waste Solutions (10th St.)	01-AA-0324	100
Tri-CED Community Recycling Facility	01-AA-0327	100
City of Berk Solid Waste Mgmt Center & TS	01-AC-0029	560
Contra Costa TS And Recovery	07-AA-0027	1,900
Central Processing Facility	07-AA-0034	1,200
Golden Bear Waste Recycling Center	07-AA-0056	1,000
El Cerrito Recycling Center	07-AA-0063	99
Brentwood Transfer Station	07-AA-0068	400
Recycling Center & Transfer Station	07-AC-0043	1,500
Marin Sanitary Service Transfer Station	21-AA-0005	2,640
Devlin Road Transfer Station	28-AA-0027	1,440
City of Napa Material Diversion Facility	28-AA-0030	360
San Francisco Solid Waste Tran & Rec Cnt	38-AA-0001	3,000
Recycle Central at Pier 96	38-AA-0012	2,100
SFR Recovery Inc.	38-AA-0024	175
San Bruno Transfer Station	41-AA-0014	120
Shoreway Environmental Center	41-AA-0016	3,000
Blue Line MRF And TS	41-AA-0185	1,200
Recology San Martin Transfer Station	43-AA-0003	500
Sunnyvale MRF & Transfer Station	43-AA-0009	1,500
Z-Best Composting Facility	43-AA-0015	1,500
Pacific Coast Recycling	43-AA-0021	100
Peninsula Sanitary Services Direct TF	43-AA-0032	149
Recology Pacheco Pass Wood Processing	43-AA-0035	175
Mission Trail Food Material Transfer Op.	43-AA-0037	99
Sunnyvale Food Materials T/P Operations	43-AA-0040	15
Zanker Material Processing Facility	43-AN-0001	1,800
Zanker Road Resource Recovery Operation	43-AN-0007	1,300
BFI Newby Island Recyclery	43-AN-0014	1,600
Guadalupe Sanitary Landfill	43-AN-0015	3,650
Greenwaste Recovery Facility	43-AN-0019	3,500
Premier Recycling Facility	43-AN-0023	550
California Waste Solutions, Inc. (CWS)	43-AN-0024	530
Rogers Avenue Transfer Station	43-AN-0025	500
Valley Recycling	43-AN-0028	175
Valley Recycling 2	43-AN-0034	175
Leo Recycle. Med. Vol. CDI Facility	43-AN-0039	175
Bay Area Scavenger and Recycling	43-AN-0041	175
Mission Trail Transfer Station	43-AO-0002	375
Recology Vallejo	48-AA-0089	600
Sonoma Transfer Station	49-AA-0144	760
Global Materials Recovery Systems	49-AA-0390	544
West College Transfer Station	49-AA-0391	99

Facility	SWIS Number	Max. Throughput (tons/day)
M and M Services, Inc.	49-AA-0398	175
Recology Sonoma Marin	49-AA-0399	498
Central Transfer Station	49-AA-0404	1,500
Recology Sonoma Marin	49-AA-0406	99
Pruitt Transload Facility	49-AA-0426	99
Total		54,136

Source: CalRecycle 2020

Composting, Chipping, and Grinding

There are 36 active composting facilities in the region that collect, grind, mix, pile, and add moisture and air to organic materials to speed natural decay and produce a soil amendment. Another 21 chipping and grinding facilities in the region are designed to reduce the size of compostable material (CalRecycle 2020). Recycling, composting, chipping, and grinding all reduce the amount of solid waste that must be disposed of in a landfill.

Construction and Demolition and Inert Debris Facilities

C&D materials include lumber, drywall, metals, masonry (e.g., brick, concrete), carpet, plastic, pipe, rocks, dirt, paper, cardboard, or green waste related to land development. Metals are the most commonly recycled material, while lumber makes up the majority of debris that still goes to a landfill. There are 20 C&D recyclers and inert fill–disposal operations in the Bay Area (CalRecycle 2020).

Energy Systems

Electric, liquid fuel, and natural gas energy sources make up most of the Bay Area energy systems, which are becoming increasingly diversified as newer, more renewable energy sources are developed and expanded. The Plan area includes key energy infrastructure within the region that is exported to other portions of the state and neighboring states. The Bay Area is also a consumer of energy resources that are produced elsewhere and imported into the Bay Area. A range of public and private providers operate the energy systems in the Plan area and maintain the regional infrastructure systems.

Energy System Providers

Pacific Gas and Electric Company (PG&E) is the major operator of electricity infrastructure in the nine-county San Francisco Bay Area. The company interfaces with a handful of municipal energy systems that have a mix of distribution and in some cases transmission and energy generation infrastructure, including SFPUC, City of Palo Alto Utilities, and Alameda Municipal Power. In addition to these municipal systems, local institutions are increasingly investing in on-site power generation or campus energy systems. Universities in the region have unique power operations as do a greater suite of buildings in the region that use microgrid technology that works independently of the main grid or in partial isolation during main system outages.

PG&E is one of the largest combination natural gas and electric utilities in the United States. The company, a subsidiary of PG&E Corporation, serves approximately 16 million people in 70,000 square miles of northern and central California. PG&E provides electric service to all nine counties in the Plan area with natural gas coverage to most areas in the region except in a few more remote locations where no natural gas service is available.

PG&E obtains its electricity from natural gas, fossil fuels, nuclear power, hydroelectric power, and eligible renewable resources. In 2018, 85 percent of the electricity PG&E delivered to its customers came from sources that do not generate greenhouse gases (GHGs). The mix of sources generating

electricity was 39 percent renewable resources (biomass, geothermal, small hydroelectric, solar, and wind), 34 percent nuclear power, 13 percent large hydroelectric power, and 15 percent natural gas and other fuels (PG&E 2019).

PG&E provides a number of incentives for rooftop solar, solar water heating, fuel cells, wind, battery storage, advanced LED lighting, and other advanced technologies that help customers reduce their energy bills and their carbon footprint. PG&E also continues to encourage customers to invest in cost-effective energy efficiency measures and offers electric vehicle–charging pricing plans (PG&E 2021a).

Community Choice Aggregations (CCAs) are not-for-profit public agencies that purchase contracts for electric generation with a lower GHG content. PG&E delivers electricity provided through CCAs, maintaining the power lines, and responding to service calls and emergencies. In the Plan area, there are seven CCAs: CleanPowerSF, East Bay Community Energy, Marin Clean Energy (which operates in Marin, Napa, Solano, and Contra Costa Counties), Peninsula Clean Energy, San Jose Clean Energy, Silicon Valley Clean Energy, and Sonoma Clean Power.

Chevron, Phillips 66, Valero, Shell, and Tesoro are the major companies that run fuel operations out of Bay Area refineries. In addition, Kinder Morgan pumps fuel in major transmission lines from its pumping facility in Concord across the region and out of the region to other portions of northern California and Reno, Nevada. From those locations, smaller companies across the region truck the fuel to gas stations and fueling stations across the region.

Energy System Infrastructure

Electric power delivery is largely composed of a four-phase process: generation, transmission, substation transformation (high voltage to lower voltage), and distribution. In 2011, the Bay Area consumed 55,000 gigawatt-hours of electricity, 60 percent of which was generated inside the nine-county region (CEC 2013a, 2013b). The remaining demand was met by power imports generated elsewhere in the state, the Pacific Northwest, and the Southwest. Ninety-eight percent of the regionally produced power is generated at 25 large facilities with the remaining 2 percent generated at 44 small facilities with less than 50-megawatt capacity (ABAG 2014).

Most of the Bay Area power is transmitted on 500-, 230-, 115-, and 60-kilovolt aboveground transmission lines by PG&E. A handful of local jurisdictions operate their distribution system, but most are reliant in some way on PG&E for power supply. The high-voltage transmission lines distribute electricity from regional and outside generation facilities to substations. Some substations are simply nodes along a stretch of transmission lines, while others drop the high-voltage transmission lines to lower-voltage distribution lines. From the substations, distribution lines route power at a lower voltage to the end user.

Bay Area liquid fuel infrastructure can be described in four primary stages: crude oil import, refinement, fuel transmission export, and fuel distribution. Crude oil is imported by pipeline from the east, rail from the north, and marine tankers from the west. Thirty-five percent of crude oil is extracted in California, mainly in Kern County, with the remainder coming from Alaska and foreign sources (CEC 2021a).

The San Francisco Bay Area has five refineries that, combined, processed 235 million barrels of crude oil in 2012, a 40-percent share of the state's total. As a state, California uses only 87 percent of its total 682-million-barrel capacity. The five Bay Area refineries are located along the San Pablo Bay and the Carquinez Strait. Once refined, the variety of fuel products is pumped and piped across the state to terminal facilities that serve all northern California and northern Nevada. In addition to refining all the fuel it uses, California refines 90 percent of Nevada's fuel and 50 percent of Arizona's fuel. The refineries in the Bay Area supply 100 percent of the Plan area's fuel, northern California's fuel, northern Nevada's

fuel, and a portion of central California counties' fuel (which is also supplied by Kern County refineries). Once refined, fuel is delivered to terminal facilities, where fuel tanker trucks distribute fuel locally using the road network.

Natural gas is primarily used for electric power generation and as a residential, commercial, and industrial energy resource. Natural gas–generated electricity accounted for nearly 50 percent of all power generated in California in 2016, the largest source of power in the state. Almost 90 percent of natural gas in California is generated out of state and is imported through interstate pipelines from the southwest, the Rocky Mountains, and Canada (CEC 2021b).

PG&E runs natural gas transmission pipelines throughout the Plan area. Local distribution lines exist under most urban and suburban local roads in the region with large transmission lines running along the Interstate 280 and U.S. 101 corridors from San Francisco to Palo Alto, along State Route 237 in northern Santa Clara County, along the Interstate 880 and 80 corridor from Santa Clara County to western Contra Costa County, along the Interstate 680 and State Route 84 corridor from western Alameda to eastern Alameda County and portions of the Interstate 580 corridor in eastern Alameda County, and along State Route 4 in eastern Contra Costa County. In the North Bay, transmission lines run along the U.S. 101 corridor from Mill Valley in Marin County through Cloverdale in Sonoma County, as well as along State Route 128 in Sonoma and Napa Counties and across State Route 12 in Sonoma, Napa, and Solano Counties (PG&E 2021b).

Telecommunication Services

Telecommunications are mainly a privately owned enterprise and are offered by a variety of companies with different service capacities across the Plan area. The number of providers offering the service, the type of service available, and the transmission speed of the service all affect the quality of telecommunications. This approach differs from that of most other utilities, which are generally publicly owned or offered by limited or individual service providers in a given area.

Telecommunication Providers

Many telecommunications providers offer phone, Internet, and/or television service in the Plan area for the proposed Plan, as shown in **Table 3.14-7**. Telecommunications providers will usually complete infrastructure and other service improvements for an area as the need arises to meet customer demand.

Table 3.14-7: Consumer Telecommunications Service Providers in the Plan Area

Consumer Telecommunications Service Provider	Type of Broadband	RTP/SCS Plan Area Service Reach by County (not complete coverage)[1]
AFES Network Services LLC	Terrestrial Fixed Wireless	Solano
AT&T Mobility	GSM, LTE	All
AT&T Service Inc.	Terrestrial Fixed Wireless	Contra Costa, San Mateo
	ADSL2/ADSL2+, Asymmetric xDSL	All
AVISP	Terrestrial Fixed Wireless	Sonoma
CalDSL	Terrestrial Fixed Wireless	Contra Costa
CalNeva Broadband	Cable Modem DOCSIS 3.0	Sonoma
Comcast	Cable Modem DOCSIS 3.0	San Mateo
	Cable Modem DOCSIS 3.1	All
Common Networks	Terrestrial Fixed Wireless	Alameda
Cruzio	Terrestrial Fixed Wireless	Santa Clara

Consumer Telecommunications Service Provider	Type of Broadband	RTP/SCS Plan Area Service Reach by County (not complete coverage)[1]
DigitalPath, Inc.	Terrestrial Fixed Wireless	Napa, Solano, Sonoma
Dillon Beach Internet Services	Terrestrial Fixed Wireless	Marin
Etheric Networks Inc.	Terrestrial Fixed Wireless	Alameda, Contra Costa, San Francisco, San Mateo, Santa Clara
Frontier Communications	ADSL2/ADSL2+, Asymmetric xDSL	Marin, Santa Clara, Solano, Sonoma
	VDSL	Santa Clara, Solano
Further Reach	Terrestrial Fixed Wireless	Solano
Google Fiber LLC	Optical Carrier/Fiber to the end user	Santa Clara
Hankins Information Technology	Terrestrial Fixed Wireless	Santa Clara
Horizon Cable TV	Cable Modem DOCSIS 3.0	Marin
Internet Free Planet	Terrestrial Fixed Wireless	Solano
Inyo Networks	Optical Carrier/Fiber to the end user	Marin
Napanet Internet Services	Terrestrial Fixed Wireless	Napa
Oasis Broadband	Terrestrial Fixed Wireless	Contra Costa, Santa Clara
Paxio	Optical Carrier/Fiber to the end user	Santa Clara
Race Communications	Optical Carrier/Fiber to the end user	San Francisco, San Mateo, Sonoma
Raw Bandwidth Communications	ADSL2/ADSL2+	Alameda, San Francisco, San Mateo, Santa Clara
	VDSL	San Francisco, San Mateo
Razzo Link, Inc.	Terrestrial Fixed Wireless	Santa Clara
San Bruno CityNet Services	Cable Modem DOCSIS 3.0, Optical Carrier/Fiber to the end user	San Mateo
Sonic.net	ADSL2/ADSL2+	All
	Optical Carrier/Fiber to the end user	Alameda, Contra Costa, San Francisco, San Mateo, Sonoma
	VDSL	All
SouthValleyInternet	ADSL2/ADSL2+, Asymmetric xDSL, Symmetric xDSL, Terrestrial Fixed Wireless	Santa Clara
Sprint Communications Inc.	CDMA, LTE	All
Surfnet Communications	Terrestrial Fixed Wireless	Santa Clara
T-Mobile	GSM, LTE	All
Tekify Fiber and Wireless	Optical Carrier/Fiber to the end user, Terrestrial Fixed Wireless	Alameda
Valley Internet	Terrestrial Fixed Wireless	Napa, Solano
Verizon Wireless	CDMA, LTE	All
Vista Broadband Networks, Inc.	Terrestrial Fixed Wireless	Marin, Napa, Solano, Sonoma
Wave Broadband	Cable Modem DOCSIS 1/1.0/2.0	Contra Costa, San Francisco, San Mateo
	Cable Modem DOCSIS 3.0, Cable Modem DOCSIS 3.1, Optical Carrier/Fiber to the end user	Contra Costa, San Francisco, San Mateo, Solano
Webpass, Inc.	Terrestrial Fixed Wireless	Alameda, San Francisco
WebPerception LLC	Terrestrial Fixed Wireless	All
Winters Broadband LLC	Terrestrial Fixed Wireless	Solano

[1] Service reach determined from 2018 map data and may vary from what is currently available.
Source: CPUC 2018

There are 39 telecommunications providers offering services across the Plan area. Some providers offer service across all nine counties, while others have focused service within a single jurisdiction. **Table 3.14-7** lists the consumer telecommunication service providers in the Plan Area (CPUC 2018).

Telecommunication Infrastructure

Telecommunication infrastructure includes phone, wireless, cable, and Internet platforms, each with infrastructure components that are stand alone or shared. Phone service providers use a combination of underground lines and aboveground cellular towers to provide telephone service to the Plan area. Cellular towers are located in range of areas and are often designed to blend into the surroundings.

Wireless technology is largely encompassed by 5G. "5G" is an umbrella term for a set of international wireless standards. Capabilities and advantages of a 5G wireless technology include enhanced mobile broadband; speeds faster than those available through 4G; less expensive connectivity; and reliable, resilient, and instantaneous connectivity that allows connection of a variety of devices (CPUC 2019).

Internet service may be provided through mobile (i.e., cellular phone), wireless (Wi-Fi), hotspots (i.e., wireless local area network), phone line (i.e., integrated services digital network), or broadband (i.e., DSL, cable) connections. Cable television is primarily provided by hardwired infrastructure and is also available via satellite connections. Cable fibers and copper wires are generally co-located and installed concurrently with other utility infrastructure. This infrastructure is usually installed underground within new development to reduce visual and aesthetic impacts and any potential safety hazards. Fiber cables, the fastest form of communications infrastructure, are also co-located and installed underground. However, fiber optic networks generally serve larger urban areas where demand offsets the high cost of installing the fiber optics. Additionally, television and Internet services can be provided through satellite connections and Wi-Fi networks that allow electronic devices to communicate using radio waves rather than a wire.

Broadband refers to a high-speed connection to the Internet that is always on, as opposed to other connections (e.g., dial-up) that need to be turned on with every use. The region is served by mobile broadband. Fixed wireless broadband service is available at varying speeds throughout the Plan area. Wireline broadband is the least available service because it is generally offered only near more developed areas.

3.14.2 Regulatory Setting

FEDERAL REGULATIONS

Federal Power Act of 1935

The Federal Power Act of 1935 (16 U.S. Code Section 791 et seq.) created the Federal Power Commission, an independent regulatory agency with authority over both the interstate transmission of electricity and the sale of hydroelectric power at the wholesale level. The act requires the commission to ensure that electricity rates are "reasonable, nondiscriminatory, and just to the consumer." The Federal Power Act also amended the criteria that the commission must apply in deciding whether to license the construction and operation of new hydroelectric facilities. The Federal Power Commission was dissolved and is now known as the Federal Energy Regulatory Commission (FERC). FERC acts under the legal authority of the Federal Power Act, the Public Utility Regulatory Policies, and the Energy Policy Act (EPAct) (42 U.S. Code Section 13201 note), as well as other federal acts.

Natural Gas Act of 1938

Together with the Federal Power Act, described above, the Natural Gas Act (15 U.S. Code Section 717 et seq.) helped to establish federal energy regulation. The Natural Gas Act became the first legislation to regulate the natural gas industry, enabling federal regulators to set prices for gas sold in interstate commerce in exchange for exclusive rights to transport the gas.

U.S. Department of Transportation – Act of Congress 1966

The U.S. Department of Transportation (DOT) was established by an act of Congress in 1966 as a federal department of the U.S. government concerned with transportation. Propane transportation is regulated by DOT. With authority stated in Title 49 of the Code of Federal Regulations, DOT requires that all shipping papers contain a 24-hour-a-day telephone number where emergency assistance and information can be obtained. This service must provide information about any cargo that DOT classifies as a hazardous material. There are several sources in the United States that an emergency response crew leader can contact in the case of a transportation accident.

Safe Drinking Water Act

Passed in 1974 and amended in 1986 and 1996, the Safe Drinking Water Act gives EPA the authority to set drinking water standards. Drinking water standards apply to public water systems that provide water for human consumption through at least 15 service connections or regularly serve at least 25 individuals. There are two categories of drinking water standards: the National Primary Drinking Water Regulations (NPDWRs) and the National Secondary Drinking Water Regulations. The NPDWRs are legally enforceable standards that apply to public water systems. NPDWR standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in water. The act protects against both naturally occurring and human-made contaminants in drinking water and requires that information on the quality of drinking water be made available to the public.

Clean Water Act

Section 402 of the Clean Water Act (CWA) establishes the NPDES permit program to regulate the discharge of pollutants from point sources. The CWA defines point sources of water pollutants as “any discernible, confined, and discrete conveyance” that discharges or may discharge pollutants. The 1972 amendments to the CWA prohibit the discharge of pollutants to navigable waters from a point source unless the discharge is authorized by an NPDES permit. The CWA requires NPDES permits for stormwater discharges caused by general construction activity, industrial activity, and municipal drainage collection. The purpose of the NPDES program is to establish a comprehensive stormwater quality program to manage urban stormwater, reducing pollution of the environment as much as possible. The NPDES program involves characterizing the quality of receiving water, identifying harmful constituents, targeting potential sources of pollutants, and implementing a comprehensive stormwater management program. In California, NPDES permits are issued by RWQCBs.

Provision C.3

On May 17, 1996, EPA published an Interpretive Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems, which provided guidance on permit application requirements for regulated MS4s. MS4 permits include requirements for postconstruction control of stormwater runoff in what is known as Provision C.3. The goal of Provision C.3 is for the permittees to use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows from new

development and redevelopment projects. This goal is to be accomplished primarily through the implementation of low-impact development (LID) techniques.

Resource Conservation and Recovery Act of 1976

The Resource Conservation and Recovery Act of 1976, Subtitle D (Subtitle D) focuses on State and local governments as the primary planning, regulating, and implementing entities for the management of nonhazardous solid waste, such as household garbage and nonhazardous industrial solid waste. To promote the use of safer units for solid waste disposal, Subtitle D provides regulations for the generation, transportation, and treatment, storage, or disposal of hazardous wastes. EPA developed federal criteria for the proper design and operation of municipal solid waste landfills and other solid waste disposal facilities, but State and local governments are the primary planning, permitting, regulating, implementing, and enforcement agencies for management and disposal subject to approval by EPA. EPA approved the State of California's program, a joint effort of the California Integrated Waste Management Board (now CalRecycle), SWRCB, RWQCBs, and LEAs, on October 7, 1993.

Federal Energy Regulatory Commission of 1977

FERC was created by the Department to Energy Organization Act of 1977 and established within the U.S. Department of Energy. It replaced the Federal Power Commission, which was created by the Federal Power Act of 1935. FERC regulates the transmission and sale of electricity in interstate commerce, oversees licensing of hydroelectric projects, and provides oversight of related environmental matters.

Natural Gas Policy Act of 1978

The Natural Gas Policy Act (15 U.S. Code Section 3301 et seq.) granted FERC authority over intrastate and interstate natural gas production. It established price ceilings for wellhead first sales of gas that vary with the applicable gas category and gradually increase over time.

Public Utility Regulatory Policies Act of 1978

The Public Utility Regulatory Policies Act (PURPA) (Public Law 95-617), which was passed in response to the energy crisis of the late 1970s, sought to promote the conservation of electric energy. PURPA also created small power producers as a new class of nonutility generators from which utilities are required to buy more power.

The PURPA was also intended to augment electric utility generation with more efficiently produced electricity and to provide equitable rates to electric consumers. Utility companies are required to buy all electricity from "Qfs" (qualifying facilities) at avoided cost (avoided costs are incremental savings associated with not having to produce additional units of electricity). The PURPA expanded participation of nonutility generators in the electricity market and demonstrated that electricity from nonutility generators could successfully be integrated with a utility's own supply. The PURPA requires utilities to purchase whatever power is produced by Qfs (typically cogeneration or renewable energy).

Energy Policy Act of 1992

The EPAct of 1992 was passed to reduce the country's dependence on foreign petroleum and improve air quality. It addressed energy efficiency, energy conservation and management, natural gas imports and exports, alternative fuels, electric motor vehicles, radioactive waste, goal power and clean coal, renewable energy, and other issues. It reformed the Public Utility Holding Company Act (Wheeler-Rayburn Act) of 1935 (15 U.S. Code Section 79 et seq.) and amended parts of the Federal Power Act of 1935. For more information, see Section 3.6, "Climate Change, Greenhouse Gases, and Energy."

Energy Policy Act of 2005

The EPAct of 2005 was signed on August 8, 2005, by President George W. Bush. The comprehensive energy legislation provided several electricity-related provisions:

- Ensure that consumers receive electricity through dependable, modern infrastructure.
- Remove outdated obstacles to investment in electricity transmission lines.
- Make electricity reliability standards mandatory.
- Give federal officials the authority to site new power lines in U.S. Department of Energy–designated national corridors in limited circumstances.

The EPAct also created the Renewable Fuel Standard (RFS) program to reduce GHG emissions and expand the renewable fuels sector. The program regulations were developed in collaboration with stakeholders from many energy sectors, including refiners, renewable fuel producers, and others. As required under the EPAct, the original RFS program (RFS1) required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012.

Clean Air Act

Section 211(o) of the Clean Air Act, as amended by the Energy Policy Act of 2005, requires the EPA administrator to annually determine an RFS applicable to refiners, importers, and certain blenders of gasoline and to publish the standards in the *Federal Register* each year by November 30. On the basis of this standard, each obligated party must determine the appropriate proportion of renewable fuel as motor vehicle fuel. The standard is calculated as a percentage, dividing the amount of renewable fuel required by the Clean Air Act into the expected gasoline usage during that year, including certain adjustments. The most recent RFS established a 11.56% annual percentage standard for total renewable fuel in 2020 (Congressional Research Service 2020).

Telecommunication Act of 1996

The Telecommunications Act (47 U.S. Code) was the first major overhaul of U.S. telecommunications law in nearly 62 years, amending the Communication Act of 1934 (47 U.S. Code Section 151 et seq.). The act deregulates local phone service, allows long-distance carriers and cable television companies to provide local phone service, and allows local telephone companies to provide long-distance service.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act (EISA) (Public Law 110-140) was signed into law by President George W. Bush on December 19, 2007. The EISA's goal is to achieve energy security in the United States by increasing the production and use of renewable fuels, reducing dependence on oil, improving energy efficiency and performance, protecting consumers, and promoting research on GHG capture and storage. The EISA updated the RFS program (RFS2) in several key ways:

- expanded the RFS program to include diesel in addition to gasoline,
- increased the volume of renewable fuel required to be blended into transportation fuel from 9 billion gallons in 2008 to 36 billion gallons in 2022,
- established new categories of renewable fuel with accompanying volume requirements, and
- required EPA to apply lifecycle GHG performance threshold standards to ensure that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces.

RFS2 laid the foundation for achieving significant GHG reductions from the use of renewable fuels, reducing imported petroleum, and encouraging the development and expansion of the national renewable fuels sector. The EISA also included a variety of new standards for lighting and appliance equipment, such as residential refrigerators and metal halide lamps, and commercial coolers and freezers.

STATE REGULATIONS

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Water Quality Control Act established SWRCB and divided the State into nine regions, each overseen by a separate RWQCB. Each RWQCB region is required to prepare and update a basin plan for its jurisdictional area. The RWQCBs also issue waste discharge requirements (WDRs) for discharges of privately or publicly treated domestic wastewater to locations other than surface water, such as groundwater basins. The Plan area is largely within the San Francisco Bay RWQCB, with portions in the North Coastal, Central Coastal, and Central Valley RWQCBs.

New or expanded landfills must submit Reports of Waste Discharge to RWQCBs prior to landfill operations. In conjunction with CalRecycle approval of solid waste facility permits, RWQCBs issue Waste Discharge Orders, which regulate the liner, leachate control and removal, and groundwater monitoring systems at Class III landfills. While Waste Discharge Orders apply only to landfills, RWQCBs also regulate surface water runoff for all solid waste facilities by issuing stormwater discharge permits under the NPDES program. Separate NPDES permits are issued for the construction and operation of these facilities.

Construction General Permit

The California Construction Stormwater Permit (Construction General Permit), adopted by SWRCB, regulates construction activities that include clearing, grading, and excavation resulting in soil disturbance of at least 1 acre of total land area. The Construction General Permit authorizes the discharge of stormwater to surface waters from construction activities. It prohibits the discharge of materials other than stormwater and authorized non-stormwater discharges and all discharges that contain a hazardous substance in excess of reportable quantities, unless a separate NPDES permit has been issued to regulate those discharges. The Construction General Permit requires that all developers of land where construction activities will occur over more than 1 acre:

- complete a risk assessment to determine pollution prevention requirements pursuant to the three risk levels established in the permit,
- eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the United States,
- develop and implement a SWPPP that specifies BMPs that will reduce pollution in stormwater discharges to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology standards, and
- perform inspections and maintenance of all BMPs.

To obtain coverage under the NPDES Construction General Permit, the legally responsible person must electronically file all permit registration documents with SWRCB before the start of construction. Permit registration documents must include the following elements:

- notice of intent,
- risk assessment,

- site map,
- SWPPP,
- annual fee, and
- signed certification statement.

Typical BMPs contained in SWPPPs are designed to minimize erosion during construction, stabilize construction areas, control sediment, control pollutants from construction materials, and address postconstruction runoff quantity (volume) and quality (treatment). The SWPPP must also include a discussion of the program to inspect and maintain all BMPs.

California Department of Transportation NPDES Permit

The California Department of Transportation (Caltrans) was originally issued a Statewide NPDES permit (Order 99-06-DWQ) in 1999 that requires Caltrans to regulate nonpoint source discharge from its properties, facilities, and activities. The Caltrans permit requires development of a program for communication with local agencies and coordination with other MS4 programs where those programs overlap geographically with Caltrans facilities. As part of the permit, Caltrans is required to create and annually update a stormwater management plan (SWMP) that is used to outline the regulation of pollutant discharge caused by current and future construction and maintenance activities. SWMP requirements apply to discharges from Caltrans stormwater conveyances, including catch basins and drain inlets, curbs, gutters, ditches, channels, and storm drains. The SWMP applies to discharges consisting of stormwater and non-stormwater resulting from:

- maintenance and operation of State-owned highways, freeways, and roads;
- maintenance facilities;
- other facilities with activities that have the potential for discharging pollutants;
- permanent discharges from subsurface dewatering;
- temporary dewatering; and
- construction activities.

The discharges addressed by the SWMP flow through municipal stormwater conveyance systems or flow directly to surface water bodies in the State. These surface water bodies include creeks, rivers, reservoirs, lakes, wetlands, lagoons, estuaries, bays, and the Pacific Ocean and tributaries.

This SWMP applies to the oversight of activities performed by outside agencies or non-Caltrans entities (third parties) within Caltrans' MS4 to ensure compliance with stormwater regulations. Non-Caltrans activities include highway construction and road improvement projects, as well as residential use and business operations on leased property.

The SWMP must be approved by SWRCB, and as specified in the permit, it is an enforceable document. Compliance with the permit is measured by implementation of the SWMP. Caltrans' policies, manuals, and other guidance related to stormwater are intended to facilitate implementation of the SWMP. Caltrans also requires all contractors to prepare and implement a program to control water pollution effectively during the construction of all projects. In lieu of the more recently adopted Construction General Permit, as described above, Caltrans continues to modify its current policies and procedures to be consistent with the new permit.

California Code of Regulations, Title 22

Under Title 22, the California Department of Public Health establishes State-wide effluent bacteriological and treatment reliability standards for recycled water uses. The standards are based on the potential for human contact with recycled water. The RWQCB has established and enforces

requirements for the application and use of recycled water. Permits are required from an RWQCB for any recycling operation. Applicants for a permit are required to demonstrate that the proposed recycled water operation is in compliance with Title 22 and will not exceed the groundwater or surface water quality objectives in the regional basin management plan.

Water Conservation Act of 2009

The Water Conservation Act of 2009, enacted as Senate Bill (SB) X7-7, set water conservation targets and efficiency improvements for urban and agricultural water suppliers in Section 10608.16 and Section 10608.48, respectively, of the Water Code. The legislation establishes a State-wide target to reduce urban per capita water use by 20 percent by 2020. The State was required to make incremental progress toward this goal by reducing per capita water use by at least 10 percent on or before December 31, 2015. Urban water suppliers cannot impose conservation requirements on process water (water used in the production of a product) and are required to employ two critical efficient water management practices: water measurement and pricing. Urban retail water suppliers must include in a water management plan the baseline daily per capita water use, water use target, interim water use target, and compliance daily per capita water use. Notably, new water use efficiency targets that go beyond those established under this act will be developed as part of a long-term conservation framework for urban water agencies per Executive Order B-37-16, described below.

In 2018, new landmark water conservation legislation was signed into law. Together, Assembly Bill (AB) 1668 and SB 606 lay out a new long-term water conservation framework for California. Programs an initiatives are organized around four primary goals: use water more wisely, eliminate water waste, strengthen local drought resilience, and improve agricultural water use efficiency and drought planning.

Executive Order B-37-16

In May 2016, Governor Brown issued Executive Order B-37-16, which bolsters the State's climate and drought resilience. Built on the temporary Statewide emergency water restriction, Executive Order B-37-17 directs five State agencies to establish a long-term water conservation framework that will enhance the resiliency of California communities against climate change and drought. The Executive Order is intended to eliminate water waste, use water more wisely, strengthen local drought resilience, and improve agricultural water use efficiency and drought planning.

California Urban Water Management Planning Act

Section 10610 of the State Water Code, known as the California Urban Water Management Planning Act, states that each urban water supplier that provides water to 3,000 or more customers, or that provides over 3,000 acre-feet of water annually, must prepare a UWMP and update it every five years to ensure that the reliability of its water service is sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years. The act describes the contents of UWMPs and requires each agency's UWMP to assess the reliability of the agency's water resources over a 20-year planning horizon.

Water Supply Assessment and Water Supply Verification

California SB 610 and SB 221 ensure that sufficient water supplies are available for growing communities by increasing the reporting in a water supply assessment (WSA) for new development projects. The WSA must document sources of water supply, quantify water demands, and compare future water supply and demand to show that sufficient water will be available to serve the development project. Water supply must be assessed for normal, single dry, and multiple dry water years during a 20-year forecast. If supplies are found to be insufficient to serve the project, the WSA must include plans for acquiring sufficient supplies. The WSA must be included in the CEQA document for the project. SB 221 applies to subdivisions of more than 500 dwelling units (Water Code

Section 10912). Like SB 610, it is intended to ensure an adequate water supply for new development. SB 221 requires that approval of a tentative map showing the design and improvement of a proposed subdivision include a requirement that a sufficient water supply is available.

In September 2016, the governor signed SB 1262 to amend SB 610 and SB 221 in order to address the relationship between California's water supply planning laws and groundwater management requirements under the Sustainable Groundwater Management Act (SGMA). SB 1262 requires that during environment review, a project reliant on groundwater as a water source must provide additional information in its WSA and negates the identification of hauled water as a water source in a WSA.

California Groundwater Management Act

The Groundwater Management Act (AB 3030, Water Code Section 10750 et seq.) provides guidance for applicable local agencies to develop voluntary groundwater management plans in State-designated groundwater basins. Groundwater management plans can allow agencies to raise revenue to pay for measures influencing the management of the basin, including extraction, recharge, conveyance, facilities' maintenance, and water quality.

Sustainable Groundwater Management Act of 2014

The SGMA (Water Code Sections 10720–10737.8) provides local agencies with the tools to manage groundwater basins in a sustainable manner over a long-term horizon and allows for limited State intervention when necessary to protect groundwater resources. It requires the formation of local groundwater sustainability agencies that must assess conditions in their local water aquifer basins and adopt locally based management plans by 2022 that address sustainable groundwater levels. SGMA requires governments and water agencies of high- and medium-priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. The SGMA provides 20 years for groundwater sustainability agencies to implement plans and achieve long-term groundwater sustainability.

State Water Resources Control Board and Regional Water Quality Control Boards

SWRCB issues individual and general NPDES permits for wastewater and stormwater through the authorization of EPA. Discharges that may affect surface water or groundwater, and that are not regulated by an NPDES permit, are issued a WDR that serves as a permit under the authority of the California Water Code. The RWQCBs issue land disposal WDRs that permit certain solid and liquid waste discharges to land to ensure that wastes do not reach surface water or groundwater. Land disposal WDRs contain requirements for liners, covers, monitoring, cleanup, and closure. The RWQCBs also permit certain point source discharges of waste to land that have the potential to affect surface water or groundwater quality. This category of discharges, known as "Non-15" discharges, are the most diverse and include sewage sludge and biosolids, industrial wastewater from power plants, wastes from water supply treatment plants, treated wastewater for aquifer storage and recovery, treated groundwater from cleanup sites, and many others.

SWRCB has issued the following regulations, which are related to wastewater collection and treatment facilities, stormwater drainage facilities, and landfills:

- Caltrans NPDES Permit (Order 99-06-DWQ) requires Caltrans to regulate nonpoint source discharge from its properties, facilities, and activities. Among other requirements, Caltrans must annually update an enforceable SWMP.
- Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (Order No. 2006-0003-DWQ) require all federal and State agencies, municipalities, counties, districts, and other

public entities that own, operate, or are otherwise responsible for sanitary sewer systems greater than 1 mile in length that collect and/or convey untreated wastewater to a publicly owned treatment facility in California to prepare sewer system management plans and report all sanitary sewer overflows to SWRCB. Order No. WQ 2008-0002-EXEC, amended the Statewide Monitoring and Reporting Program for sanitary sewer overflows that reach surface waters or storm drains. The RWQCB issued Order No. R9-2007-0005 to reaffirm the prohibition of sanitary sewer overflows upstream of a wastewater treatment facility.

AB 885 - On-Site Wastewater Treatment Systems

AB 885 (Chapter 781, Statutes of 2000) required SWRCB to draft and implement regulations for siting, installation, operation, and maintenance of on-site wastewater treatment systems. Proposed regulations were issued in 2009 and adopted in June 2012.

Integrated Waste Management Regulations (AB 939, AB 341, and SB 1016)

To minimize the amount of solid waste that must be disposed of, the State Legislature passed the California Integrated Waste Management Act of 1989 (IWMA), effective January 1990. Under AB 939, all cities and counties were required to divert at least 50 percent of solid waste from landfill facilities by 2000 and every year thereafter. This act also requires every city and county to report to CalRecycle annually and requires jurisdictions to begin planning for new landfills when the jurisdiction's primary disposal site reaches its 15-year capacity.

The IWMA establishes a hierarchy of preferred waste management practices: (1) source reduction (waste prevention) to reduce the amount of waste generated at its source, (2) recycling (or reuse) and composting, (3) transformation, and (4) disposal by landfilling. The IWMA requires the preparation of a countywide integrated waste management plan, including a countywide siting element that must demonstrate a remaining landfill disposal capacity of at least 15 years to serve all the jurisdictions in the county. The countywide siting element must include a combination of strategies to demonstrate adequate capacity, including existing, proposed, and tentative landfills or expansions; increased diversion efforts; and the export of solid waste for disposal. As part of the countywide integrated waste management plan, the IWMA also requires that each jurisdiction (cities and the county) prepare a source reduction and recycling element, a household hazardous waste element, and a non-disposal facility element.

SB 1016, passed in 2008, builds on AB 939 compliance requirements by implementing a streamlined measure of jurisdictions' performance. SB 1016 accomplishes this by focusing on a disposal-based indicator rather than diversion rates. The per capita disposal rate uses two factors: a jurisdiction's residents/employees and its disposal amount as reported by disposal facilities. Thus, rather than mandating a 50-percent or more diversion of solid waste, SB 1016 requires a 50-percent or less disposal rate of solid waste per capita. In 2012, the California Legislature sought to further reduce solid waste disposal rates through AB 341, which set a goal of 75 percent recycling, composting, or source reduction of solid waste Statewide by 2020 (CalRecycle 2020).

Short-Lived Climate Pollutants Organic Waste Methane Emissions Reductions (SB 1383)

SB 1383 (2016) established methane emissions reduction targets in a statewide effort to reduce emissions of short-lived climate pollutants in various sectors of California's economy. The new law codifies the California Air Resources Board's Short-Lived Climate Pollutant Reduction Strategy and established targets to achieve a 50-percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75-percent reduction by 2025. The law granted CalRecycle the regulatory authority required to achieve the organic waste disposal reduction targets and established

an additional target that not less than 20 percent of currently disposed edible food is recovered for human consumption by 2025.

AB 1826

AB 1826 (Chapter 727, Statutes of 2014 [Chesbro]) requires businesses that generate a specific amount of organic waste per week to arrange for recycling services for that waste and requires jurisdictions to implement a recycling program to divert organic waste from businesses subject to the law, as well as report to CalRecycle on their progress in implementing an organic waste recycling program. CalRecycle has phased the requirements, starting first in 2016, requiring businesses with more than 8 cubic yards of organic waste per week, and expanding to businesses with 4 or more cubic yards in 2017. In 2020, CalRecycle initiated the final expansion to include all businesses with more than 2 cubic yards of organic waste, providing an exemption of rural areas through December 31, 2026.

California Renewables Portfolio Standard Program

The California Renewables Portfolio Standard (RPS) was established by SB 1078 in 2002 and has been revised multiple times, most recently by SB 100 (Chapter 312, Statutes of 2018). SB 100 established new goals for the RPS program of achieving a 50-percent renewable resources target by 2026 and a 60-percent target by 2030. It requires that retail sellers and local publicly owned electric utilities procure a minimum quantity of electricity products from eligible renewable energy sources so that the total kilowatt-hours of those products sold achieves 44 percent of retail sales by 2024, 52 percent by 2027, and 60 percent by 2030. It also requires that eligible renewable energy resources and zero-carbon resources supply 100 percent of retail sales of electricity to California end-use customers and 100 percent of electricity produced to serve all State agencies by 2045.

California Building Energy Efficiency Standards (Title 24, Part 6)

The energy consumption of new residential and nonresidential buildings in California is regulated by California Code of Regulations Title 24, Part 6, Building Energy Efficiency Standards (California Energy Code). Known by the shorthand name of "Title 24," this policy was established in 1978 in response to a legislative mandate to reduce California's energy consumption. The California Energy Commission (CEC) updates the California Energy Code every 3 years with more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions. The current California Energy Code will require builders to use more energy-efficient building technologies for compliance with increased restrictions on allowable energy use. CEC estimates that the combination of required energy-efficiency features and mandatory solar panels in the 2019 California Energy Code will result in new residential buildings that use 53 percent less energy than those designed to meet the 2016 California Energy Code. CEC also estimates that the 2019 California Energy Code will result in new commercial buildings that use 30 percent less energy than those designed to meet the 2016 standards, primarily through the transition to high-efficacy lighting (CEC 2018).

Title 14, California Code of Regulations

California Code of Regulations, Title 14, Chapter 3 establishes minimum standards for solid waste handling and disposal. CalRecycle regulations pertaining to nonhazardous waste management in California include minimum standards for solid waste handling and disposal; regulatory requirements for composting operations; standards for handling and disposal of asbestos-containing waste; resource conservation programs; enforcement of solid waste standards and administration of solid waste facility permits; permitting of waste tire facilities and waste tire hauler registration; special waste standards; used oil recycling program; electronic waste recovery and recycling; planning guidelines and procedures for preparing, revising, and amending CIWMP; and solid waste cleanup program.

Title 27, California Code of Regulations

CalRecycle and SWRCB jointly issue regulations pertaining to waste disposal on land, including criteria for all waste management units, facilities, and disposal sites; documentation and reporting; enforcement; financial assurance; and special treatment, storage, and disposal units. Title 27 regulations require a significant proportion of the waste stream must be diverted from landfill disposal. Objectives of waste diversion programs address individual diversion techniques, including source reduction, curbside recycling, green waste collection, and load-checking to prevent illegal disposal at dump sites.

California Department of Water Resources

DWR is responsible for the planning, construction, and operation of SWP facilities. It also sets conditions on use of SWP facilities. In addition, DWR is responsible for Statewide water planning, evaluating UWMPs, overseeing dam safety and flood control, and transferring certain water rights permits (e.g., pre-1914).

California Model Water Efficient Landscape Ordinance

The California Model Water Efficient Landscape Ordinance (MWELO) sets restrictions on outdoor landscaping. The Bay Area contains several local agencies under the MWELO that require project applicants to prepare plans consistent with the requirements of the MWELO for review and approval. The MWELO was most recently updated by DWR and approved by the California Water Commission on July 15, 2015. All provisions became effective on February 1, 2016. The revisions, which apply to new construction with a landscape area greater than 500 square feet, reduced the allowable coverage of high-water-use plants to 25 percent of the landscaped area. The MWELO also requires use of a dedicated landscape meter on landscape areas for residential landscape areas greater than 5,000 square feet or nonresidential landscape areas greater than 1,000 square feet, it and requires weather-based irrigation controllers or soil moisture–based controllers or other self-adjusting irrigation controllers for irrigation scheduling in all irrigation systems. Local agencies may adopt local ordinances if they are at least as effective in conserving water as MWELO.

California Green Building Standards Code, Construction Waste Reduction Requirements

The 2016 California Green Building Standards Code requires builders/owners to divert 65 percent of the waste from covered projects (i.e., new construction, demolition, and/or addition to nonresidential and residential structures requiring construction or building permit). This can be met through three methods: (1) develop and submit a waste management plan to the jurisdiction's enforcement agency that identifies materials and facilities to be used and document diversion; (2) use a waste management company, approved by the enforcing agency, that can document 65 percent diversion; or (3) use the disposal reduction alternative, as appropriate for the type of project. If the waste management plan option is used, the plan should be developed before construction begins, and project managers should use the project's planning phase to estimate materials that will be generated and identify diversion strategies for those materials. The California Department of Housing and Community Development has developed suggested methods and compliance forms as options for residential builders and owners to demonstrate compliance with the requirement to reduce construction waste by 65 percent or greater.

California Green Building Standards Code (Title 24, Part 11)

Title 24, Part 11, of the California Code of Regulations (California Green Building Standards Code, or CALGreen) was first adopted in 2008 and made mandatory in 2010, and the updated 2019 CALGreen code, adopted May 9, 2018, became effective January 1, 2020. It includes mandatory and voluntary nonresidential standards related to green building that reduce GHG emissions, energy and water

consumption, and solid waste and stormwater generation. CALGreen establishes mandatory minimum green building standards and optional, more stringent Tier 1 and Tier 2 provisions. Cities and counties are required by State law to enforce Title 24 but have the discretion to adopt either optional tier as mandatory or to adopt their own stricter standards.

Warren-Alquist Energy Resources Conservation and Development Act of 1974

The CEC regulates energy resources by coordinating and funding energy supply and demand research to reduce the energy consumption rate of growth, through the Warren-Alquist Energy Resources Conservation and Development Act (Warren-Alquist Act) (Government Code Section 25000 et seq.). The CEC is the State's primary energy policy and planning agency. Its responsibilities include forecasting future energy needs and keeping historical energy data, licensing thermal power plants 50 megawatts or larger, promoting energy efficiency through appliance and building standards, developing energy technologies and supporting renewable energy, and planning for and directing State response to energy emergencies. CEC develops energy efficiency standards for residential and nonresidential buildings approximately every 3 years. In May 2018, it adopted the 2019 Building Energy Efficiency Standards, which became effective January 1, 2020.

REGIONAL AND LOCAL REGULATIONS

Planning for water management, wastewater and stormwater management, and solid waste disposal is conducted by local agencies to support their long-term resource planning and ensure adequate service to meet existing and future demands. In addition to federal and State regulations governing these planning efforts, cities, counties, and water districts may provide regulatory advisement on water resources, water treatment, and solid waste disposal. Many jurisdictions incorporate goals and policies relating to these topic areas in their municipal codes, general plans, development standards, or other regulations (e.g., utility master plans, solid waste management plans).

3.14.3 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, the criteria used in the 2017 Plan Bay Area 2040 EIR, and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities the construction or relocation of which could cause significant environmental effects (Criterion PUF-1);
- have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years (Criterion PUF-2);
- result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments (Criterion PUF-3); or
- generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals and comply with federal, State, and local management and reduction statutes and regulations related to solid waste (Criterion PUF-4).

METHOD OF ANALYSIS

As described in Chapter 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.7 million residents and 1.4 million jobs, resulting in 1.4 million new households. The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that result in focused housing and job growth concentrated primarily in or adjacent to already developed areas and along existing transit corridors. The land use growth footprint is derived from the UrbanSim 2.0 land use model and represents the development or redevelopment of parcels of land simulated to accommodate the region's forecasted growth of households and jobs from 2015 through 2050 through new building(s). Precise building site(s) on the parcels are not known, therefore the land use growth footprint incorporates the entire parcel. Because of this assumption, the area of potential effects tends to be overstated when considering the land use growth footprint.

This analysis includes a program-level, qualitative assessment of impacts related to water supply, wastewater/stormwater, and solid waste. The assessment of available water supply considers the current regional demand and supply of water based on analyses available in current UWMPs for major water providers (e.g., East Bay Municipal Utilities District, SFPUC, Santa Clara Valley Water District, Sonoma County Water Agency, Marin Municipal Water District). The projections included in the applicable UWMPs inform where additional demand may exceed the capacity of water districts as well as which water districts may have additional capacity. The EIR identifies areas where: 1) there is an existing forecasted shortage in long-term supplies that would need to be met by imported water or additional water conservation, reuse, and recycling; or 2) where the proposed Plan projects population or jobs beyond what is assumed in current UWMPs and could result in a potential shortage.

Impacts related to wastewater, stormwater, and solid waste are more localized in nature, and therefore the analysis is qualitative and focuses on the existing regulations, standards, and policy measures to address these localized impacts. Water and wastewater impacts related to implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects would be inherently operational in nature, and the following analyses discuss effects of the proposed Plan following implementation, which may require construction of new facilities to meet increased demands. Therefore, land use development construction impacts are not addressed separately from operation impacts in Impacts PUF-1 through PUF-3. The physical effects of future construction are identified here and addressed in more depth in the other EIR technical sections. The baseline for the following analysis reflects existing conditions when the EIR NOP was released in September 2020. 2015 UWMPs were the best available source for water supply analysis in PUF-2, with 2020 UWMP updates expected to be completed following the public release of this Draft EIR.

This evaluation of public utilities and facilities impacts assumes that construction and development under the proposed Plan would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts.

IMPACTS AND MITIGATION MEASURES

Impact PUF-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities the construction or relocation of which could cause significant environmental effects (PS)

Land Use Impacts

Operation

The proposed Plan's land use development pattern could result in a need for new or expanded water and wastewater treatment facilities to accommodate demand that exceeds the capacity at existing facilities. Much of the new treatment capacity is likely to be through expansion of existing facilities, because over 69 percent of the proposed Plan's development would occur within land designated as urban built-up (see Chapter 2, "Project Description") and therefore could connect to existing conveyance and treatment systems. Bay Area water and wastewater agencies are actively exploring the possibility of expanding existing water facilities. The Contra Costa Water District is studying expansion of the Los Vaqueros Reservoir to store 100,000 acre-feet of additional water. In addition, many wastewater agencies are currently implementing capital improvement programs to expand wastewater treatment capacity and build new functionality with water reuse (City of San Mateo 2021).

Some wastewater treatment facilities could face challenges expanding their discharge capacity because of pollutant load restrictions in receiving waters. In these instances, wastewater treatment capacity may need to be expanded along with the use of advanced treatment technology, reclaimed water distribution, or groundwater recharge. The expansions and updates to existing wastewater treatment facilities to meet future needs and requirements present opportunities to explore how to use a higher quality water output for beneficial reuse that could help sustain reliability of local water supplies.

The total land use growth footprint identified under the proposed Plan increases the total urban footprint by approximately 12,300 acres. This increase in the region's urban footprint by roughly 1.4 percent over existing conditions accommodates the over 50 percent increase in the number of regional households forecasted during the horizon of the proposed Plan. Development of the remaining acres outside of existing urban areas could be composed of a variety of land uses and impervious surfaces (e.g., paved areas, building rooftops, parking lots) that could result in incremental increases in the volume and rate of stormwater runoff, and possibly require the expansion or construction of new stormwater drainage facilities.

Urban infill can also increase impervious surfaces by converting permeable vacant or underused parcels into land with more paving or structures. Some redevelopment can reduce the amount of impervious surface, however, by converting pavement or buildings into permeable paving or landscape. Redevelopment can also increase the amount and rate of runoff by discharging greater amounts of water on a site than before development, typically because of excessive landscape irrigation. Because TPAs are already urbanized, most of the land use changes in these areas would be redevelopment, infill, and intensification of existing land uses. Infrastructure upgrades would accommodate the stormwater and water quality treatment needs of the individual development.

The successful and continued implementation of Regional Stormwater Permit Provision C.3 requirements would help mitigate increases in runoff flows from new development and redevelopment projects through post-construction controls such as LID techniques. As required by Provision C.3, for new development that would introduce 10,000 square feet of new impervious surfaces, the specific

project applicant would incorporate LID strategies, such as stormwater reuse, onsite infiltration, and evapotranspiration as initial stormwater management strategies. Secondary methods that could be incorporated include the use of natural, landscape-based stormwater treatment measures, as identified by Provision C.3. For a complete discussion of water quality impacts associated with stormwater runoff, see Section 3.10, “Hydrology and Water Quality.”

The infill nature of the proposed Plan’s development pattern, combined with compliance with existing stormwater regulations that mitigate runoff flows from the use of LID techniques, would result in less-than-significant impacts on the stormwater capacity of existing systems because much of the growth would occur on already impervious land built to lower standards and the slight increase of urbanized land would have to comply with current standards. However, development outside of urbanized areas could require the construction of new stormwater drainage systems.

It is possible that implementation of the proposed Plan's land use development pattern would result in the demand for new energy and telecommunication infrastructure. The specific nature of the infrastructure is difficult to predict because both the energy and telecommunication fields are evolving rapidly with new technologies. In the Bay Area, a number of cities are restricting natural gas use in new buildings which may limit expansion of natural gas infrastructure associated with the proposed Plan. As communities continue to implement strategies to electrify their communities and transition to a less carbon intensive electric system, upgrades to existing distribution systems would be expected, as well as increased use of micro infrastructure used at a small neighborhood or even single parcel scale. Where existing electric, natural gas, and telecommunications infrastructure cannot accommodate demand generated from increased land development associated with implementation of the proposed Plan, and where the capacity of existing infrastructure is exceeded, new or expanded infrastructure, including electric power, natural gas, and telecommunications may be required.

Environmental impacts could occur from both construction and the conversion of undeveloped land to accommodate new, expanded, or relocated water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities. The construction process could result in environmental impacts related to air quality, greenhouse gas emissions, hazardous materials, stormwater runoff, cultural and tribal cultural resources, and noise. Moreover, it may be necessary to relocate existing electrical, natural gas, and telecommunication infrastructure if the proposed Plan's development pattern would require re-routing infrastructure. It is foreseeable that the removal or relocation of this infrastructure could result in potentially significant construction impacts related to aesthetics, agriculture and forest land, air quality, greenhouse gas emissions, hazardous materials, emergency response or evacuation plans, wildfire, stormwater runoff, cultural resources, and noise.

For a discussion of these impacts see Section 3.2, “Aesthetics and Visual Resources”; 3.3, “Agriculture and Forestry Resources”; 3.4, “Air Quality”; 3.6, "Climate Change, Greenhouse Gases, and Energy"; 3.9, “Hazards and Wildfire”; 3.10, “Hydrology and Water Quality”; Section 3.7, “Cultural Resources and Tribal Cultural Resources”; and Section 3.12, “Noise.” The conversion of underdeveloped land could result in the loss of agricultural land, increased stormwater runoff, loss of habitat, and damage to visual resources, among other impacts. For a discussion on these impacts see Section 3.3, “Agriculture and Forestry Resources” Section 3.5, “Biological Resources,” for habitat and biological resources, and Section 3.2, "Aesthetics and Visual Resources."

Construction-related impacts are typically short term and can be mitigated to less than significant through actions of the implementing agency. Similarly, land use conversion–related impacts may also be minimized through appropriate siting and mitigation developed during project-level environmental review. Nonetheless, project-level environmental review would be required for

construction of new, expanded, or relocated water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities. Typically, improvements are identified in district master plans in advance of the need for expansion, and environmental review would identify project-specific mitigation based on impacts of the expansion project.

As discussed above, the land use development pattern that would result from implementation of the proposed Plan could result in construction of new or expanded stormwater drainage, water, wastewater treatment facilities, electric power, natural gas, and telecommunications infrastructure, the construction of which may have significant impacts. Therefore, this impact would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

Construction

Sea-level rise adaptation infrastructure could have an effect on water treatment demand or wastewater treatment. Sea-level rise adaptation infrastructure would not generate wastewater such that new or expanded facilities would be required. Adaptation infrastructure that is designed with engineered environmental systems are likely to have no or minimal stormwater impacts. Construction of some "grey" engineered infrastructure like sea walls or levees with roadways or trails on their top surface could increase construction-related wastewater runoff or expand the extent of impervious surfaces. While it is not anticipated that sea level rise adaptation infrastructure would have an effect on wastewater treatment demand or water treatment demand, any increase in the extent of impermeable surfaces could increase stormwater demands, possibly requiring new or expanded facilities.

Moreover, it may be necessary to relocate existing electrical, natural gas, and telecommunications infrastructure if such facilities are located within the vicinity of sea level rise adaptation infrastructure. Environmental impacts could occur from both construction and the potential conversion of undeveloped land to accommodate relocated water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities. This would be a potentially significant impact (PS). As noted above, the potential impacts related to construction and land conversion are discussed throughout this DEIR.

Operation

Notably, the implementation of sea level rise adaptation infrastructure under the proposed Plan would improve the resiliency of the Plan area from inundation from rising seas. Several wastewater treatment facilities such as the San Jose-Santa Clara Regional Wastewater Facility are in low-lying areas that are vulnerable to elevated sea levels, particularly when combined with 100-, 200-, and 500-year storm events, which deposit high volumes of precipitation over short periods while also facilitating storm surge.

For the reasons identified above, while sea level adaptation infrastructure would increase the Plan area's resiliency to this climate change impact, it may result in the construction or relocation of stormwater drainage, water, and wastewater treatment facilities and electric power, natural gas, and telecommunications infrastructure, the construction of which may have significant impacts. Thus, this impact would be potentially significant (PS).

Transportation System Impacts

Construction

Transportation projects resulting from implementation of the proposed Plan could have an effect on water treatment demand and wastewater treatment demand. Development of new roadway projects as part of the proposed Plan could create new impervious areas by converting existing permeable

surfaces into impervious surfaces through the expansion of existing roadways and construction of new traffic lanes. The proposed Plan calls for the addition of approximately 460 lane miles, consisting of freeway, expressway, and arterial lane-miles, to be constructed in the region, a two percent increase over existing conditions (see Chapter 2, "Project Description"). Any projects undertaken by Caltrans, or by a third party operating within its stormwater system, are subject to its Stormwater Management Plan which regulates discharges from Caltrans stormwater conveyances.

Transit projects may also increase impervious surfaces if new bus stops or supporting interchanges expand the right of way footprint. Notably, some rail systems are below ground (e.g., Bay Area Rapid Transit's [BART's] underground lines), use existing roadways and train tracks (e.g., light rail, cable cars, street cars), or are elevated (e.g., BART's aboveground lines), and therefore do not introduce new impervious surfaces. Additionally, some at-grade rail lines may be largely permeable.

As with land development, transportation projects under the proposed Plan can be a source of additional stormwater runoff. In locations with a combined stormwater and wastewater conveyance system, this increase in runoff could impact wastewater treatment capacity as well. Regulations exist to mitigate stormwater runoff from transportation projects. A summary of the regulatory mechanisms that would reduce potential adverse impacts to stormwater and wastewater infrastructure is presented in the following paragraphs.

Transportation projects that fall under Caltrans jurisdiction would be covered by the Caltrans NPDES Stormwater Program. As described in the regulatory setting for SWRCB, this NPDES permit regulates all stormwater discharges from Caltrans-owned conveyances, maintenance facilities and construction activities. Caltrans also has a Storm Water Management Plan that describes the procedures and practices used to reduce or eliminate the discharge of pollutants to storm drainage systems and receiving waters. Guidance documents have also been developed by Caltrans to implement stormwater BMPs in the design, construction, and maintenance of highway facilities.

Transportation projects where local agencies are the lead agency are subject to local and State regulations for post-construction runoff management requirements. The NPDES permit requirements described in the land use discussion above (project design including general site design control measures, LID features, treatment control measures, ordinances, and regulations) also apply to transportation impacts to reduce the discharge of sediments and other pollutants.

Overall, while existing regulations applying to transportation projects would minimize stormwater-related effects, the more stringent and effective Caltrans NPDES stormwater regulations apply only to some transportation projects under the purview of Caltrans. In addition, new roadway lane miles in areas lacking adequate stormwater drainage capacity could require expanded systems. As a result, the potential stormwater capacity impacts related to construction of transportation improvements from implementation of the proposed Plan would be potentially significant (PS).

Operation

The electrification of the transportation fleet as well as the increased use of communication systems for transportation could result in the need for new or realigned electric and telecommunication infrastructure. It may be necessary to relocate existing electrical, natural gas, and telecommunications infrastructure if such facilities are located within the vicinity of a transportation project. Environmental impacts could occur from both construction and the potential conversion of undeveloped land to accommodate new or relocated electrical, natural gas, and telecommunications infrastructure. As noted above, the potential impacts related to construction and land conversion are discussed throughout this DEIR.

Overall, while existing regulations applying to transportation projects would minimize stormwater-related effects, the more stringent and effective Caltrans NPDES Stormwater Regulations only apply to some transportation projects under the purview of Caltrans. In addition, new roadway lane miles in areas lacking adequate stormwater drainage capacity could require expanded systems. As a result, the potential stormwater capacity impacts related to transportation improvements from implementation of the proposed Plan would be potentially significant (PS).

Conclusion

Potential impacts on water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities would occur primarily from the land use development pattern that would result from implementation of the proposed Plan. Impacts from transportation projects would only be expected to occur in the case of a combined stormwater and wastewater conveyance system. Development outside of urbanized areas could require the construction of new stormwater drainage systems, and this impact would be potentially significant. Transportation projects that aren't subject to Caltrans NPDES Stormwater Regulations or in areas lacking adequate stormwater drainage capacity or hardened sea level rise adaptation infrastructure could result in impacts that would be potentially significant. Additionally, implementation of the proposed Plan may require new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities or the relocation of existing facilities. The construction or relocation of these facilities may have effects related to construction and to conversion of undeveloped land. Therefore, these impacts would be **potentially significant (PS**). Mitigation Measures PUF-1(a) through PUF-1(f) address these impacts and are described below.

Mitigation Measures

Mitigation Measure PUF-1(a) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- For projects that could increase demand on water and wastewater treatment facilities, coordinate with the relevant service provider to ensure that the existing public services and utilities could accommodate the increase in demand. If the current infrastructure servicing the project site is found to be inadequate, infrastructure improvements for the appropriate public service or utility shall be identified in each project's CEQA documentation. The relevant public service provider or utility shall be responsible for undertaking project-level review as necessary to provide CEQA clearance for new facilities.

Mitigation Measure PUF-1(b) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- During the design and CEQA review of individual future projects, determine whether sufficient stormwater drainage facilities exist for a proposed project. These CEQA determinations must ensure that the proposed development can be served by its existing or planned drainage capacity. If adequate stormwater drainage facilities do not exist, project sponsors shall coordinate with the appropriate utility and service provider to ensure that adequate facilities could accommodate the increased demand, and if not, infrastructure and facility improvements shall be identified in each project's CEQA determination. The relevant public service provider or utility shall be responsible for undertaking project-level review as necessary to provide CEQA clearance for new facilities.

- For projects of greater than 1 acre in size, reduce stormwater runoff caused by construction by implementing stormwater control best practices, based on those required for a SWPPP.
- Model and implement a stormwater management plan or site design that prevents the post-development peak discharge rate and quantity from exceeding pre-development rates.

Mitigation Measure PUF-1(c) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- For transportation projects, incorporate stormwater control, retention, and infiltration features, such as detention basins, bioswales, vegetated median strips, and permeable paving, early into the design process to ensure that adequate acreage and elevation contours are planned.

Mitigation Measure PUF-1(d) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- For transportation projects implemented by Caltrans or subject to Caltrans review, adhere to Caltrans' Stormwater Management Plan, which includes best practices to reduce the volume of stormwater runoff and pollutants in the design, construction, and maintenance of highway facilities.

Mitigation Measure PUF-1(e) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Consider the use of onsite electric generation and storage systems that produce all or a portion of the energy used by a land use, sea level rise adaptation, or transportation project.

Further, Mitigation Measures PUF-2(a), PUF-2(b), and PUF-2(c), summarized under Impact PUF-2, and PUF-3, summarized under Impact PUF-3, would reduce water demand and wastewater generation, and subsequently reduce the need for new or expanded water and wastewater treatment facilities.

Mitigation Measure PUF-1(f) Implementing agencies and/or project sponsors shall implement, where feasible and necessary based on project- and site-specific considerations, the mitigation measures described throughout this EIR to address the effects related to the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, including:

- Mitigation Measures AES-1 through AES-4
- Mitigation Measures AGF-1 through AGF-3
- Mitigation Measures AQ-2 through AQ-4
- Mitigation Measures BIO-1 through BIO-3 and BIO-5
- Mitigation Measures GHG-1 and GHG-3
- Mitigation Measures CUL/TCR-1, CUL/TCR-2, and CUL/TCR-4
- Mitigation Measure GEO-7
- Mitigation Measures HAZ-4, HAZ-6 and HAZ-7
- Mitigation Measures LU-1, LU-2, and LU-4
- Mitigation Measures NOISE-1 through Noise-4
- Mitigation Measures PSR-1 and PSR-2
- Mitigation Measures PUF-2 through PUF-4
- Mitigation Measure TRA-2

Significance after Mitigation

Implementation of Mitigation Measure PUF-1(a)) would reduce impacts associated with exceeding existing water and wastewater treatment capacity because application of such mitigation would require that land use and transportation projects comply with project-level CEQA review and identify infrastructure improvements to ensure adequate capacity. Implementation of Mitigation Measures PUF-1(b), and PUF-1(c), and PUF-1(d) would reduce impacts associated with exceedances of existing stormwater drainage capacity because application of such mitigation would require that land use, sea level rise, and transportation projects comply with project-level CEQA review, incorporate on-site stormwater control practices, and develop and implement stormwater management plans or stormwater control design features. Additionally, as stated above, implementation of Mitigation Measures PUF-2(a), PUF-2(b), and PUF-2(c) would lower water demand and wastewater generation, thus reducing the potential need for facilities. Implementation of Mitigation Measure PUF-1(f) would mitigate impacts related to the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities and to conversion of undeveloped land to accommodate new or expanded facilities. However, it cannot be concluded with certainty that all impacts related to this potential construction and land conversion would be mitigated to less than significant. Therefore, there may be instances where the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities would cause **significant and unavoidable (SU)** environmental effects.

Impact PUF-2: Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years (SU)

Land Use Impacts

Operation

As shown in **Table 3.14-2**, the major water suppliers in the region are projected to be able to supply adequate water for their projected service populations through 2040 during normal years, apart from Solano County Water Agency which expects to meet water demand projections up to 2020 but has not analyzed beyond that horizon. Water demand projections beyond 2040 were unavailable for all Bay Area water agency UWMPs with some agencies only projecting water demand and supply through 2035. The ability to provide adequate water supply for many districts is dependent on successful achievement of water conservation targets and the completion of supply expansion projects, such as new water contracts, land acquisition, groundwater recharge, and reclaimed water distribution. In some areas, such as the City and County of San Francisco and the Santa Clara Valley, adequate supply through 2040 depends on substantial water conservation efforts. In San Francisco, the ability for supply projects to move forward depends on multiple factors such as environmental review, permitting requirements, public acceptance, and the availability of funding. Water suppliers are pursuing the water conservation targets set by the State under SB X7-7 (2009) and regularly updating their UWMPs. Future development projects would be required to comply with Water Code Section 10910 and Section 10912, as described above in the Regulatory Setting, under "Water Supply Assessment and Water Supply Verification.". The enforcement of these regulations by local jurisdictions would ensure that a water supply assessment is prepared to demonstrate that sufficient water would be available to serve development projects before their approval.

As shown in **Table 3.14-3**, major water supply agencies such as Alameda County Water District, Santa Clara Valley Water District, Solano County Water Agency, and Sonoma County Water Agency expect demand to exceed supply during a single dry year before 2040. In addition, Alameda County Water

District, East Bay Municipal Utility District, San Francisco Public Utilities Commission, Santa Clara Valley Water District, and Solano County Water Agency expect demand to exceed supply during multiple dry years before 2040. Therefore, in localized parts of the region, there is an existing forecasted shortage in long-term supplies during a single dry year and multiple dry years that will need to be met through additional water conservation, reuse, and recycling, and additional water supply sources.

The combined population projections (9,883,000) of the water supply agencies for 2040 (the projected year available) exceed the 2040 regional population projections for the proposed Plan (approximately 9,500,000 in 2040 and growing to over 10 million by 2050). **Table 3.14-8** includes the projected households served in 2050 by 11 of the largest agencies. San José, served by the Santa Clara Valley Water District, projects 2040 as the year wherein a water shortage may occur during a single dry year. San Francisco, served by SFPUC, does not project water shortages during a single dry year in their UWMP which runs through 2040, largely because of supplies from reservoir storage, but does project water shortages by 2040 in the event of multiple dry years. With implementation of the proposed Plan, land use development would not occur evenly around the region; therefore, the proposed Plan could result in population or job growth beyond what is assumed in current UWMPs and could result in a localized water supply shortage. As discussed in Section 3.14-1, "Environmental Setting," eight of the regions water agencies are working together to consider new approaches to drought contingencies and together produced a Drought Contingency Plan that included 15 potential drought mitigation measures including new interties between systems, expanded storage, as well as new treatment options for water reuse (Brown and Caldwell 2017).

Table 3.14-8: Projected Service Area Population of Major Bay Area Water Agencies

Agency	Projected 2050 Households
Alameda County Water District	152,800
Bay Area Water Supply & Conservation Agency (BAWSCA)[1]	457,200
Contra Costa Water District	255,700
East Bay Municipal Utility District	762,000
Marin Municipal Water District	113,600
City of Napa	33,800
San Francisco Public Utilities Comission[2]	569,200
Santa Clara Valley Water District	1,074,000
Solano County Water Agency	176,600
Sonoma County Water Agency[3]	189,400
Zone 7	131,800
TOTAL	3,916,000

Notes: Numbers have been rounded (between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum because of independent rounding.

[1] BAWSCA is composed of 26 member water agencies that purchase all or a portion of their water supply from the San Francisco Public Utilities Commission. In this table, BAWSCA households include only the 19 members in San Mateo County and City of Hayward in Alameda County. All Santa Clara County BAWSCA members are counted in the Santa Clara Valley Water District value.

[2] San Francisco Public Utilities Commission is a wholesale water provider to BAWSCA; however, the agencies' service populations are listed separately.

[3] Sonoma County Water Agency is a wholesale water provider to Marin Municipal Water District; however, the agencies' service populations are listed separately.

Sources: Data compiled by MTC and ABAG in 2021 based on data from DWR 2020

Locally, as shown in **Tables 3.14-2 and 3.14-3**, land development through 2040 served by the Contra Costa Water District, East Bay Municipal Utility District, Marin Municipal Water District, and SFPUC would have adequate water supplies in both regular and single dry years. The City of Napa and Zone 7 also have adequate water supplies in regular and single dry years through 2035, their furthest

reported projection. Contra Costa Water District, Marin Municipal Water District, Sonoma Water, City of Napa and Zone 7 would also have adequate water supplies in multiple dry years. However, at a regional level, changes in land use projected development from the proposed Plan may result in insufficient water supplies requiring the acquisition of additional water sources and the imposition of conservation requirements. Further, as discussed in the "Drought" subsection in Section 3.14-1, "Environmental Setting," California, including the Plan area, may face future water supply challenges associated with climate change-related periods of drought. The uncertainty of water supply availability is furthered by the Plan's 2050 horizon being 10–15 years further than water agency 2015 UWMPs which have a planning horizon of 2035 or 2040. The increase in population-, household-, and jobs-related demand on water supply coupled with potentially reoccurring drought conditions may result in insufficient water supply to serve the Plan area. For these reasons, these impacts would be potentially significant (PS).

Sea-Level Rise Adaptation Impacts

Construction and Operation

The construction and maintenance of sea level rise adaptation infrastructure could increase the demand for water. Construction activities such as dust control and operational activities such as landscape irrigation could increase water demand. Although these increases in demand are anticipated to be small on a per project basis, the collective demand from all the projects taken together could increase water demand that exceeds an applicable water supply agency's projected demand and supply. Because sea level rise adaptation infrastructure constructed under the proposed Plan may be in areas with constrained water supplies, especially during a dry year or extended drought period, these impacts would be potentially significant (PS).

Transportation System Impacts

Construction and Operation

The construction of new roadway capacity, bicycle and pedestrian facilities, transit facilities; maintenance on existing transportation facilities; and operation of new and existing facilities could increase the demand for water for construction activities such as concrete mixing or dust control and operational activities such as landscape irrigation or services such as restrooms and drinking fountains. Although these increases in demand are anticipated to be small on a per project basis, the collective demand from all the projects taken together could increase water demand that exceeds an applicable water supply agency's projected demand and supply. Because transportation projects under the proposed Plan may be constructed in locations with constrained water supplies, especially during a dry year or prolonged drought period, these impacts would be potentially significant (PS).

Conclusion

The land use development pattern that would result from implementation of the proposed Plan would generate most of the water demand generated as a result of accommodating the regional growth forecast. While the permanent demand on potable water supplies required by sea level rise adaptation infrastructure and transportation projects would be relatively small compared to the total demand associated with construction and operation of land use projects, the collective demand could result in water demand that exceeds an applicable water agency's projected demand and supply. Additionally, the construction phase of a sea level rise adaptation infrastructure or transportation project (water for mixing concrete, watering down topsoil, initial irrigation needs) could exceed local water supplies on a temporary basis, especially during dry years or prolonged drought periods. It is also possible that a transportation project that features significant landscaping that is not drought-

resistant could significantly impact local water supplies over a longer term. Because the construction and operation of land use, sea level rise adaptation, and transportation projects under the proposed Plan overall generate water demand that could result in insufficient water supplies, which could require the acquisition of additional water sources and the imposition of conservation requirements, these impacts would be **potentially significant (PS)**. Mitigation Measures PUF-2(a), PUF-2(b), and PUF-2(c) address these impacts and are described below.

Mitigation Measures

Mitigation Measure PUF-2(a) Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- For projects that could increase demand for water, coordinate with the relevant water service provider to ensure that the provider has adequate supplies to accommodate the increase in demand. This can and should be documented in the form of an SB 610 Water Supply Assessment, an SB 221 Water Supply Verification, or other capacity analysis.
- Implement water conservation measures which result in reduced demand for potable water. This could include reducing the use of potable water for landscape irrigation (such as through drought-tolerant plantings, water-efficient irrigation systems, the capture and use of rainwater) and the use of water-conserving fixtures (such as dual-flush toilets, waterless urinals, reduced flow faucets).
- Coordinate with the water provider to identify an appropriate water consumption budget for the size and type of project and designing and operating the project accordingly.
- For projects located in an area with existing reclaimed water conveyance infrastructure and excess reclaimed water capacity, use reclaimed water for non-potable uses, especially landscape irrigation. For projects in a location planned for future reclaimed water service, projects should install dual plumbing systems in anticipation of future use. Large developments could treat wastewater onsite to tertiary standards and use it for non-potable uses onsite.
- Apply Tier 1 or Tier 2 CALGreen standards as mandatory local requirements, which reduce water use by 12 and 20 percent, respectively, and require additional qualifying elective actions.

Mitigation Measure PUF-2(b) Implementing agencies and/or project sponsors shall require the construction phase of transportation projects to connect to reclaimed water distribution systems for non-potable water needs, when feasible based on project- and site-specific considerations.

Mitigation Measure PUF-2(c) Implementing agencies and/or project sponsors shall require transportation projects with landscaping to use drought-resistant plantings or connect to reclaimed water distribution systems for irrigation and other non-potable water needs when available and feasible based on project- and site-specific considerations.

Significance after Mitigation

Implementation of Mitigation Measures PUF-2(a), PUF-2(b), and PUF-2(c) would reduce impacts associated with water supply because they would require that land use, sea level rise, and transportation project sponsors coordinate with water suppliers to ensure adequate water supplies exist or comply with project-level CEQA review and incorporate on-site water conservation strategies, water budgeting, and incorporation of recycled water for non-potable use. However, it cannot be concluded with certainty that all impacts related to water supply would be mitigated to a less-than-significant. Therefore, this impact would remain **significant and unavoidable (SU)**.

Impact PUF-3: Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments (PS)

Land Use Impacts

Operation

Increased volumes of wastewater from forecasted growth under the proposed Plan could exceed the wastewater treatment capacity of individual treatment facilities, if not properly planned. Generation of additional wastewater as a result of forecasted development would depend on the location of planned development and would not be spread evenly across each treatment facility system. Generally, capacity planning is undertaken in advance of need. Funding for new and expanded facilities is typically provided through developer impact fees, and through the rates customers pay for treatment. Building occupancy is prohibited if wastewater service is not available. Therefore, exceedance of the capacity of a wastewater treatment plant is not expected.

Furthermore, wastewater generation per capita would be expected to decrease by 2050 as compared to baseline conditions because of implementation of regional- and Statewide water conservation measures. Also, wastewater generation per capita will likely be reduced in future years as municipalities in the Bay Area adopt new versions of Part 11 of the Title 24 California Building Code (California Green Building Standards or CALGreen) which will require new development to incorporate low-flow, water-efficient appliances, and design. However, wastewater is not conveyed between different treatment agencies (this would require construction of an extensive network of major pipelines). One wastewater facility could approach its treatment capacity and require expansion, whereas other plants in the region may have substantial available capacity. This is a localized issue, therefore, and potential local impacts are discussed below.

Under the proposed Plan, population and job growth would be concentrated in areas of existing development. Overall, population in the Bay Area is projected to grow by 35 percent from 2015 to 2050. With implementation of the proposed Plan, Santa Clara, San Francisco, and Alameda Counties are projected to grow households by more than the regionwide rate, while all others would grow less. Areas with the most growth also are most likely to need additional wastewater treatment capacity. Therefore, the counties that would support the highest percentage of growth would also be the locations where treatment plant expansion is most likely. The City of San Mateo broke ground on a project to upgrade their 1935 wastewater treatment plant in 2020 to bring the facility up to a higher standard and expand capacity (City of San Mateo 2021).

It is likely that some treatment facilities would need to expand their capacity before 2050 to meet expected population growth, or to respond to RWQCB requirements to provide capacity to receive their NDPES permit. Because the changes to the land use pattern under the proposed Plan may result in insufficient wastewater treatment capacity, these impacts would be potentially significant (PS).

Sea-Level Rise Adaptation Impacts

Construction and Operation

Sea-level rise adaptation infrastructure would not affect wastewater treatment capacity. Instead, sea level rise adaptation infrastructure will help protect existing wastewater treatment facilities from future sea level rise and in some cases may become components of the wastewater treatment

process. Because sea level rise adaptation infrastructure would not generate significant wastewater, these impacts would be less than significant (LTS).

Transportation System Impacts

Construction and Operation

Implementation of transportation projects would not directly increase wastewater generation from forecasted growth. As noted in Impact HYDRO-4, the design of transportation projects that would have the potential to alter drainage patterns would conform to local stormwater drainage master plans and regional MS4 permit requirements. This could increase capacity in combined stormwater and wastewater conveyance systems. Transportation projects for which local agencies are the lead agency are subject to local and State regulations for construction and nonconstruction runoff prevention. The regional MS4 NPDES permit described above would also apply to transportation projects. Transportation projects would be required to incorporate BMPs and LID stormwater management principles. In addition, any enhancements or modifications to California State highways would be required to follow Caltrans guidelines, which include the preparation of a hydraulic study and submittal of a hydraulics study report for any project intercepting a waterway or encroaching upon a floodplain, to assess the potential impacts on natural processes and beneficial uses as part of the environmental review. These existing regulatory requirements address the potential for impacts on drainage patterns and rates.

In accordance with federal, State, and local stormwater management regulations, new construction must maintain preproject hydrology. Because transportation projects would comply with these requirements, implementation of the proposed Plan would not be expected to alter existing drainage patterns in a manner that would result in runoff that exceeds the capacity of existing or planned stormwater drainage systems or results in flooding. Therefore, impacts associated with the implementation of the proposed Plan's transportation infrastructure would be less than significant (LTS).

Conclusion

The land use development pattern that would result from implementation of the proposed Plan could result in potential impacts on wastewater treatment capacity. Because of the relatively small permanent generation of wastewater by transportation projects, and because projects would comply with federal, State, and local stormwater management regulations to maintain preproject hydrology, transportation projects would not contribute to a significant impact. Similar to transportation projects, sea level rise adaptation infrastructure projects are unlikely to contribute to a significant impact. Nonetheless, because new land use development under the proposed Plan could generate new volumes of wastewater that could contribute to a wastewater treatment facility meeting or exceeding its existing capacity, this impact would be **potentially significant (PS)**. Mitigation Measure PUF-3 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure PUF-3 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- During the design and CEQA review of individual future projects, determine whether sufficient wastewater treatment capacity exists for a proposed project. These CEQA determinations must ensure that the proposed development can be served by its existing or planned treatment capacity. If adequate capacity does not exist, project sponsors shall coordinate with the relevant service provider to ensure that adequate public services and utilities could accommodate the

increased demand, and if not, infrastructure improvements for the appropriate public service or utility shall be identified in each project's CEQA documentation. The relevant public service provider or utility shall be responsible for undertaking project-level review as necessary to provide CEQA clearance for new facilities.

- Require compliance with Mitigation Measure PUF-2(a), and MTC shall require implementation of Mitigation Measures PUF-2(b) and PUF-2(c), as feasible based on project- and site-specific considerations to reduce water usage and, subsequently, some wastewater flows.

Significance after Mitigation

Implementation of Mitigation Measure PUF-3 would reduce impacts related to exceedance of existing wastewater capacity because application of this mitigation would require that land use and transportation projects comply with project-level CEQA review and incorporate on-site water conservation strategies, water budgeting, and incorporation of recycled water for non-potable use as mandated by Mitigation Measures PUF-2(b), PUF-2(c), and PUF-3 listed above, which would reduce the generation of wastewater. To the extent that an implementing agency requires an individual project to implement all feasible mitigation measures described above, the impact would be less than significant with mitigation (LTS-M).

Projects taking advantage of the CEQA streamlining provisions of SB 375 (Public Resources Code Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. However, MTC/ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact PUF-4: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals, and comply with federal, state, and local management and reduction statutes and regulations related to solid waste (PS)

Land Use Impacts

Construction

The 2019 CALGreen code contains construction waste management requirements for certain new construction and additions, as well as demolition of nonresidential (i.e., State-owned buildings and commercial, industrial, and medical facilities) and residential buildings. Effective starting January 1, 2020, the construction activities must adhere to a 65-percent diversion standard and may be required to submit a construction waste management plan or contract with a waste management company that submits verifiable documentation. Newly constructed multifamily housing with more than five units are required to have accessible areas that serve the entire building and are identified for the depositing, storage, and collection of recycling. Projected development under the proposed Plan would be subject to the standards defined in the 2019 CALGreen code, as well as any future updates.

Because Countywide Integrated Waste Management Plans must demonstrate a remaining landfill disposal capacity of at least 15 years to serve all the jurisdictions in the county, landfill capacities are updated on a continuing basis to identify insufficient capacity. Future growth in the region may require the expansion of existing facilities or construction of new landfills, the identification of waste

disposal capacity outside of the region, and/or larger reductions in solid waste generation or diversion rates to serve the projected level of development.

There are also multiple additional laws intended to reduce solid waste in California, including AB 1826, which sought to greatly reduce the amount of organic material deposited into landfills by further mandating waste recycling services for organic material. At the beginning of 2016, local jurisdictions were required under AB 1826 to implement an organic waste recycling program and measure and monitor their efforts. Also, Section 5.408, "Construction Waste Reduction, Disposal and Recycling," of the 2019 CALGreen code requires all new construction and demolition projects to develop a construction waste management plan that documents how a minimum of 65 percent of nonhazardous construction and demolition waste will be recycled or salvaged. The construction-related impact would be less than significant (LTS).

Operation

The existing population and employment uses in the region will continue to generate solid waste that requires disposal in a licensed and regulated landfill. The expected growth in the region's population, which is expected to increase by 2.7 million to 10.3 million during the planning horizon of the proposed Plan (2015-2050), would result in an increase in solid waste production. As of January 2020, the nine-county Bay Area region had a population of 7.8 million (see Chapter 2, "Project Description"). CalRecycle estimates that the average resident over the last ten years in California disposes of 5.8 pounds of trash per day (CalRecycle 2021a). Assuming an average diversion (to recycling) rate of 50 percent, as required by AB 939, the region's solid waste generation would increase from approximately 11,069 tons of solid waste per day and 4.0 million tons per year, to approximately 14,927 tons per day and 5.4 million tons per year. Further, if California meets its goal of achieving the 75 percent diversion rate initiatives set by SB 1383 and AB 341, future rates of disposal would be 7,463 tons per day and 2.7 million tons per year in 2050. While the State of California is not on track to meet this goal, some Bay Area jurisdictions like the City and County of San Francisco are meeting the goal. San Francisco has achieved the 75% target since 2009 and surpassed it achieving 80% diversion in 2012 (City and County of San Francisco 2021).

Landfill closure dates typically reflect the year a landfill is projected to reach capacity and take many factors into account, including rates of solid waste generation, rates of diversion, and projected growth. All but three (i.e., Altamont Landfill and Resource Recovery, USS-Poscoe Industries Waste Management Unit II, and Kirby Canyon Recycling and Disposal Facility) of the fourteen landfills active in the region, listed in **Table 3.14-5**, have an estimated closure date before the year 2050 (CalRecycle 2020). It is unlikely these three remaining landfills, which make up around 33 percent of the region's existing remaining capacity, could accommodate the solid waste disposal needs of the entire region.

Land use development projects undertaken with implementation of the proposed Plan would be required to comply with federal, State, and local statues and regulations related to solid waste, including county and city general plans. Local jurisdictions also have goals and policies for recycling and diversion of solid waste to ensure compliance, see AB 939 and SB 341 in Section 3.14.2, "Regulatory Setting." Local governments submit an annual report to CalRecycle on the implementation of waste diversion plans to comply with their respective per capita disposal targets. CalRecycle reviews each local government's progress in implementing its unique diversion program and progress in sustaining or achieving compliance. CalRecycle may refer some local governments for a compliance evaluation review, although the number of local governments referred is generally less than 1 percent. If a more thorough analysis reveals a jurisdiction is not meeting the "good faith" standard for implementing its diversion programs or for reaching per capita disposal targets, CalRecycle will issue

a compliance order. If the jurisdiction fails to fulfill its implementation plan to correct the program deficiencies, then the jurisdiction will be subject to penalties.

As noted above, there are also multiple additional laws intended to reduce solid waste in California, including AB 1826, which sought to greatly reduce the amount of organic material deposited into landfills by further mandating waste recycling services for organic material. At the beginning of 2016, local jurisdictions were required under AB 1826 to implement an organic waste recycling program and measure and monitor their efforts.

While there are regulations in place intended to reduce solid waste in California, implementation of the proposed Plan's would concentrate growth in areas of existing development and land use development would not occur evenly around the region. Areas with the most growth could generate waste that could exceed the current permitted capacity at local landfills. Therefore, this impact would be potentially significant (PS).

Sea Level Rise Adaptation Impacts

Construction and Operation

Sea level rise adaptation infrastructure construction and maintenance in the proposed Plan have the potential to generate a substantial amount of solid waste during construction. This waste can come from typical construction activities, such as grading, excavation, and removal of existing structures. The amount of this waste is difficult to predict, but it could result in an exceedance of local landfill capacities for construction of sea level rise adaptation infrastructure in the future closer to expected closure dates of the landfills. Operation of sea level rise adaptation infrastructure are unlikely to produce substantial solid waste, if any. Nevertheless, construction would still generate a notable volume of solid waste. Thus, these impacts would be potentially significant (PS).

Transportation System Impacts

Construction and Operation

Roadway and transit construction and maintenance projects in the proposed Plan have the potential to generate a substantial amount of solid waste during construction. This waste can come from typical construction activities, such as grading, excavation, and removal of existing structures. The operation of transportation facilities may also generate solid waste. The amount of this waste is difficult to predict, but it could result in an exceedance of local landfill capacities for transportation projects constructed in the future closer to expected closure dates of the landfills. Transportation projects under the proposed Plan would be required to comply with AB 341, as well as the additional laws cited above which would further reduce anticipated solid waste generation. Nevertheless, construction of these projects would still generate a notable volume of solid waste that could exceed the capacity of local landfills. Thus, these impacts would be potentially significant (PS).

Conclusion

Implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects has the potential to reduce the capacity of existing landfills, leading to earlier closure dates than currently anticipated and a need for increased landfill capacity. This impact is considered **potentially significant (PS)**. Mitigation Measure PUF-4 addresses this impact and is described below.

Mitigation Measures

Mitigation Measure PUF-4 Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, that include those identified below:

- Provide an easily accessible area that is dedicated to the collection and storage of non-hazardous recycling materials.
- Maintain or reuse existing building structures and materials during building renovations and redevelopment.
- Use salvaged, refurbished, or reused materials to help divert such items from landfills.
- Divert construction waste from landfills, where feasible, through means such as:

submitting and implementing a construction waste management plan that identifies materials to be diverted from disposal;

establishing diversion targets, possibly with different targets for different types and scales of development; and

helping developments share information on available materials with one another, to aid in the transfer and use of salvaged materials.

- Apply the specifications developed by the Construction Materials Recycling Association (CMRA) to assist contractors and developers in diverting materials from construction and demolition projects, where feasible (CalRecycle 2021b).

Significance after Mitigation

Implementation of Mitigation Measure PUF-4 would reduce impacts associated with solid waste generation because it would require that land use and transportation projects apply landfill diversion strategies including re-using building materials, maintaining structures where applicable, developing construction waste management plans, and using guidance from CMRA. However, it cannot be concluded with certainty that all impacts related to solid waste would be mitigated to a less-than-significant. Therefore, this impact would remain **significant and unavoidable (SU)**.

3.15 TRANSPORTATION

This section describes the current transportation conditions and examines the effects of implementation of the proposed Plan's forecasted land use development pattern, sea level rise adaptation infrastructure, and transportation projects on transportation conditions in 2050. The study area consists of the existing and proposed elements of the transportation system for the nine-county Bay Area, including highways, local roads, rail, bus and ferry transit, bicycle and pedestrian facilities, and airports and seaports. This section evaluates the impacts related to transportation including conflicts with applicable plans and policies, hazards, changes in vehicle miles traveled (VMT) per capita, and emergency vehicle access that may result from the implementation of the proposed Plan.

Comments received in response to the Notice of Preparation expressed concerns around the impacts of COVID-19, consideration of hazards and evacuation routes (see Section 3.15.3, "Impact Analysis," and Section 3.9, "Hazards and Wildfire"); diversity of travel demand management (TDM) strategies for mitigation measures (see Section 3.15.3, "Impact Analysis"); consideration and coordination with other plans and studies (see Section 3.14.2, "Regulatory Setting," and Section 3.15.3, "Impact Analysis") consideration of interregional and interstate travel (see Section 3.15.3, "Impact Analysis"); transportation impact analysis options and VMT (see Section 3.15.2, "Regulatory Setting," and Section 3.15.3, "Impact Analysis"); alternative scenarios with transportation strategies, including expanded transit options and increased managed lanes (see Chapter 4, "Alternatives").

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." (CEQA Guidelines Section 15083) Neither the CEQA Guidelines nor Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of impact analysis in this section. Appendix B includes all NOP comments received.

3.15.1 Environmental Setting

EXISTING REGIONAL TRANSPORTATION CONDITIONS 2015

The Bay Area features a robust transportation network, allowing for multimodal access across the region. The transportation system includes interstate and State highways, local arterial roadways, local streets and roads, public transit systems, bicycle and pedestrian facilities, seaports, and airports. In combination, these facilities allow for the movement of people and goods throughout the region. The various elements of the Bay Area transportation system are described below using the most recent data readily available from public sources or using transportation outputs from the regional travel model for the baseline year (2015). Note that the descriptions are representative of the transportation system prior to the coronavirus (COVID-19) pandemic, as the social distancing and stay-at-home orders have resulted in continually changing travel behaviors that are not appropriate for long-range planning comparisons.

Roadway Network: The Bay Area currently contains over 650 miles of limited-access highways, which include both interstates and State highways (Caltrans 2019). These facilities provide access to major employment centers and to destinations outside of the Bay Area. In addition to providing mobility for

automobiles, these facilities also support express bus services and freight movement. The major limited-access highways in the Bay Area are listed in **Table 3.15-1**. In addition, the Bay Area has over 20,000 miles of arterials and local streets, providing access to communities, and accommodating on-street parking and loading activities. Together, these roadway facilities carry 165 million vehicle miles each weekday (Caltrans 2019). The road network also serves nearly 660,000 vehicles that travel into or out of the region from adjacent areas (2017 data, Vital Signs website, MTC 2020). **Figure 3.15-1** depicts the major roadway facilities in the Bay Area.

Table 3.15-1: Major Limited-Access Highways in the Bay Area

Route	Highway Limits		Bay Area Counties Served
Interstate 80	San Francisco	Teaneck, NJ	SF, ALA, CC, NAP, SOL
Interstate 280	San Francisco	San José	SF, SM, SCL
Interstate 380	San Bruno	South San Francisco	SM
Interstate 580	San Rafael	Tracy	MRN, CC, ALA
Interstate 680	Fairfield	San José	SOL, CC, ALA, SCL
Interstate 780	Vallejo	Benicia	SOL
Interstate 880	Oakland	San José	ALA, SCL
Interstate 980	Oakland	Oakland	ALA
Interstate 238	San Leandro	Castro Valley	ALA
Interstate 505	Dunnigan	Vacaville	SOL
U.S. Route 101	Olympia, WA	Los Angeles	SON, MRN, SF, SM, SCL
State Route 1	Leggett	Dana Point	SON, MRN, SF, SM
State Route 4	Hercules	Markleeville	CC
State Route 12	Sebastopol	San Andreas	SON, NAP, SOL
State Route 17	San José	Santa Cruz	SCL
State Route 24	Oakland	Walnut Creek	ALA, CC
State Route 29	Upper Lake	Vallejo	NAP, SOL
State Route 37	Novato	Vallejo	MRN, SON, NAP, SOL
State Route 85	Mountain View	San José	SCL
State Route 87	San José	San José	SCL
State Route 92	Half Moon Bay	Hayward	SM, ALA
State Route 160	Sacramento	Antioch	SOL, CC
State Route 237	Mountain View	Milpitas	SCL
State Route 242	Concord	Concord	CC

Notes: Highway limits reflects the overall route limits, rather than the limits of the limited-access segment; County abbreviations used: ALA (Alameda), CC (Contra Costa), Marin (MRN), NAP (Napa), San Francisco (SF), San Mateo (SM), Santa Clara (SCL), Solano (SOL), and SON (Sonoma)
Source: Data compiled by MTC and ABAG in 2020.

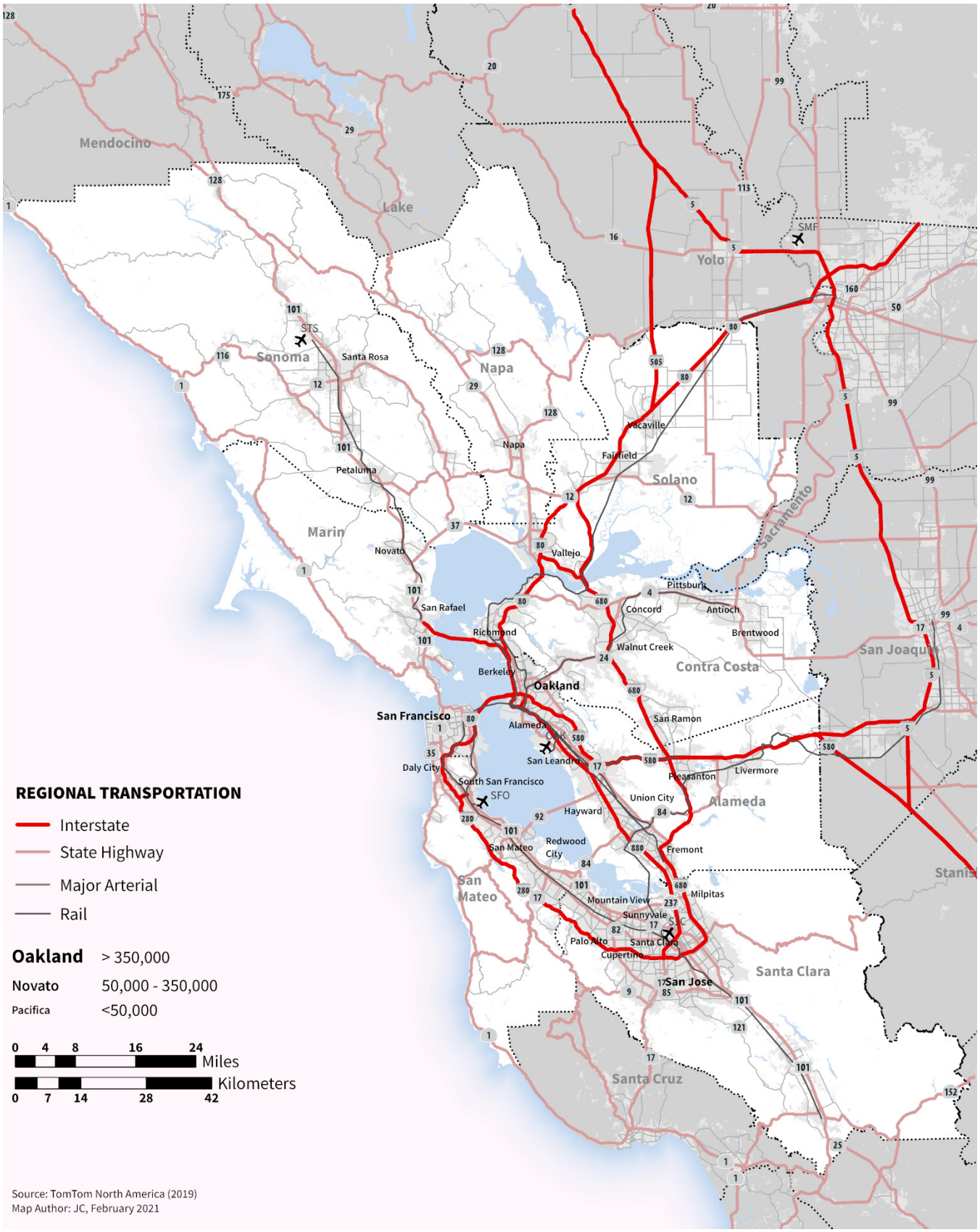


Figure 3.15-1: Major Road Facilities

Public Transit Systems: The Bay Area public transit system includes a combination of heavy rail (e.g., BART), light rail (e.g., Muni Metro and Santa Clara Valley Transportation Authority [VTA] Light Rail), commuter rail (e.g., Caltrain and ACE), diesel and electric buses, cable cars, and ferries. This public transit system accommodates a total of over 1.7 million passengers a day, with about 45 percent of daily passengers (744,000) on Muni, about 26 percent of daily passengers (427,000) on BART, 11 percent (180,000) on AC Transit, and 7 percent (121,000) on VTA (**Table 3.15-2**). **Figure 3.15-2** shows the areas served by each of the Bay Area transit operators. A list of the public transit operators and average weekday ridership is shown in **Table 3.15-2**.

Table 3.15-2: Public Transit Operators in the Bay Area

Transit System	Mode	Average Weekday Ridership	Bay Area Counties Served
SFMTA	Local/express bus; Light rail; Cable car/streetcar/trolley	744,000	MRN, **SF**, SM
BART	Heavy rail	427,000	ALA, CC, SCL, SF, SM
AC Transit	Local/transbay bus	180,000	**ALA, CC**, SCL, SF, SM
VTA	Local/express bus; Light rail	121,000	ALA, **SCL**, SM
Caltrain	Commuter rail	61,000	SCL, SF, SM
SamTrans	Local/express bus	38,000	SCL, SF, **SM**
Golden Gate Transit	Local/express bus; Ferry	19,000	**MRN**, SF, **SON**
County Connection	Local/express bus	11,000	ALA, **CC**
Marin Transit	Local bus	10,000	MRN
WETA	Ferry	10,000	ALA, CC, SF, SM, SOL
Tri Delta Transit	Local/express bus	7,000	CC
Santa Rosa CityBus	Local bus	6,000	SON
LAVTA Wheels	Local/express bus	6,000	**ALA**, CC
ACE	Commuter rail	5,000	ALA, SCL
SolTrans	Local/express bus	5,000	CC, **SOL**
WestCAT	Local bus; Express/transbay bus	4,000	**CC**, SF
VINE	Local/express bus	4,000	**NAP**, SOL
Sonoma County Transit	Local/express bus	3,000	SON
FAST	Local/express bus	3,000	CC, **SOL**
SMART	Commuter rail	2,000	MRN, SON
Vacaville City Coach	Local bus	1,000	SOL
Petaluma Transit	Local bus	1,000	SON
Union City Transit	Local bus	1,000	ALA
Dixon Readi-Ride	Local bus	< 1,000	SOL
Rio Vista Delta Breeze	Local/express bus	< 1,000	CC, **SOL**
Pleasanton Paratransit	Local bus	< 1,000	CC

Note: Average weekday ridership has been rounded to the nearest 1,000; Figures may not sum due to independent rounding; Average weekday ridership is calculated by taking the total annual ridership and dividing by 300, an assumption which is consistent with MTC travel modeling procedure; Primary counties served by operator are marked in bold.

Source: Data compiled by MTC and ABAG in 2020 based on data from Unlinked Passenger Trips and National Transit Database 2019

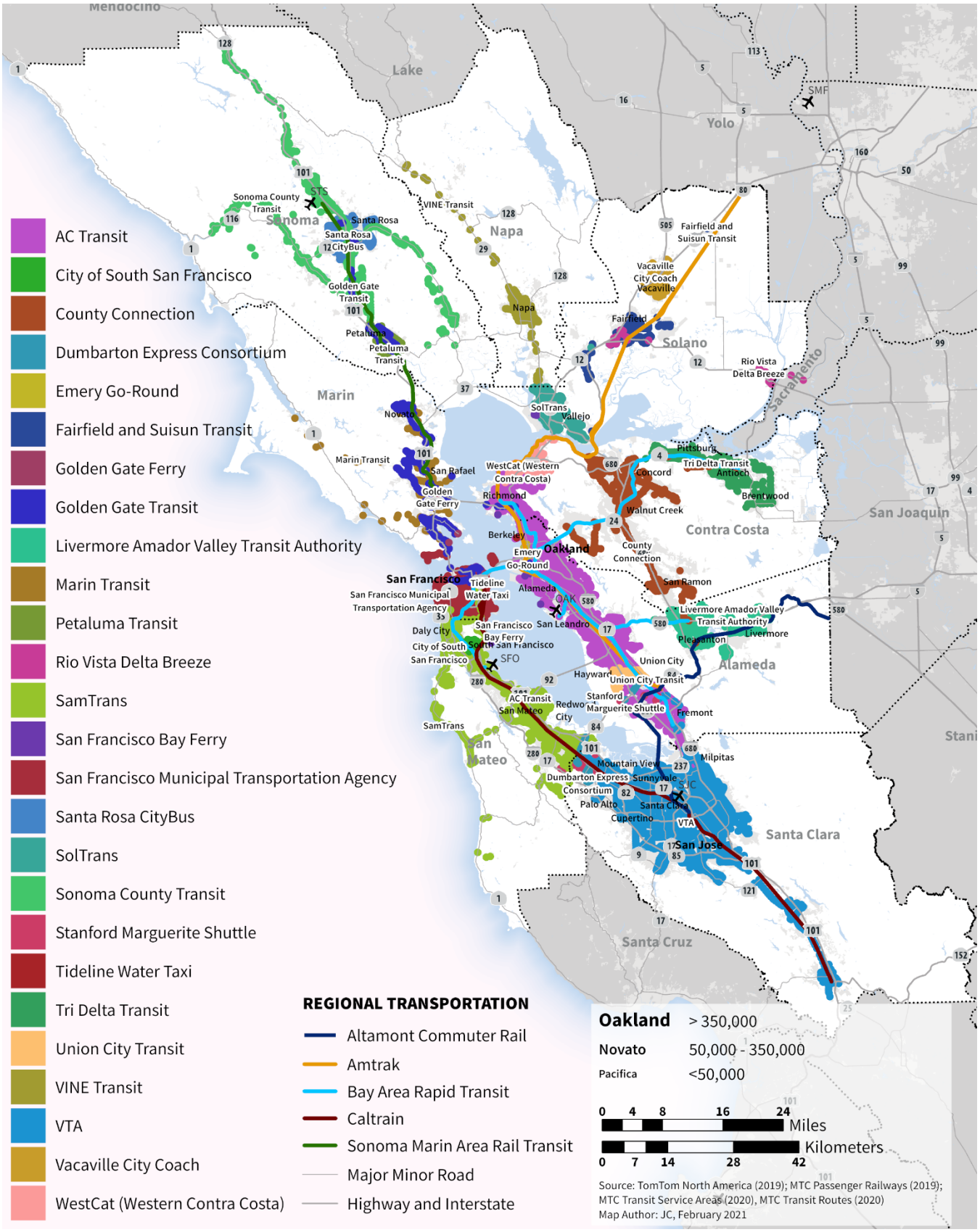


Figure 3.15-2: Transit Lines and Areas Served by Transit

Amtrak provides long-distance passenger rail services to the Bay Area via the Capitol Corridor, San Joaquin, Coast Starlight, and California Zephyr lines, connecting the region to the Central Valley, Southern California, the Pacific Northwest, and the Midwest.

California High-Speed Rail service is planned to begin revenue operations during the timeframe of the proposed Plan. As currently planned, by 2029, the system will run from San Francisco to the Los Angeles basin in under three hours. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations. Within the Bay Area region, the High-Speed Rail stations will provide development opportunities in the existing downtown cores of San Francisco, Millbrae, San Jose, and Gilroy.

Private Transit: In addition to public transit systems and operators, private transit options have expanded over recent years in the Bay Area. Private transit services include privately operated commuter shuttles (e.g. Apple, Google, Genentech) and publicly accessible private shuttles (e.g., Emery Go-Round, San Francisco Mission Bay Shuttles, Stanford University Marguerite).

Emerging Transportation Technology: New transportation technologies can have an important influence on regional and national transportation systems, and some have already started to change longstanding transportation behaviors. Transportation innovations include the following: on-demand ridesharing; bike-sharing; powered scooter-sharing; connected and autonomous vehicles; mobility aggregation applications that provide users with one source for mobility services (e.g., Moovel, CityMapper); transportation network companies (TNCs) (i.e., Lyft, Uber); coordinated and adaptive traffic signals; active traffic management, which provides the ability to dynamically manage traffic through use of strategies such as adaptive ramp metering and adaptive traffic signal control; and unmanned aircraft systems. These and other emerging technologies have the potential to transform mobility choices and alter the transportation landscape. For example, the expansion of TNC use and the deployment of autonomous vehicles could introduce zero-passenger vehicle miles as a significant source of car travel on roadways. The effect these technologies will have on the transportation system is uncertain and will be shaped by regulations and policies surrounding their use.

Bicycle and Pedestrian Facilities: The Bay Area has an extensive system of pedestrian facilities including multi-use paths, sidewalks, crosswalks, walkways, stairs, and ramps. Other pedestrian facilities include pedestrian signals, pedestrian refuge islands and medians, and curb extensions.

In addition to pedestrian facilities, the Bay Area has a bikeway network consisting of four classes of bikeways, defined in the California Highway Design Manual (California Department of Transportation, updated July 2020), as follows:

- **Class I Bikeway (Bike Path)**: completely separated right-of-way for exclusive use of bicycles and pedestrians,
- **Class II Bikeway (Bike Lane)**: dedicated lane for bicycle travel on a street or highway,
- **Class III Bikeway (Bike Route)**: shared lane for bicycle travel on a street or highway, and
- **Class IV Bikeway (Separated Bikeway/Cycle Track)**: separated or protected lane for bicycle travel on a street or highway.

Figure 3.15-3 shows the location of various bikeways through the Bay Area.

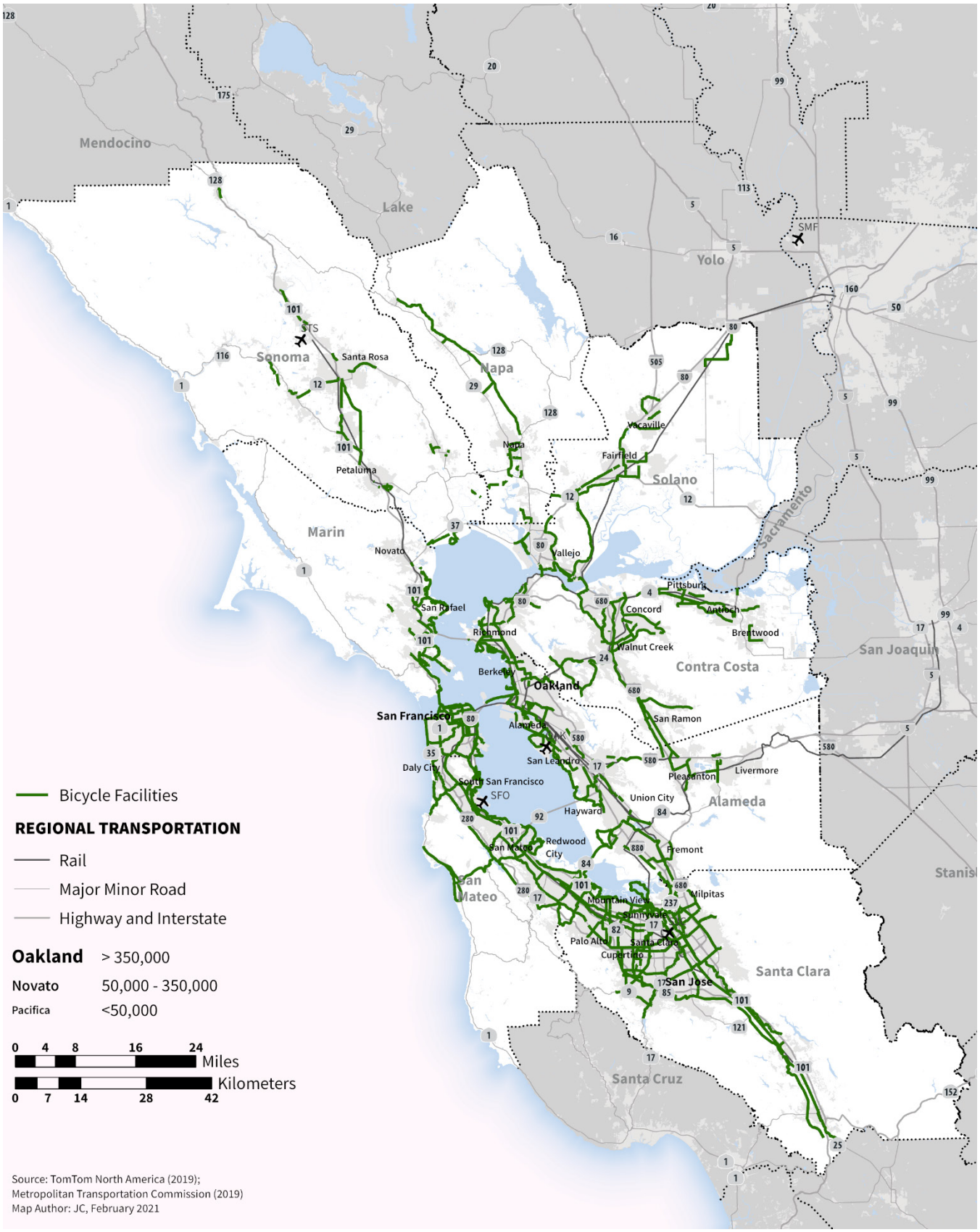


Figure 3.15-3: Bay Area Bicycle Facilities

MTC's Regional Bicycle Plan, updated in 2009, includes a Regional Bikeway Network. As of December 2018, 1,450 miles of the 2,140-mile network were completed. MTC is currently developing a regional Active Transportation Plan (AT Plan) to serve as a blueprint to strategically guide investments in active transportation infrastructure and regional policy development and implementation. The AT Plan will set specific active transportation and goals to increase usage of bicycles, scooters, and skateboards, including those with electric assistance, and will identify regional infrastructure gaps to be closed, policies requiring updating or creation, and funding scenarios to help achieve the AT Plan's goals.

Seaports and Airports: The Bay Area is served by five seaports, which provide the opportunity for intermodal transfers to trucks and railcars. The Port of Oakland, the largest of the five, is the third largest U.S. seaport on the West Coast (after the Ports of Los Angeles and Long Beach). Other seaports include the Port of San Francisco, the Port of Richmond, the Port of Benicia, and the Port of Redwood City. These seaports are supported by freight railroad services operated by Union Pacific and Burlington Northern Santa Fe.

The Bay Area is also served by three international airports: San Francisco International Airport, Oakland International Airport, and Norman Y. Mineta San José International Airport. Each of these airports provides mobility for people and freight nationally and internationally. The region is also served by one smaller airport with limited commercial service, Charles M. Schulz Sonoma County Airport, as well as numerous smaller general aviation airports.

Goods Movement: Goods movement supports global supply chains and regional industries that trade in international, domestic, and local markets. The types of goods moved, how the goods are moved, and where they are moved between, is a function of the regional economic activity and what transportation options are available. The movement of goods in the Bay Area region involves intermodal systems of air cargo, maritime, rail, and roadways. Efficient goods movement requires access and connectivity to logistics centers and terminals to ensure movement onto and off the network. The regional goods movement infrastructure includes the country's eighth-busiest container port (Port of Oakland), two of the most active air cargo airports (San Francisco International Airport and Oakland International Airport), major rail lines and terminals operated by Union Pacific and Burlington Northern Santa Fe Railway, and highways that carry high volumes of trucks (Port of Oakland 2020, MTC 2016).

Caltrans District 4 led the *San Francisco Bay Area Freight Mobility Study* in 2014, which provides detailed information regarding the region's multimodal goods movement system. The Alameda County Transportation Commission developed a long-range *Countywide Goods Movement Plan* (January 2016) and MTC has produced the *San Francisco Goods Movement Plan* (February 2016). MTC also partnered with the planning agencies for the Sacramento area, San Joaquin County, and the Monterey Bay area to study goods movement across the broader economic cluster and recommend strategies to support the mega-region in the *Northern California Mega-Region Goods Movement Study*. Additionally, MTC formed the Regional Freight New Technologies Task Force in September 2015 and studied freight strategies to develop the *Freight Emissions Reduction Action Plan* (July 2017).

TRANSPORTATION PERFORMANCE MEASURES

Regional conditions for a number of performance measures form the basis for the transportation impact analysis presented in this EIR. These measures include daily VMT and VMT per capita, mode share, and daily vehicle trips. These performance measures are described and summarized in more detail in this section. The existing conditions analysis in this EIR refers to conditions modeled in the

baseline year 2015. MTC utilized its regional travel demand model (Travel Model 1.5) to compare the proposed Plan for 2050 conditions to the 2015 baseline conditions.

Regional Travel Patterns: The Bay Area transportation system includes infrastructure supporting travel by numerous modes and routes for the movement of people and goods. **Table 3.15-3** provides some key metrics regarding Bay Area travel behavior in 2015 based on the simulation results from the travel model.

Table 3.15-3: Modeled Bay Area Travel Behavior (2015)

Daily Trips	
Commute Trips	8,360,000
Non-Commute Trips	17,939,000
Total Daily Trips	26,299,000
Daily Vehicle Trips	20,896,000
Daily Vehicle Miles Traveled (VMT)	155,006,000
Daily Vehicle Miles Traveled per Capita	20.4
Daily Vehicle Hours of Recurring Delay	264,500
Daily Transit Boardings	1,703,000
Daily Transit Passenger Miles	11,292,000

Note: Figures may not sum due to independent rounding; Daily metrics are measures for a typical weekday; Vehicle trips reflect interzonal trips assigned directly to the network and includes intraregional and commercial vehicle trips; Population statistics reflect the total Bay Area population able to travel on the region's transport network and does not include immobile, involuntary populations such as prison inmates.

Source: Data compiled by MTC and ABAG in 2021.

Vehicle Miles Traveled

The basic measure of the amount of vehicle travel generated is VMT. One vehicle traveling one mile constitutes one vehicle mile, regardless of its size, fuel type, or the number of passengers. Vehicle miles traveled is a term used throughout this EIR and refers to the number of VMT within the region (or a specified geographic area) during a typical weekday and includes VMT for all trip types (commute, shopping, social/recreational, school, goods movement). The VMT reported in this EIR reflects the mileage accrued within the nine county Bay Area region and not necessarily all VMT created by the residents of the region (for example, it would not include the VMT generated by a Bay Area resident driving in Los Angeles or Stockton). The VMT reported for a large nine county regional area includes the vast majority of VMT generated by Bay Area residents and employees. A portion of the regional VMT can be accrued by through (or interregional) trips. VMT is a common measure of roadway use and economic activity and has a strong correlation with congestion and emissions.

An area's per capita (or per person) VMT as applied in this EIR is the total VMT divided by the population of that area and is a measure of the average vehicle miles each person travels on a typical weekday. Per capita VMT tends to increase as a result of greater overall economic activity in the region, higher levels of per-household automobile ownership, and/or a jobs-housing imbalance that contributes to longer average commute distances.

As shown in **Table 3.15-3**, the region sees 155 million VMT on a typical weekday in the 2015 base year, or 20.4 VMT per capita.

Mode Share and Daily Trips

Of the trips made by Bay Area residents, the MTC travel model forecasts that 32 percent are for work, 14 percent for college or school, and 13 percent for shopping, as shown below in **Table 3.15-4**. The average one-way commute trip for the region is about 10 miles and takes 20 minutes, as shown in **Table 3.15-5**. The average one-way transit commute trip is just above the regional average distance, but almost double the regional average time.

Table 3.15-4: Modeled Typical Weekday Daily Person Trips by Purpose (2015)

Purpose	Trips	Percent of Total
Commute	8,360,000	32%
Shopping	3,478,000	13%
School	2,764,000	11%
Escort (pick-up/drop-off passengers)	2,393,000	9%
At Work	1,900,000	7%
Eat Out	1,088,000	4%
Social/Recreational	827,800	3%
College	663,600	3%
Other	4,826,000	18%
Non-Commute Subtotal	17,939,000	68%
Regional Total	26,299,000	100%

Note: Whole numbers have been rounded (between 1,000 and 1,000,000 to the nearest 100 and over 1,000,000 to the nearest 1,000).
Figures may not sum due to independent rounding; Metrics are measures for a typical weekday.
Source: Data compiled by MTC and ABAG 2021.

Table 3.15-5: Average One-Way Commute Trip by Mode (2015)

Purpose	Average Commute Distance (miles)	Average Commute Time (minutes)
Auto	10.3	18.0
Walk	0.8	16.2
Transit	11.0	37.2
Bicycle	2.4	12
Regional Average	9.8	19.7

Note: Metrics are measures for a typical weekday.
Source: Data compiled by MTC and ABAG in 2021.

According to U.S. Census Bureau data, Bay Area residents use a variety of transportation modes to get to their workplaces, as shown below in **Table 3.15-6**. While nearly two in three Bay Area residents drive alone to get to work on a typical day, twelve percent of residents rely on public transit and six percent either walk or bike to work.

Over the past nearly three decades, the share of workers driving alone to work has been fairly constant at the regional level, remaining at around 68 percent between 1990 and 2010, with a decrease of four percentage points to 64 percent in 2018. Carpooling has decreased in popularity in the Bay Area over the past decade compared to other commute options, declining from thirteen percent in 1990 to ten percent in 2018. Transit mode share has increased by two percentage points, from ten percent to twelve percent, while bicycling to work and working from home have doubled from one percent to two percent and from three percent to six percent, respectively.

Table 33.15-6: Bay Area Resident Workers Categorized by Means of Transportation to Work (1990-2015)

Year	1990 Number (Percent of Total)	2000 Number (Percent of Total)	2010 Number (Percent of Total)	2018 Number (Percent of Total)
Drive Alone	2,105,000 (68%)	2,248,000 (68%)	2,243,000 (68%)	2,539,000 (64%)
Carpool	400,000 (13%)	427,000 (13%)	354,000 (11%)	393,000 (10%)
Transit	294,000 (10%)	321,000 (10%)	333,000 (10%)	473,000 (12%)
Walk	112,000 (4%)	106,000 (3%)	112,000 (3%)	146,000 (4%)
Bike	32,000 (1%)	36,000 (1%)	50,000 (2%)	66,000 (2%)
Other	37,000 (1%)	36,000 (1%)	35,000 (1%)	80,000 (2%)
Work at Home	105,000 (3%)	133,000 (4%)	194,000 (6%)	252,000 (6%)
Total Workers	3,086,000 (100%)	3,306,000 (100%)	3,321,000 (100%)	3,949,000 (100%)

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, over 1,000,000 to the nearest 1,000.

Source: Data compiled by MTC/ABAG in 2020 based on data from U.S. Census Bureau 1990 and 2000 and American Community Survey 2010 and 2018 (B08301: Means of Transportation to Work, 1-Year Estimates)

3.15.2 Regulatory Setting

FEDERAL REGULATIONS

Fixing America's Surface Transportation Act

Since Moving Ahead for Progress in the 21st Century (MAP-21), a longer term 5-year federal funding bill, Fixing America's Surface Transportation (FAST) Act was signed into law in December 2015 and extended for one year through September 2021. The FAST Act expands the scope of consideration of the metropolitan planning process to include—consideration of intercity transportation (including intercity buses, intercity bus facilities, and commuter vanpool providers); improving transportation system resiliency and reliability; reducing (or mitigating) the stormwater impacts of surface transportation; and enhancing travel and tourism. In addition, it newly requires strategies to reduce the vulnerability of existing transportation infrastructure to natural disasters.

Metropolitan Planning General Requirements

Under the FAST Act/MAP-21, the U.S. Department of Transportation requires that metropolitan planning organizations, such as MTC, prepare long-range transportation plans (RTPs) and update them every four years if they are in areas designated as "nonattainment" or "maintenance" for federal air quality standards. Before enactment of MAP-21, the primary federal requirements regarding RTPs were included in the metropolitan transportation planning rules—Title 23 CFR Part 450 and 49 CFR Part 613. The FAST Act/MAP-21 makes a number of changes to the statutes that underpin these regulations. Key federal requirements described in Title 23 CFR 134 and California Transportation Commission guidelines for long range plans include the following:

- RTPs must be developed through an open and inclusive process that ensures public input; seeks out and considers the needs of those traditionally under served by existing transportation systems; and consults with resource agencies to ensure potential problems are discovered early in the RTP planning process;
- RTPs must be developed for a period of not less than 20 years into the future; RTPs must reflect the most recent assumptions for population, travel, land use, congestion, employment, and economic activity;

- RTPs must have a financially constrained element, transportation revenue assumptions must be reasonable, and the long-range financial estimate must take into account construction-related inflation costs;
- RTPs must include a description of the performance measures and performance targets used in assessing the performance of the transportation system;
- RTPs must include a system performance report evaluating the condition and performance of the system with respect to performance targets adopted by the State that detail progress over time;
- RTPs may include multiple scenarios for consideration and evaluation relative to the State performance targets as well as locally-developed measures.
- RTPs must conform to the applicable federal air quality plan, called the State Implementation Plan (SIP), for ozone and other pollutants for which an area is not in attainment; and
- RTPs must consider planning factors and strategies in the local context.

STATE REGULATIONS

California Transportation Commission Regional Transportation Plan Guidelines

California law relating to the development of the RTPs is primarily reflected in Government Code Section 65080. State requirements for long-range transportation plans are similar to the federal regulations. However, key additional requirements described in Government Code Section 65080 include:

- compliance with CEQA,
- consistency with State Transportation Improvement Program,
- use of program level performance measures that include goals and objectives,
- inclusion of a policy element, an action element, and a financial element, and
- inclusion of a Sustainable Communities Strategy for MPOs (see Senate Bill [SB] 375 discussion below).

Pursuant to Government Code Section 65080(d), MPOs, such as MTC, that are located in nonattainment and monitoring areas for transportation-air quality must update their RTPs at least every four years. If the current RTP is determined to be adequate such that an update is not warranted, the MPO may re-adopt the current RTP.

Under Government Code Section 14522, the California Transportation Commission (CTC) is authorized to prepare guidelines to assist in the preparation of RTPs. The CTC's RTP guidelines suggest that projections used in the development of an RTP should be based upon available data (such as from the Bureau of the Census), use acceptable forecasting methodologies, and be consistent with the Department of Finance baseline projections for the region. The guidelines further state that the RTP should identify and discuss any differences between the agency projections and those of the Department of Finance. The most recent and applicable guidelines are the 2017 RTP Guidelines for MPOs (CTC 2017).

Senate Bill 375

The Sustainable Communities and Climate Protection Act of 2008 (Chapter 728, Statues of 2008) (SB 375) has diversified the areas of study from past RTPs to include land use impacts and climate change issues. Specifically, SB 375 requires MPOs to prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its greenhouse gas (GHG) reduction targets through integrated land use, housing and transportation planning. The SCS must identify a transportation network that, when integrated with the forecasted development pattern for the Plan area, will reduce GHG emissions from automobiles and light trucks in accordance with targets set by CARB. See Section 3.6, "Climate Change, Greenhouse Gases, and Energy," for a more in-depth discussion of SB 375 and its implications for the proposed Plan. In 2018, CARB revised the previously established per-capita passenger vehicle GHG emission reduction targets for MPOs across the state. The Bay Area's revised reduction targets were set as 10 percent per capita by 2020 and 19 percent per capita by 2035 (CARB 2018). However, in the statewide 2017 Climate Change Scoping Plan and during CARB's 2018 update to SB 375 greenhouse gas emission reduction targets, CARB acknowledges that MPOs meeting their regional SB 375 targets alone will not achieve the emission reductions necessary to meet the statewide goal of 25 percent per capita greenhouse gas emission reductions by 2035; collectively, achieving the regional targets would only achieve a 19 percent reduction statewide (CARB 2018). The State expects to achieve the remaining reductions through additional State-level policies and measures.

Under SB 375, some development and transportation projects assumed as a part of the proposed Plan may be eligible to use a streamlined version of the environmental review process. Among other criteria, these projects must be consistent with the land use designation, density, intensity, and policies of Plan Bay Area, and fall within the identified criteria for development and transportation projects.

Senate Bill 226

CEQA Streamlining for Infill Projects (SB 226) sets forth a streamlined review process for infill projects and includes performance standards that will be used to determine an infill project's eligibility for streamlined review. The purpose of SB 226 and updated CEQA Guideline Section 15183.3 is to streamline the environmental review process by "limiting the topics subject to review at the project level where the effects of infill development have been addressed in a planning level decision or by uniformly applicable development policies." Residential, commercial and retail, public office buildings, transit stations, and schools are eligible for this streamlining provided they: (1) are located in an urban area on a site that has been previously developed or adjoins existing qualified urban uses on at least 75 percent of the site's perimeter; (2) satisfy the performance standards provided in Appendix M [of CEQA]; and, (3) are consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in either a sustainable communities strategy or an alternative planning strategy, with some exceptions.

Under SB 226, some development and transportation projects assumed as a part of the proposed Plan may be eligible to use a streamlined version of the environmental review process. Among other criteria, these projects must be consistent with the land use designation, density, intensity, and policies of Plan Bay Area, and fall within the identified criteria for development and transportation projects.

Senate Bill 743

SB 743 (2013) changes the way that public agencies evaluate the transportation impacts of projects under CEQA, recognizing that roadway congestion, while an inconvenience to drivers, is not itself an

environmental impact. (See PRC Section 21099(b)(2) ["automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to [CEQA]"].)

Under SB 743, the Governor's Office of Planning and Research (OPR) established vehicle miles traveled (VMT) as the preferred metric for measuring transportation impacts of most projects in place of vehicle level of service (LOS) or related measures of congestion as the primary metric. The use of VMT for determining significance of transportation impacts has become commonplace since the certification of this provision and the release of OPR's Technical Advisory on Evaluating Transportation Impacts in CEQA in December 2018 and, as of July 1, 2020, is the required metric Statewide.

For land use projects, SB 743 provides opportunities to streamline transportation analysis under CEQA for qualifying urban infill development near major transit stops in metropolitan regions Statewide. The legislation established a new CEQA exemption for a residential, mixed-use, or employment center project if it is: (1) proposed in a transit priority area, or TPA (i.e., an area within one-half mile of a major transit stop that is existing or planned); (2) consistent with a specific plan for which an EIR was certified, and (3) consistent with the use, intensity, and policies of an SCS or Alternative Planning Strategy (APS) that is certified by the California Air Resources Board as meeting its greenhouse gas reduction targets. This exemption requires further review if the project or circumstances change substantially. Additionally, the legislation establishes that aesthetic and parking impacts of these projects are not considered significant impacts on the environment.

SB 743 can also significantly affect the review of transportation projects under CEQA. Some projects, such as expanding facilities for bicycle, pedestrian, or transit-only use, will not result in negative transportation impacts because they are assumed not to significantly increase automobile trips. However, for roadway capacity projects, the CEQA guidelines (Section 15064.3) give lead agencies some discretion over what metric is used to evaluate transportation impacts, as some roadway expansion projects can induce vehicle travel. If using a metric besides VMT, however, the change in vehicle travel should still be reported. A program-level assessment of roadway projects in a regional plan may also be used to streamline project-level analysis (OPR 2018).

Caltrans has provided two guidance documents to address VMT impacts on the state highway system consistent with the requirements of SB 743 and the OPR Technical Advisory:

- The Transportation Analysis under CEQA (TAC) provides information to support CEQA practitioners in making CEQA significance determinations for transportation impacts of projects on the state highway system. These could include land use projects or transportation projects.
- The Transportation Analysis Framework (TAF) guides the preferred approach for analyzing the VMT attributable to proposed projects (induced travel) in various project settings, with particular focus on the analysis of induced travel associated with transportation projects which would add road capacity to the transportation system.

Senate Bill 1339 and Senate Bill 1128

Senate Bill 1339 authorized the Bay Area Air Quality Management District (BAAQMD) and MTC to adopt and implement a regional commuter benefits ordinance on a pilot basis. BAAQMD and MTC adopted the Bay Area Commuter Benefits Program, which requires Bay Area employers with 50 or more full-time employees in the Bay Area to offer commute benefits with the goal of reducing single-occupant vehicle commute trips, traffic congestion, and vehicle emissions. Under this program, large employers offer commuter benefits to their employees such as pre-tax contributions towards public transit passes

or commute shuttle services. Senate Bill 1128 authorized BAAQMD and MTC to make the Bay Area Commuter Benefits Program permanent.

Assembly Bill 1358

Assembly Bill 1358, also known as the Complete Streets Bill, amended the California Government Code Section 65302 to require that all major revisions to a city or county's Circulation Element include provisions for accommodation of all roadway users, including bicyclists and pedestrians.

California Bicycle Transportation Act

The California Bicycle Transportation Act (1994) requires all cities and counties to have an adopted bicycle master plan to apply for Bicycle Transportation Account funding source.

Senate Bill 1014

The Clean Miles Standard and Incentive Program (SB 1014) requires the California Public Utilities Commission (CPUC) and California Air Resources Board (CARB) to establish and implement greenhouse gas emission reduction targets and goals for transportation network companies (TNCs). The State is establishing targets in 2021. TNCs will be required to develop GHG emission reduction plans beginning January 1, 2022, with targets and goals starting in 2023. In the proposed rulemaking, TNCs will be able to comply with the rule through any combination of electrification, reduction of miles without passengers, increased ridesharing, and optional credits.

REGIONAL AND LOCAL REGULATIONS

Congestion Management Agency Transportation Plans

Each of the nine Bay Area counties has a congestion management agency (CMA) designated to manage traffic congestion through implementation of multimodal transportation projects. These agencies work with MTC to advance road, bicycle, pedestrian, and transit projects in line with regional objectives. In addition, many CMAs develop county transportation plans that should be consistent with the Regional Transportation Plan adopted by MTC. MTC has developed guidelines to be used in the preparation of countywide transportation plans. MTC published the *Guidelines for Countywide Transportation Plans* in September 2014. The intent of the guidelines is to inform the relationship between countywide transportation plans and the RTP/SCS, assist implementation of SB 375 and MAP-21/FAST, and identify appropriate content to include in the development of countywide transportation plans. Many of the CMAs are currently in the process of updating their countywide plans. The most recent countywide transportation plans are listed below.

- Alameda County Transportation Commission: *2020 Countywide Transportation Plan* (adopted November 2020);
- Contra Costa Transportation Authority: *2017 Countywide Comprehensive Transportation Plan* (adopted September 2017);
- Transportation Authority of Marin: Moving Forward A 25-Year Transportation Vision for Marin County (update in progress);
- Napa Valley Transportation Authority: *Advancing Mobility 2045* (update in progress, draft released February 2021, anticipated completion in 2021);
- San Francisco County Transportation Authority: *San Francisco Transportation Plan 2050* (update in progress, anticipated completion in 2021);

- City/County Association of Governments of San Mateo County: *San Mateo Countywide Transportation Plan 2040* (adopted February 2017);
- Santa Clara Valley Transportation Authority: *Valley Transportation Plan 2040* (adopted October 2014);
- Solano Transportation Authority: *Solano Comprehensive Transportation Plan 2040* (adopted June 2020); and
- Sonoma County Transportation Authority: *Comprehensive Transportation Plan: Moving Forward 2050* (update in progress).

City and County General Plans

State law requires cities and counties to adopt general plans, which must include a transportation, or circulation, element and a land use element. The circulation and land use elements must correlate such that each must address changes in the other. The circulation element describes the existing and proposed transportation facilities and must "plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways for safe and convenient travel in a manner that is suitable to the rural, suburban, or urban context of the general plan" (Government Code Section 65302) Local circulation elements should reflect the regional transportation plan and sustainable community strategy to be consistent with regional greenhouse gas reductions and ensure access to transportation funds (OPR 2017). This EIR does not examine consistency with the general plans of jurisdictions within the Bay Area; rather, it addresses issues of overall system performance from a regional perspective.

City and County Modal Plans

City- and county-wide bicycle and pedestrian master plans, active transportation plans, freight/goods movement plan, and other mode-specific plans serve as policy documents to guide the development and maintenance of the transportation network, support facilities, and non-infrastructure programs. These plans describe the acceptable operating standards, levels of service, facility classifications, and mode-specific goals and policies of a given city or county.

3.15.3 Impact Analysis

SIGNIFICANCE CRITERIA

The following significance criteria are based on CEQA Guidelines Appendix G, OPR's Technical Advisory on Evaluating Transportation Impacts in CEQA (December 2018), the criteria used in the Plan Bay Area 2040 EIR (2017), and professional judgment. Under these criteria, implementation of the proposed Plan would have a potentially significant adverse impact if it would:

- conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities (Criterion TRA-1);
- conflict or be inconsistent with CEQA Guidelines section 15064.3(b) (Criterion TRA-2);
- substantially increase hazards due to geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) (Criterion TRA-3); or
- result in inadequate emergency access (Criterion TRA-4).

METHOD OF ANALYSIS

This program-level EIR evaluates potential transportation impacts based on the location of the proposed Plan's footprint associated with the forecasted development pattern (i.e., the land use growth footprint), sea level rise adaptation infrastructure (i.e., sea level rise adaptation footprint), and transportation projects (i.e., transportation system footprint). The baseline for this analysis reflects existing conditions when the EIR Notice of Preparation was released in September 2020. However, impacts relying on analysis from Travel Model 1.5 (e.g., VMT), reflect a baseline year of 2015, because it is the most recent year for which comprehensive land use, demographic, transit ridership and traffic volumes are available for the Bay Area region.

This evaluation of transportation impacts assumes that construction and development under the proposed Plan would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts.

Vehicle Miles Traveled

Changes in VMT for this analysis are based on travel forecasts developed using the MTC travel demand forecasting model, known as Travel Model 1.5, which is integrated with the regional land use forecasting model, known as Bay Area UrbanSim 2.0, to produce forecasts of travel behavior and vehicle activity (see Section 2.3.3, "Analysis Tools," in Chapter 2 for more detail).

Travel Model 1.5 considers numerous factors that influence travel behavior and vehicle activity in the region which in turn affect the roadway network assignment, including:

- demographic factors – age, income, household size, number of workers;
- population, household, and employment forecasts;
- land use and development patterns – density, intensity, mix of uses, distance to transit;
- transportation costs – gas prices and transit fares;
- travel characteristics of adjacent regions – including the amount and extent of external, or interregional, and through travel;
- geographic features and topography – such as rivers, mountains, and valleys; and
- transportation systems characteristics – including number of lane miles and posted speed, transit service schedules and station locations.

The integrated model framework of UrbanSim 2.0 and Travel Model 1.5 address short- and long-run induced travel demand. For example, short-run induced travel demand can be caused by a new transportation facility creating additional capacity, thus inducing new trips due to shortened travel times to destinations in the months or years after construction. Long-run induced demand can be caused by residential and employment location changes as a result of transportation investments, such as a new rail station inducing development of new office buildings in the vicinity over a period of years or decades. Major transportation projects are implemented in Travel Model 1.5 on top of the region's existing transportation system, resulting in changes to accessibility. The change in accessibility affects short-run induced travel, which is accounted for in Travel Model 1.5 through

changes to trip length, travel routes, and trip modes, as well as the generation of new trips. The integrated model system also captures long-run induced demand through feedback loops between Travel Model 1.5 and UrbanSim 2.0. The land use development forecasts generated by Bay UrbanSim 2.0 are informed by Travel Model 1.5's transportation accessibility measure, which are altered as transportation projects are implemented into the model. Changes in accessibility can affect the land use development pattern and ultimately the forecasts of travel behavior and vehicle activity.

These effects of induced demand are captured in both the land use growth pattern, and in the regional travel forecast summaries shown in Section 2.2.2, "Conditions Under the Proposed Plan." This includes VMT, which in the context of this analysis refers to network VMT. Network VMT is an aggregation of each vehicle trip multiplied by the distance of its respective path, based upon Travel Model 1.5's forecast of travel behavior and vehicle activity. VMT is quantified in the same manner for both existing and forecasted conditions and the increment of change is then calculated.

Travel Model 1.5 is not sensitive to the full range of strategies in the proposed Plan. Marketing and education campaigns, as well as non-capacity-increasing transportation investments like bikeshare programs (i.e., Strategy EN09, "Expand Travel Demand Management Strategies"), are examples of strategies with the potential to change behavior in ways that result in reduced VMT and vehicle emissions. Travel Model 1.5 and EMFAC do not estimate reductions in VMT and emissions in response to these types of changes in traveler behavior. As such, an "off-model" approach was used to quantify the VMT and GHG reduction benefits of these important programs. Off-model analyses are standard element of an SCS and have been included in all previous MTC SCS. CARB provides guidance on the off-model analyses in the Final Sustainable Communities Strategy Program and Evaluation Guidelines Appendix D (November 2019) and reviews "the development, quantification, and effectiveness and potential adjustments of the MPO's off-model strategies" as part of the evaluation of MTC's SCS technical methodology (CARB 2019c).

IMPACTS AND MITIGATION MEASURES

Impact TRA-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities (LTS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

The proposed Plan includes several elements to leverage the region's transportation network—including transit, bicycle, and pedestrian systems—to achieve regional goals. Note that the assessment of the proposed Plan's impact on vehicle miles traveled (VMT) is discussed in TRA-2.

As described in Chapter 2, "Project Description," the regional growth forecast for the Bay Area projects that by 2050 the region will support an additional 2.7 million residents and 1.4 million jobs, resulting in 1.4 million new households. The proposed Plan designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that would result in focused housing and job growth concentrated primarily in or adjacent to already developed areas and along existing transit corridors. As described in Section 2.3.4, "Proposed Plan Growth Geographies," the proposed Plan would focus forecasted growth within infill locations with access to transit. Planning for future growth in Priority Development Areas (PDAs) near transit helps the region accommodate future growth while meeting the region's SB 375 greenhouse gas emissions reduction target. In addition to PDAs, Transit Rich Areas (TRAs) and High-Resource Areas (HRAs) were added as designated growth geographies to accommodate the regional growth forecast near transit, thereby allowing more

people access to sustainable transportation options. The PDAs build on local and regional planning efforts and include 216 locally nominated areas within the nine-county Bay Area.

In 2005, MTC adopted Resolution 3434, a transit-oriented development (TOD) policy for regional transit expansion projects. This policy requires the establishment of a minimum level of development around stations and corridors and the development of station area plans before regional funds can be programmed and allocated to the transit expansion project. The proposed Plan PDA planning policies align with the TOD Policy's intent to direct regional growth into areas with transit access.

In 2012, MTC developed the One Bay Area Grant Program (OBAG 1), adopted under Resolution 4035. OBAG 1 aligned FY 2012-13 through FY 2016-2017 federal funding with the Sustainable Communities Strategy by promoting transportation investments in PDAs. With Resolution 4202, MTC established the second round of OBAG (OBAG 2) for funding FY 2017-18 to FY 2021-22. OBAG 2 continued similar policies as OBAG 1, including targeting project investments to PDAs to support the SCS goals. Under the program, counties must direct at least 50 to 70 percent of allocated OBAG funds to PDAs.

MTC adheres to longstanding transportation investment approaches, which include a "Fix It First" commitment to direct most funding to repair, maintain, and operate the existing roadway and transit system; focused growth in PDAs connected to the transportation network; developing a modern transit network; and protecting our climate by reducing our transportation-related emissions.

The proposed Plan aligns with this investment framework through its transportation strategies, which include the following:

- T01. Restore, Operate and Maintain the Existing System,
- T10. Enhance Local Transit Frequency, Capacity and Reliability,
- T11. Expand and Modernize the Regional Rail Network, and
- T12. Build an Integrated Regional Express Lane and Express Bus Network.

Most of the proposed Plan's $579 billion transportation investments are committed to these strategies.

In addition to investments for transit infrastructure, capital, and maintenance, the proposed Plan includes strategies to improve the use of the existing transit network, which aligns with the overall goals to focus on more cost-effective operation approaches. These strategies include:

- T03. Enable a Seamless Mobility Experience, and
- T04. Reform Regional Transit Fare Policy.

These strategies align with existing programs and plans to increase transit use in the region. Existing programs and plans include MTC's activities to streamline fare payment and trip planning across transit operators, including managing a Transit Fare Coordination and Integration Study and a Fare Integration Task Force to identify practical steps toward integrating the fare structure and polices of the Bay Area's more than two dozen transit agencies to explore ways to make the region's transit network better coordinated, more affordable, and more attractive. Similarly, MTC is leading the modernization of the Clipper transit fare payment system. The proposed Plan includes continued support for Clipper as part of its strategy to Advance Other Regional Programs and Local Priorities.

Table 2-11 in Chapter 2, "Project Description," summarizes the change in forecasted daily transit boardings and daily transit passenger miles. Both transit metrics are forecasted to more than double, 133 percent and 168 percent respectively, from baseline (2015) to proposed Plan conditions (2050).

Similarly, transit trips are forecasted to double between 2015 and 2050 and increase transit mode share from six to nine percent of all trips in 2050 (see **Table 2-14**).

The proposed Plan's strategies support the region's road network, primarily focusing on repairing and maintaining roadways and making more efficient use of the existing capacity through an expanded managed lane network, which includes carpool and express lanes. In addition to Restore, Operate and Maintain the Existing System, the strategies to improve the road network include:

- T05. Implement Per-Mile Tolling on Congested Freeways with Transit Alternatives,
- T06. Improve Interchanges and Address Highway Bottlenecks, and
- T12. Build an Integrated Regional Express Lane and Express Bus Network.

The Bay Area Infrastructure Financing Authority (BAIFA), a joint powers authority between MTC and the Bay Area Toll Authority (BATA), manages the Bay Area Express Lanes Network, which currently includes 118 miles with plans for over 600 miles of express lanes by 2035. The proposed Plan leverages the express lanes network with strategies to help manage traffic, VMT, and mode choice.

In addition to managed lanes, MTC also has a number of other programs to help improve travel times, maintain optimal speeds, reduce congestion, and reinforce efforts to reduce GHG emissions on the region's roadways. These programs include the Freeway Performance Initiative (FPI); the Arterial Operations Program; and the "Forward" commute initiatives, which include Bay Bridge Forward, Dumbarton Forward, Napa Valley Forward and Richmond-San Rafael Forward. These initiatives include strategies such as intelligent transportation systems, metering, traffic monitoring, all-electronic tolling, extensions of High Occupancy Vehicle (HOV) lanes, dedicated transit lanes, transit signal prioritizing and adaptive signal timing, increased express bus service, carpool and vanpool programs, commuter parking programs to encourage carpooling, and programs to encourage biking and walking. Along with improving interchanges and addressing bottlenecks, the proposed Plan's transit, managed lanes, transportation demand management, and bicycle and pedestrian strategies align with and support these programs by reducing the demand on the roads. As discussed in Chapter 2, "Project Description," minimal changes to roadway capacity, coupled with increases in commuters and other drivers leads to more hours of vehicle delay on the region's roadway systems. However, the proposed Plan's land use and transportation strategies lead to shifts in travel mode choice decisions, as summarized in **Table 2-14** and **Table 3.15-3**, with auto mode shares—drive alone, carpool and ride hail—decreasing as a share over time, from a combined share of 79-percent in the baseline (2015) to 70-percent in 2050.

The proposed Plan includes strategies to support pedestrians, bicyclists, scooter users, and skateboard users, including those with electronic assistance, as well as strategies designed to reduce reliance on driving. These strategies include:

- T08. Build a Complete Streets Network, and
- T09. Advance Regional Vision Zero Policy through Street Design and Reduced Speeds.

As part of the Complete Streets vision, the proposed Plan includes building out 10,000 miles of bike lanes or multi-use paths across the region. The strategies to reduce speeds and design roads that are safe for all users also support the efforts to increase use of roadways by cyclists and pedestrians.

These strategies reflect and support several existing and developing regional programs, plans, and policies. Adopted in 2006 under Resolution 3765, MTC has a Complete Streets policy requiring that all projects funded with regional funds consider the accommodation of pedestrians, cyclists, public transit users and drivers as part of project planning, design, funding, and construction. As part of this

policy, project sponsors must have a complete streets policy or updated circulation element of their local General Plan in place and must complete a Complete Streets Checklist for the project to access regional funding such as OBAG and the Active Transportation Program (ATP), the state funding program for bike and pedestrian projects. MTC administers the region's share of the State's ATP funding, which allows cities, counties, transit agencies, and other public agencies to compete for grants to build bicycle/pedestrian paths, install bike racks and implement other projects and programs that make walking or biking easier, safer, and more convenient. MTC also administers the Bay Area Safe Routes to School program, which taps federal money to provide approximately $5 million each year in grants for cities, counties, and congestion management agencies to fund bike and pedestrian paths that connect with schools; on-street bike lanes; bike racks or other secure bike parking; traffic calming projects; bike safety programs; and education and outreach for students and families.

MTC is developing the Bay Area's first regional Active Transportation Plan (AT Plan) to serve as a blueprint to strategically guide investments in active transportation infrastructure and regional policy development and implementation. Prior to this effort, MTC adopted a Regional Bicycle Plan, which established the Regional Bikeway Network and served to prioritize and guide bicycle-related investments on key bicycle facilities in the region; by 2018, two-thirds of the key bike facilities identified in the Regional Bicycle Plan had been built. The AT Plan will set specific active transportation and micromobility goals, and will identify regional infrastructure gaps to be closed, policies requiring updating or creation, and funding scenarios to help achieve the AT Plan's goals. The AT Plan will directly support the proposed Plan strategy to build a Complete Streets Network, as well as help to meet the proposed Plan mode shift, safety, equity, health, resilience, and climate goals.

The proposed Plan forecasts substantial increases in the number of bicycle trips as a share of total trip making. **Table 2-14** in Chapter 2, "Project Description," details a 300-percent projected increase in bicycle trips from baseline (2015) to future conditions (2050). This increase would result in bicycle trips growing from two percent of all trips in the baseline to seven percent of all trips in future conditions. The proposed Plan includes a number of other transportation-related strategies aside from those specifically targeting transit, roads, bicycle, and pedestrian facilities:

- EN07. Expand Commute Trip Reduction Programs at Major Employers, and
- EN09. Expand Transportation Demand Management Initiatives.

In partnership with the Bay Area Air Quality Management District, MTC administers the Commuter Benefits Program (CBP), requires that employers with 50 or more employees in the Bay Area provide commuter benefits to employees with the goal of reducing VMT and greenhouse gas emissions, as authorized by Senate Bills 1339 and 1128. The proposed Plan includes continued support for the CBP as part of its strategy to Expand Commute Trip Reduction Programs at Major Employers.

MTC's Climate Initiatives Program funds activities with the primary goal to reduce greenhouse gas emissions from the transportation sector and help the Bay Area meet its regional emission reduction targets. This program includes a set of transportation demand management (TDM) approaches, such as developing targeted outreach and incentives to shift away from vehicle trips and expanding car share locations alongside mobility hubs. MTC also operates regional vanpool and carpool programs and is the contract administrator for the regional bike share system. These TDM initiatives are continued with expanded investments in the proposed Plan.

To provide increased mobility options to historically marginalized communities, the proposed Plan also includes transportation Strategy T02. Support Community-Led Transportation Enhancements in Communities of Concern. This strategy relies on identifying and addressing the transportation needs

identified by the community. This aligns with the longstanding Community-Based Transportation Plan (CBTP) program, in which MTC awards funds to county transportation agencies for the development of plans for low-income neighborhoods based on engagement with local residents, community organizations, and transportation agencies together to identify their most important transportation challenges and develop strategies to overcome them. MTC also programs federal and State funds to implement elements of a CBTP through its Lifeline Transportation Program.

Local jurisdictions and transit agencies also develop plans that affect the circulation system. County Transportation Agencies (CTA)/Congestion Management Agencies (CMA) develop Congestion Management Plans (CMP) and/or Countywide Transportation Plans (CTP), which are required to be consistent with the RTP/SCS. To this end, MTC issues guidance to ensure that the local and regional plans are aligned. Additionally, any substantial projects included in local plans are incorporated into the RTP, either in the development of the proposed Plan or through amendments to the existing Plan. Through this coordinated planning process, the proposed Plan is not expected to conflict or be inconsistent with local plans.

MTC also participates in multijurisdictional planning for goods movement, including the impact of this economic activity on land use, the transportation network, and the environment. In 2016, MTC released the San Francisco Bay Area Goods Movement Plan, which responded to the evolving economic context, the need to balance between PDAs and industrial land uses, and greenhouse gas and environmental justice issues associated with goods movement. Prior goods movement planning efforts inform the proposed Plan's transportation network.

The proposed Plan includes investments to protect communities and transportation facilities vulnerable to sea level rise. These adaptation strategies align with other regional adaptation and resiliency plans. MTC coordinated with the Bay Conservation and Development Commission and their Adapting to Rising Tides Program on a series of projects to understand the vulnerability and consequences of sea level rise inundation and storm event flooding on transportation infrastructure and the program's products were used to inform the proposed Plan.

Conclusion

The proposed Plan approach and strategies align with other regional programs, plans, and policies, including MTC programs administering State and federal programs. MTC partners with BAAQMD and other regional agencies to assure alignment of transportation strategies. The core approach of directing regional growth to infill areas and providing sustainable transportation options to reduce emissions, improve mobility and access, reduce congestion, and increase safety on the transportation system is reflective of federal, State, and local efforts. Implementation of the proposed Plan is not expected to substantially conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities, and the impact would be **less than significant (LTS)**.

Mitigation Measures

None required.

Impact TRA-2: Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b) (PS)

As noted in CEQA Guidelines Section 15064.3(a), in general, vehicle miles traveled is the most appropriate measure of transportation impacts. CEQA Guidelines Section 15064.3(b) provides the criteria for analyzing and determining transportation impacts, as follows:

b. Criteria for Analyzing Transportation Impacts.

1. Land Use Projects. Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be considered to have a less than significant transportation impact.

2. Transportation Projects. Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, a lead agency may tier from that analysis as provided in Section 15152.

3. Qualitative Analysis. If existing models or methods are not available to estimate the vehicle miles traveled for the particular project being considered, a lead agency may analyze the project's vehicle miles traveled qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate.

4. Methodology. A lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's vehicle miles traveled, and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document prepared for the project. The standard of adequacy in Section 15151 shall apply to the analysis described in this section.

The criteria in Section 15064.3(b) are primarily directed toward the assessment of project-level impacts, whereas the proposed Plan is a regional long-range plan integrating a region-wide suite of projects, programs, and policies, and the proposed Plan is analyzed using regional models.

While VMT has been established as the new measure of transportation impacts under SB 743 (see Section 3.15.2, "Regulatory Setting," for further discussion of SB 743), CEQA allows lead agencies to determine the methodology for evaluating VMT (CEQA Guidelines Section 15064.3(b)(4) and to establish a threshold of significance (CEQA Guidelines Section 15064.7).

The State has developed resources to help lead agencies evaluate impacts and establish impact thresholds under the new VMT standard. Key guidance relevant to transportation impacts and VMT include the California OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018) and the California Air Resources Board's (CARB) *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals* (January 2019).

OPR's Technical Advisory provides guidance on determining significance thresholds and assessing VMT. The Technical Advisory is directed to specific projects by project type (i.e., residential, retail, office, etc.) and local plans (Ie general plans), and includes recommendations for evaluating transportation impacts. OPR uses the Statewide greenhouse gas targets established through 2050 by State laws and

executive orders as the basis for its recommended VMT significance thresholds. For project-level analyses, OPR recommends that "a per capita or per employee VMT that is fifteen percent below that of existing development may be a reasonable threshold" based on their review of relevant research on project-level impact mitigation measures. The OPR guidance addresses general plans (and lesser area plans), but not regional plans: "A general plan, area plan or community plan may have a significant impact on transportation if proposed new residential office, or retail land use would, in aggregate, exceed the respective thresholds" for the project level thresholds, a per capita VMT that is fifteen percent below existing development.

In the *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, CARB describes VMT estimates associated with a scenario developed for the 2017 Scoping Plan Update. The scenario assumed a combination of vehicle technologies, vehicle fuels, and slower VMT growth that would achieve the Statewide 2050 GHG emission reductions targets (80% below 1990 levels by 2050, as established under EO S-03-05). The assessment is based on a scenario CARB developed that would achieve the GHG goals through a combination of cleaner vehicles and fuels and slower VMT growth. Based on the scenario assessment, CARB found that for light-duty vehicle travel, per-capita VMT would need to be 16.8 percent lower than existing levels (Statewide 2015-2018 average VMT per capita) by 2050, and for overall vehicle travel, per-capita VMT would need to be 14.3 percent lower than existing levels to be consistent with the 2050 State climate goals (CARB 2019). However, CARB also stresses that the VMT developed in these estimates "is <u>not</u> household-generated VMT, and the values are <u>not</u> directly comparable to output from a local or regional travel demand model."

Based on the above, no thresholds for assessing significant impacts in VMT at the regional level, such as for an RTP/SCS, have been established by the State. Despite this, the proposed Plan meets other associated State targets. Pursuant to CARB's target setting under SB 375, the proposed Plan must achieve at least a 19 percent per-capita reduction in forecasted GHG emissions from light- and medium-duty vehicle in 2035 relative to 2005. The proposed Plan meets and exceeds this target (see Criterion GHG-4 in Section 3.6, "Climate Change, Greenhouse Gases, and Energy"). The GHG emission reductions are primarily achieved by land use, transportation, and a subset of environmental strategies in the proposed Plan to slow VMT growth as opposed to vehicle technology and vehicle fuels improvements. However, in the 2017 Climate Change Scoping Plan, CARB acknowledges that the GHG emission reduction needed to meet the Statewide goals is 25 percent by 2035 but the targets established for the MPOs under SB 375 collectively are only expected to achieve 19 percent reduction Statewide (CARB 2018). Although the SB 375 GHG emission reduction target does not equate to a VMT reduction threshold, the proposed Plan's GHG reductions are representative of substantial reductions in VMT per capita in the proposed Plan.

Although the reduction amounts developed by OPR and CARB may not apply to significance thresholds for an RTP/SCS, they establish standards that may be used for lead agencies as guidance, subject to lead agency discretion as discussed above.

<u>Land Use, Sea Level Rise Adaptation, and Transportation System Impacts</u>

The proposed Plan is designed to reduce GHG emissions pursuant to SB 375, through complementary land use and transportation strategies. The core land use strategy of the proposed Plan is to accommodate forecasted changes in population, households, and employment through "focused growth" in existing communities along the existing transportation network, particularly in communities with proximity to frequent, robust transit service. As discussed in detail in Chapter 2, "Project Description," the proposed Plan designates approximately five percent of the region's land to accommodate the Bay Area's regional growth forecast (see Impact TRA-1) and identifies a series of housing and economic strategies to affect the regional growth pattern. The growth geographies in

the proposed Plan accommodate 85 percent of the 1.4 million new households and 55 percent of the 1.4 million new jobs. Over 50 percent of the designated growth geographies also qualify as areas that would meet the State's guidelines as TPAs (see **Table 2-21** in Chapter 2, "Project Description"). The proposed Plan's combination of designated growth geographies and land use strategies focus housing and job growth primarily into infill areas with access to transit and other mobility options while also encouraging a more balanced jobs-housing ratio. The regional growth forecast along with the proposed Plan's growth geographies, strategies, and ensuing forecasted development pattern leads to a shift from automobile travel to public transit and non-motorized modes over the Plan horizon (2050) in order to achieve SB 375's mandate to reduce GHG emissions (see Section 2.2.3, "Conditions Under the Proposed Plan," for a complete summary of regional travel forecasts).

The focused growth approach is articulated in strategies in the Housing and Economy Elements of the proposed Plan, discussed in Chapter 2, "Project Description." The Housing Element includes a set of strategies that spur increased housing density in growth geographies, particularly Strategy H03, "Allow a Greater Mix of Housing Densities and Types in Growth Geographies." To support growth and the ability for households of all incomes to have transit access, the suite of strategies spurs affordable housing development and preservation in addition to increased renter protections. The Economy Element includes strategies—strategies EC04, "Allow Greater Commercial Densities in Growth Geographies" and EC05, "Provide Incentives to Employers to Shift Jobs to HTAs Well Served by Transit"—to encourage improved jobs-housing ratios, locating jobs and housing closer to each other and potentially reducing the commute distances throughout the region.

The housing and economy strategies result in the proposed Plan's forecasted development pattern, which informs travel patterns in 2050. These travel patterns, when coupled with the transportation strategies, are simulated in the regional travel model, Travel Model 1.5, to derive a series of forecasted travel metrics to contrast to simulated baseline conditions (2015). Metrics include summaries of trips by mode, their average travel time and distance, and the purpose of the trip. **Table 3.15-7** summarizes auto trips by purpose—commute versus non-commute—and their respective average travel distances. Overall, implementation of the proposed Plan would lead to shorter auto trip distances for both commute and non-commute trips. Auto commute trip distances are expected to decrease by four percent and non-commute trips are forecasted to decrease by five percent between 2015 and 2050.

Table 3.15-7: Average Travel Distance per Auto Trip by Purpose

	2015 Baseline (miles)	2050 Proposed Plan (miles)	Change (2015 to 2050)	
			Numerical	Percent
Commute	10.3	9.9	-0.4	-4%
Non-Commute	5.5	5.2	-0.3	-5%

Source: Data compiled by MTC and ABAG in 2021

In addition to shorter auto trips, the proposed Plan's land use strategies result in increases in higher density, multi-family housing units in developed areas, where services tend to be closer to residences, walking and biking become more viable travel options, and transit is relatively more available. This type of development allows for households to reduce their reliance on automobile travel, as summarized in **Table 3.15-8**. Implementation of the proposed Plan would lead to higher shares of households with zero or one vehicle relative to existing conditions and reduce the share of households with multiple autos.

Table 3.15-8: Household Auto Ownership

	2015 Baseline	2050 Proposed Plan	Change (2015 to 2050)	
			Numerical	Percent
Share of Households with Zero Autos	9%	13%	+4%	44%
Share of Households with One Auto	31%	34%	+3%	+10%
Share of Households with Multiple Autos	59%	53%	-6%	-10%
Average Number of Vehicles by Household	1.54	1.48	-0.06	-4%

Note: Figures may not sum due to independent rounding; Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations such as prison inmates.
Source: Data compiled by MTC and ABAG in 2021

In addition, the proposed Plan includes an array of transportation strategies that affect access to non-auto transportation modes, travel times and trip costs, and ultimately mode choice. The Transportation Element includes substantial investments in transit capital, infrastructure, and operations and maintenance and in bicycle and pedestrian facilities. In addition to investments in physical systems, the proposed Plan advances improvements to make transit and other non-auto modes more convenient and attractive through integrated fare policies, streamlined multimodal trip planning and fare payment, and transportation demand management (TDM) strategies. These strategies include (see Chapter 2, "Project Description," for more detail on the strategies):

- T03. Enable a Seamless Mobility Experience,
- T04. Reform Regional Transit Fare Policy,
- T05. Implement Per-Mile Tolling on Congested Freeways with Transit Alternatives,
- T08. Build a Complete Streets Network,
- T09. Advance Regional Vision Zero Policy through Street Design and Reduced Speeds,
- EN07. Expand Commute Trip Reduction Programs at Major Employers, and
- EN09. Expand Transportation Demand Management Initiatives.

These transportation and environmental strategies in combination with the housing and economy strategies described earlier, would shift trips throughout the Bay Area away from driving and towards transit, walk, and bike modes. As shown in **Table 3.15-9**, auto trips (drive alone, carpool, and ride hail) make up 79 percent of all trips in 2015 and would make up 70 percent in 2050 under the proposed Plan.

Table 3.15-9: Count and Share of Daily Trips by Mode

Mode	2015 Baseline		2050 Proposed Plan	
	Trips	% of Total	Trips	% of Total
Drive Alone	12,030,000	46%	13,417,000	40%
Carpool	8,318,000	32%	9,190,000	27%
Ride Hail	548,100	2%	879,300	3%
Auto "Vehicle" Subtotal	20,896,000	79%	23,487,000	70%
Walk	3,348,000	13%	4,611,000	14%
Transit	1,472,000	6%	3,087,000	9%
Bike	583,800	2%	2,336,000	7%
Total Trips	26,299,000	100%	33,521,000	100%

Note: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding; Trips and mode share do not account for expected trip reductions from the implementation of Strategy EN09 due to modeling limitations.
Source: Data compiled by MTC and ABAG in 2021

Similarly, the proposed Plan results in a lower share of workers in the Bay Area commuting by auto in 2050 compared to 2015. As shown in **Table 3.15-10**, the share of workers commuting to work by auto (drive alone, carpool, and ride hail) would drop from 70 percent in 2015 to 53 percent in 2050 in the proposed Plan. Despite the addition of 1.4 million new jobs in the region, implementation of the proposed Plan would result in fewer workers commuting by driving alone relative to baseline conditions. In addition to shifting to transit, walk, and bike modes, a greater share of workers in the proposed Plan are expected to telecommute in 2050. The mode shift in commute trips is particularly impactful on overall VMT as commute trips are longer on average than trips for other purposes (see **Table 3.15-7**).

Table 3.15-10: Share of Workers by Commute Mode

Mode	2015 Baseline	2050 Proposed Plan
	% of Total	% of Total
Drive Alone	51%	36%
Carpool	19%	17%
Ride Hail	1%	< 1%
Auto "Vehicle" Subtotal	70%	53%
Walk	2%	3%
Transit	13%	20%
Bike	3%	7%
Telecommute	10%	17%

Note: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000). Figures may not sum due to independent rounding; Trips and mode share do not account for expected trip reductions from the implementation of Strategy EN09 due to modeling limitations.
Source: Data compiled by MTC and ABAG in 2021

The proposed Plan includes major highway projects that add capacity ("lane miles") to the region's freeways and expressways. As detailed in **Table 2-9** in Chapter 2, "Project Description," the proposed Plan adds approximately 460 new lane miles (two percent increase). Most of those new lane miles are attributed to express lanes on the region's freeways. Adding lane miles is known to induce more auto travel. The proposed Plan includes land use, transportation, and environmental strategies to reduce the anticipated induced travel from implementing capacity-increasing highway projects. The proposed Plan includes targeted strategies aimed at suppressing and/or shifting auto travel, including:

- T03. Enable a Seamless Mobility Experience,
- T04. Reform Regional Transit Fare Policy,
- T05. Implement Per-Mile Tolling on Congested Freeways with Transit Alternatives,
- T08. Build a Complete Streets Network,
- T10. Enhance Local Transit Frequency, Capacity and Reliability,
- T11. Expand and Modernize the Regional Rail Network,
- EN07. Expand Commute Trip Reduction Programs at Major Employers, and
- EN09. Expand Transportation Demand Management Initiatives.

These strategies help reduce regional daily vehicle trips per capita by 19 percent and VMT per capita by 17 percent, as shown in **Table 3.15-11**, below. The net impact of the transportation strategies, including investments in transit, bicycle and pedestrian infrastructure expansion, priced roads, and other strategies is an overall reduction in VMT per capita relative to baseline conditions.

Table 3.15-11: Summary of Baseline and Proposed Plan 2050 Vehicle Trips and VMT

	2015 Baseline	2050 Proposed Plan	Change (2015 to 2050)	
			Numerical	Percent
Total Population	7,581,000	10,368,000	+2,786,000	+37%
Daily Vehicle Trips without Strategy EN09	20,896,000	23,487,000	+2,591,000	+12%
Daily Vehicle Trips with Strategy EN09	20,896,000	23,222,000	+2,326,000	+11%
Daily Vehicle Trips per Capita without Strategy EN09	2.8	2.3	-0.5	-18%
Daily Vehicle Trips per Capita with Strategy EN09	2.8	2.2	-0.5	-19%
Daily VMT without Strategy EN09	155,006,000	181,917,000	+26,911,000	+17%
Daily VMT with Strategy EN09	155,006,000	175,497,000	+20,491,000	+13%
Daily VMT per Capita without Strategy EN09	20.4	17.5	-2.9	-14%
Daily VMT per Capita with Strategy EN09	20.4	16.9	-3.5	-17%

Note: Numbers have been rounded (between 1,000 and 1,000,000 to the nearest 100, above 1,000,000 to the nearest 1,000); Figures may not sum due to independent rounding; Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations such as prison inmates.

Source: Data compiled by MTC and ABAG in 2021

As noted in the methodology, Travel Model 1.5 is not sensitive to the full range of strategies in the proposed Plan. As a result, the VMT reduction benefits of Strategy EN09, "Expand Transportation Demand Management Initiatives," are calculated "off-model." The implementation of Strategy EN09 would result in additional VMT reductions as disclosed in **Table 3.15-11**, and includes supporting the expansion of regional bike share service; developing assistance for car share implementation along with assistance for mobility hub development; providing targeted transportation alternatives programs to provide personalized information and encouragement to shift individual travel choices from driving alone to ridesharing, transit, biking, or walking; supporting vanpool programs, including assistance for ridematching, startup and operations, and employer outreach; and supporting the development of parking management approaches and fees to discourage solo driving.

Implementation of sea level rise adaptation infrastructure under the proposed Plan's Strategy EN01, "Adapt to Sea Level Rise," is not expected to have an effect on VMT, because the adaptation infrastructure would elevate roadways from future inundation and would not increase capacity on the roadways. Instead, the adaptation infrastructure would alleviate risk from inundation of existing and forecasted land use development and transportation assets and support the proposed Plan's core land use strategy to "focus growth" in existing communities along the existing transportation network. Without the adaptation infrastructure, rising sea levels could result in inundation of these transportation assets, reducing access to destinations which could require longer trip routes with corresponding increases in VMT, and could have a long-term effect on the land use growth pattern and the forecasts of travel behavior and vehicle activity.

Conclusion

Overall, the impact of the proposed Plan's forecasted land use growth pattern, sea level rise adaptation infrastructure, and proposed transportation projects and strategies result in an increase in total regional VMT and a decrease in regional per-capita VMT between the base year and 2050, as shown in **Table 2-12** of Chapter 2, "Project Description," and combined in part in **Table 3.15-11** above. Implementation of the proposed Plan would result in a VMT per capita rate 17 percent lower in 2050 than in 2015.

If implemented, the proposed Plan's comprehensive suite of land use, transportation, and environmental strategies would result in regional per-capita VMT reductions and would not impede

achievement of additional Statewide VMT reductions required to meet the State's statutory GHG emission targets.

The ability to facilitate further reductions in per capita VMT relies on local jurisdictions as they review and entitle individual land use and transportation projects. OPR notes in its Technical Advisory that "at present, consistency with RTP/SCSs does not necessarily lead to a less-than-significant VMT impact" because of the gap in the SB 375 targets and the GHG reductions necessary to achieve the Statewide goals (OPR 2018). As discussed earlier, OPR and CARB provide guidance on VMT impact evaluations and suggested significance thresholds that are applicable to project level assessments. Additionally, the SB 743 and the CEQA Guidance include CEQA streamlining opportunities for land use projects located near transit, and transportation projects that reduce VMT, such as transit and bicycle infrastructure projects, are assumed to have impacts that are less than significant.

Nevertheless, because there is a gap between the GHG emissions reductions that can be achieved from targets established by CARB pursuant to SB 375 and the GHG emissions reductions needed to achieve Statewide GHG reduction goals, and because the ability to bridge this gap relies on "new State-initiated VMT reduction strategies" (CARB 2018) and on implementation of land use, TDM and other strategies that can only be employed at the local jurisdictional level, MTC and ABAG cannot conclude that the reductions would be sufficient to meet the State's climate goals. Therefore, Impact TRA-2 would be **potentially significant (PS)**. Mitigation Measures TRA-2a and TRA-2b address this impact and are described below.

Mitigation Measures

The State recognized that additional State policy actions and funding would be required to close the VMT gap between what the MPOs could achieve through implementation of their SCSs and reductions needed to meet State goals (CARB 2018). Though the State must initiate these additional actions and funding programs, the exact form of the policies and funding programs must be collaboratively developed with input from MPOs, local agencies, and other organizations to ensure they provide the tools and incentives necessary to go beyond the SCSs in reducing VMT. MTC shall be an active participant in this process to develop and explore pathways to implement State-level VMT reduction strategies, such as those outlined in Appendix C [2017 Scoping Plan] through a transparent and inclusive interagency policy development process to evaluate and identify implementation pathways for additional policies to reduce VMT and promote sustainable communities.

Mitigation Measure TRA-2a MTC shall work with state and local agencies to ensure implementation of components of the Plan that will help to reduce regional VMT, particularly projects that improve and/or expand transit service, as well as bicycle and pedestrian facilities. These transportation projects, in conjunction with land use policies included in the Plan, will help the region to achieve the projected decreases in regional VMT per capita and achieve the region's SB 375 targets for GHG emissions. MTC will collaborate with state and other agencies to explore the feasibility of new programs for reducing VMT such as VMT fees, banks, and exchanges.

Mitigation Measure TRA-2b Implementing agencies and/or project sponsors shall implement measures, where feasible and necessary based on project- and site-specific considerations, consistent with MTC's "Key SB 743 Implementation Steps for Land Use Projects" that include but are not limited to those identified below:

- Transportation demand management (TDM) strategies shall be incorporated into individual land use and transportation projects and plans, as part of the planning process. These TDM measures are strategies not included in EN09, rather they are measures that could and should be implemented

by the local agency based on land use authority that neither MTC nor ABAG has. Local agencies shall incorporate strategies identified in the Federal Highway Administration's publication: Integrating Demand Management into the Transportation Planning Process: A Desk Reference (August 2012) into the planning process (FHWA 2012). For example, the following strategies may be included to encourage use of transit and non-motorized modes of transportation and reduce vehicle miles traveled on the region's roadways:

- include TDM mitigation requirements for new developments;
- incorporate supporting infrastructure for non-motorized modes, such as, bike lanes, secure bike parking, sidewalks, and crosswalks;
- provide incentives to use alternative modes and reduce driving, such as universal transit passes, road and parking pricing;
- implement parking management programs, such as parking cash-out, priority parking for carpools and vanpools;
- develop TDM-specific performance measures to evaluate project-specific and system-wide performance;
- incorporate TDM performance measures in the decision-making process for identifying transportation investments;
- implement data collection programs for TDM to determine the effectiveness of certain strategies and to measure success over time; and
- set aside funding for TDM initiatives.

Mitigation Measure TRA-2c Implement Mitigation Measure GHG-3

Significance after Mitigation

The ability to close the gap between the SB 375 targets and the targets needed to meet State GHG reduction goals linked to transportation is tied to local jurisdictions and their ability to meet VMT targets in compliance with thresholds they set to meet CEQA Guidelines Section 15064(3)(b). However, there is no assurance that implementation of the proposed mitigation measures would be enough to achieve the regional reductions needed to attain the statewide 2050 targets. Additional regulatory action that results in substantial GHG reductions throughout all sectors of the State economy and based on State-adopted regulations would likely be needed to attain such goals, and they are beyond the feasible reach of MTC and ABAG and local jurisdictions.

Projects taking advantage of the CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described above, as applicable, to address site-specific conditions. The implementing agency would ensure that TDM measures are incorporated into projects to the extent feasible. Implementation of the mitigation measure at a project-level would encourage sustainable modes of transportation and reduce the potential for the proposed Plan to increase VMT on the regional transportation network. However, MTC and ABAG cannot require local implementing agencies to adopt the above mitigation measures, and it is ultimately the responsibility of a lead agency to determine and adopt mitigation. In addition, the State has indicated that additional State policy actions and funding would be required to close the VMT gap between what the MPOs could achieve through implementation of their SCSs, and reductions needed to meet State

goals. Therefore, this impact would be **significant and unavoidable (SU)** for purposes of this program-level review.

Impact TRA-3: Substantially increase hazards due to geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) (LTS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

The regional growth pattern of the proposed Plan does not define design-level features of roadways. While the proposed Plan expands development and increases density in growth geographies, this growth would not impact geometric design features or roadway uses in a consistent way, as those design standards and uses are established and enforced at the local jurisdictional level. Specific transportation projects under the proposed Plan would be subject to and expected to follow the design guidelines and allowable uses established by the State or the local jurisdiction with authority over the project.

Construction activities from implementation of the proposed Plan would be short term, intermittent, and geographically dispersed. At the regional level, these disruptions would be localized, and impacts would be limited and would not represent a significant impact to the operations of the regional transportation system. At the local level, construction activities could increase travel on local roads and result in detours or increased congestion in certain locations. The actual construction details of land use development projects and proposed transportation projects are not known because the projects are in the early stages of planning. Construction impacts should be evaluated at the project level as more information about the timing, design, scope, and construction program are available. Generally, construction activities for land use development and transportation projects would be required to be conducted in accordance with, and subject to review by, all applicable State and/or local jurisdictions with authority over the project; thus, ensuring projects would be designed to minimize the potential for hazardous conditions and to ensure safe travel by all modes.

Local safety planning efforts are supported by regional policies and strategies. MTC's Regional Safety/Vision Zero Policy, established under Resolution 4400 in June 2020, affirms MTC's commitment to working collaboratively with partner agencies at the county and local levels to encourage and support equitable and data-driven actions achieving the target of eliminating traffic fatalities and serious injuries in the Bay Area by 2030. The Vision Zero framework serves as the basis for MTC's approach to establishing the regional safety performance measures and targets required under the FHWA and FTA Transportation Performance Management Program.

Complete Streets policies and programs also support reducing hazards on roadways and preventing incompatible uses by designing roads for all trip purposes, including for more vulnerable users such as cyclists and pedestrians. MTC also has a regional Complete Streets policy, adopted in 2006 under Resolution 3765, requiring that all projects funded with regional funds consider the accommodation of pedestrians, cyclists, public transit users and drivers as part of project planning, design, funding, and construction. As part of this policy, project sponsors must have a complete streets policy or updated circulation element of their local General Plan in place and must complete a Complete Streets Checklist for the project to access regional funding such as OBAG and the ATP.

In accordance with the Regional Safety/Vision Zero and Complete Streets policies, the proposed Plan includes proposed investments directed towards designs and enforcement efforts that would improve safety on the roads (Strategy T9) and investments for an expanded Complete Streets network (Strategy T8). These investments would go to local jurisdictions committing to projects that install

design elements that lower driving speeds or implement road diets and to projects that make biking and walking safer.

Conclusion

The proposed Plan is not expected to negatively impact the design of transportation facilities. Rather, investments are expected to incentivize design improvements to make roadways safer. Therefore, the potential of the proposed Plan to substantially increase hazards due to geometric design features or incompatible uses would be **less than significant (LTS)**.

Mitigation Measures

None required.

Impact TRA-4: Result in inadequate emergency access (LTS)

Land Use, Sea Level Rise Adaptation, and Transportation System Impacts

The proposed Plan's impact on emergency response plans and evacuation plans is analyzed under Impact HAZ-6 in Section 3.9, "Hazards and Wildfire." The proposed Plan's core strategy remains "focused growth" in existing communities along the existing transportation network encouraging more dense development in a developed areas. Dense development in developed areas is generally more efficient at serving the public for emergency response. This is often because developed areas tend to be well served with these facilities and also because the denser land use pattern better facilitates access to specific sites.

The sea level rise adaptation infrastructure included in the proposed Plan would be anticipated to benefit emergency access by protecting areas from potential hazards, including flooding, that could otherwise impair emergency access using transportation facilities.

Transportation infrastructure plays a key role in providing access to destinations during emergencies. These systems must be able to provide access for emergency response vehicles, personnel, and equipment. In widespread disasters, the Bay Area's roads and other transportation networks can determine the success or failure of the region during the emergency and in the recovery.

Land use and transportation projects will require construction activities that may cause temporary impairments or increased congestion on transportation facilities that are used for emergency access, such as construction equipment for a building project blocking part of a street or construction of a new roadway lane temporarily redirecting travel on an alternate route. All transportation projects in the proposed Plan would be expected to comply with local regulations regarding the maintenance of emergency access during construction. Road closures would be temporary and would be coordinated with emergency responders so that alternative evacuation routes could be developed and employed. Construction associated with implementation of the proposed Plan would not likely hinder emergency access. Although construction activities could temporarily impair roadways used for emergency response and evacuation, standard construction procedures for development of a construction management plan would address these conditions and would require development of alternative routes Projects requiring encroachment permits for temporary construction activities in public roadways that could be used for emergency response or evacuation are generally required to prepare traffic mitigation plans that address traffic control during the period when project construction is occurring within public right-of-way. To address any temporary road closures that would be required during construction, standard construction procedures include notification of emergency responders and development of alternative routes for emergency access.

The actual design details of land use development projects and proposed transportation projects are not known because the projects are in the early stages of planning. However, local jurisdictions have design standards for new and existing development and roadways to ensure adequate passage of emergency vehicles. Standards include specifications related to clear width, effective turning radius, and turnouts. Further, emergency access for land use development and transportation projects would be subject to review by State and/or local jurisdictions with authority over the project as well as responsible emergency service agencies; thus, ensuring projects would be designed to meet all applicable emergency access and design standards.

Conclusion

While implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects could temporarily impede emergency access at those project locations during construction periods, construction projects must conform to local regulations requiring maintenance of emergency access during construction. Therefore, the potential of the proposed Plan to result in inadequate emergency access would be **less than significant (LTS)**.

Mitigation Measures

None required.

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4 ALTERNATIVES TO THE PROPOSED PLAN

Environmental impact reports (EIRs) are required to consider alternatives to the project that are capable of reducing or avoiding significant environmental impacts. Section 15126.6(f) of the California Environmental Quality Act (CEQA) Guidelines states:

> Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.

Section 15126.6(a) of the Guidelines requires EIRs to describe "... a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. An EIR is not required to consider alternatives that are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason. (See also CEQA Guidelines Section 15126.6[f].) This section of the CEQA Guidelines also provides guidance regarding what the alternatives analysis should consider.

The Guidelines require that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project as proposed (CEQA Guidelines Section 15126.6[d]). The Guidelines further require that the "no project" alternative be considered (CEQA Guidelines Section 15126.6[e]).

In defining "feasibility" (e.g.," ... feasibly attain most of the basic objectives of the project ..."), CEQA Guidelines Section 15126.6(f)(1) states, in part:

> Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives.

This chapter presents the alternatives development and screening process, describes the alternatives, and analyzes the three alternatives to the proposed Plan. Key features of each alternative are described. A discussion pertaining to each alternative's ability to meet the project objects and to lessen significant impacts of the project are provided (see Section 4.5, "Ability to Meet Project Objectives" and "Section 4.6, "Comparative Impact Analysis of Alternatives"). This alternatives analysis

contains a summary comparison of the proposed Plan and Plan alternatives and discussion of the environmentally superior alternative.

In determining the alternatives that should be considered in the EIR, it is important to consider the objectives of the project, the project's significant effects, and unique project considerations. These factors are crucial to the development of alternatives that meet the criteria specified in Section 15126.6(a). Although, as noted above, EIRs must contain a discussion of "potentially feasible" alternatives, the ultimate determination as to whether an alternative is feasible or infeasible is made by the lead agency's decision-making body—here, the MTC Commissioners and ABAG Executive Board. (See PRC Sections 21081.5, 21081[a] [3].)

Comments received on the Notice of Preparation provided recommendations for project elements and alternatives, including: consideration of the placement of development in relation to the wildland urban interface, avoiding flood zones, addressing the imbalance between jobs, housing, and other land uses, and proximity to transit hubs; adjustments to forecasted growth rates; recommendations for transit and other use of express lanes and high occupancy vehicle lanes as well as monitoring operations; suggestions for methods to identify priority growth areas (PDAs) and other growth geography areas, including proximity to transit criteria; strategies that address development of accessory dwelling units; consideration of transportation strategies such as increased telecommuting, reallocation of transportation investments, programs that address autonomous vehicles, and considerations for vehicular parking spaces; and transit opportunities adjacent to or located over existing highways and freeways.

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." (CEQA Guidelines Section 15083.) Neither the CEQA Guidelines nor Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require that they be considered. Consistent with these requirements, the comments received in response to the NOP have been carefully reviewed and considered by MTC and ABAG in the preparation of the alternatives analysis presented in this section.

In some cases, these comments are already addressed by the Proposed plan. In others, they are included in the framework of the alternatives. Note that adjustments to the forecasted growth rate are not considered in either the Proposed plan or alternatives to the Proposed plan. The primary objectives of the Plan are to identify strategies that will enable the Bay Area to accommodate future growth and make the region more equitable and resilient in the face of unexpected challenges, such as the uncertainties posed by rising sea levels, economic cycles, and new technologies. A discussion of various suggested alternatives is provided below.

Appendix B includes all NOP comments received.

4.1 DEVELOPMENT OF THE ALTERNATIVES TO THE PROPOSED PLAN

4.1.1 Consideration of the Alternatives to the Proposed Plan

As discussed in Chapter 1.0, "Introduction," MTC and ABAG conducted a three-year plan development process that began with the Horizon initiative before advancing into the Blueprint phase. The Horizon initiative explored the efficacy of a suite of strategies to advance the region toward the plan's adopted vision, and the Blueprint phases served as drafts of the proposed Plan by advancing and integrating effective strategies. These Plan development phases solicitated public input and comment on the identification of strategies as well as the evaluation of their efficacy. The Final Blueprint's 35 strategies were designed to enable the Bay Area to accommodate future growth and make the region more equitable and resilient in the face of unexpected challenges, such as sea level rise.

On September 28, 2020, in accordance with the CEQA Guidelines, MTC and ABAG filed the Notice of Preparation (NOP) of the EIR for Plan Bay Area 2050. The purpose of the NOP was to seek comments about the scope and content of the EIR, including solicitating feedback on EIR alternatives that should be evaluated. On Thursday, October 15, 2020, MTC and ABAG conducted an online public scoping meeting. At this meeting, a presentation by MTC/ABAG staff provided an overview of the proposed Plan, the CEQA process, and key environmental issues identified in the NOP. Oral and written comments were accepted during the meeting. Several written comment letters included suggestions for Plan alternatives. Comments pertaining to Plan alternatives were considered during development of the proposed Plan and Plan alternatives. (See Section 4.3, "Alternatives Considered but Not Analyzed in Detail").

The previously considered alternatives and adopted Plan Bay Area plans also helped inform and refine the alternatives considered in this EIR (see Section 4.1.3, "Previous Versions of the Bay Area RTP/SCS Plans and Alternatives"). In advancing the considerations of alternatives, any alternative must attain the underlying purpose of the Plan, including accommodating forecasted growth through 2050, as well as attaining most of the Plan's objectives (see Section 4.5, "Ability to Meet Project Objectives").

4.1.2 Project Objectives

The State CEQA Guidelines state that an EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen some of the significant effects of the project and that it shall evaluate the comparative merits of the alternatives (CEQA Guidelines Section 15126.6).

The proposed Plan's overall goal is to "ensure by the year 2050 that the Bay Area is affordable, connected, diverse, healthy, and vibrant for all." During the Horizon initiative, in conjunction with members of the public, partners, and elected officials between February and June 2018 through a wide range of public engagement, MTC and ABAG developed a set of guiding principles. In September 2019, MTC and ABAG both adopted the vision, guiding principles, and cross-cutting issues for the proposed Plan. MTC and ABAG further developed performance metrics associated with the guiding principles during the Blueprint planning phase. In addition, Senate Bill 375 mandates two performance targets related to housing the population and achieving greenhouse gas emissions reduction targets. Together, the guiding principles and performance metrics serve as the basis for the following CEQA objectives:

1. Address climate change by reducing carbon dioxide (CO_2) emissions pursuant to targets established by the California Air Resources Board (CARB); specifically, meet or exceed a 19-percent reduction in per-capita emissions from cars and light-duty trucks by 2035 relative to 2005 levels.

2. House 100 percent of the region's projected growth by income level, and with no increase in in-commuters over the proposed Plan baseline year.

3. Ensure that all current and future Bay Area residents and workers have sufficient housing options they can afford by reducing how much residents spend on housing and transportation and by producing and preserving more affordable housing.

4. Support an expanded, well-functioning, safe, and multimodal transportation system that connects the Bay Area by improving access to destinations and by ensuring residents and workers have a transportation system they can rely on.

5. Support an inclusive region where people from all backgrounds, abilities, and ages can remain in place with full access to the region's assets and resources by creating more inclusive communities and reducing the risk that Bay Area residents are displaced.

6. Conserve the region's natural resources, open space, clean water, and clean air with the intent of improving health of Bay Area residents and workers and improving the health of the environment locally and globally.

7. Support the creation of quality job opportunities for all and ample fiscal resources for communities by more evenly distributing jobs and housing in the Bay Area and by enabling the regional economy to thrive.

4.1.3 Previous Versions of the Bay Area RTP/SCS

The proposed Plan and Plan alternatives build upon previous version of the Bay Area's RTP/SCSs. The 2013 Plan Bay Area was the first Bay Area RTP to integrate the SCS, as required by SB 375 (MTC 2013). Plan Bay Area 2040 was an update to the 2013 Plan. As discussed in more detail in Section 1.6.3, "Federal and State Requirements," the Plan Bay Area is updated every four years, consistent with update requirements that pertain to RTPs (e.g., California Government Code Section 65080). The 2050 Plan Area extends the planning period from 2040 to 2050. Each update to the plan addresses evolving issues, including changes to the growth forecast and planning horizon.

Consideration of the alternatives to the proposed Plan builds upon prior transportation and land use plans adopted and alternatives considered in the 2013 and 2017 Plan Bay Area EIRs (MTC 2013, 2017). While the growth forecasts have changed over time, the planning horizons have been extended, and the processes to develop the 2013 Plan, Plan Bay Area 2040 (2017), and the proposed Plan differed in approach, each Bay Area RTP/SCS and the feasible alternatives identified for each were developed to meet the same overarching goals of achieving the GHG reduction targets and housing the projected population. In general, the prior plans and plan alternatives provide context for development of the alternatives to the proposed plan evaluated in this chapter.

2013 RTP/SCS

The adopted 2013 plan was designed to create a network of complete communities; increase the accessibility, affordability, and diversity of housing; create jobs to maintain and expand a prosperous

and equitable regional economy; and protect the region's unique natural environment. The transportation investments and policies in the Transportation Investment Strategy of the 2013 Plan Bay Area were based on available funding through 2040 and support the 2013 Plan Bay Area's goals by reducing automobile dependency and promoting healthier communities through reduced pollution and cleaner air.

The following alternatives were developed and evaluated in the 2013 EIR:

- **No Project Alternative:** The No Project Alternative represents the potential scenario if Plan Bay Area is not implemented. Under this alternative, no new regional policies would be implemented to influence local land use patterns, and no uncommitted transportation investments would be made.
- **Transit Priority Focus Alternative**: This alternative would develop a focused growth pattern primarily in the region's urban core by relying on Transit Priority Project eligible areas, which are areas with high-frequency transit service that are eligible for higher-density development streamlining, in accordance with Senate Bill (SB) 375. The Transit Priority Project framework is meant to leverage the significant investment that the region has made and continues to make in transit service.
- **Enhanced Network of Communities Alternative**: This alternative would provide sufficient housing for all people employed in the San Francisco Bay Area and would allow for more dispersed growth patterns than the proposed Plan.
- **Environment, Equity, and Jobs Alternative**: This alternative would seek to maximize affordable housing in high-opportunity urban and suburban areas through the use of incentives and housing subsidies. The suburban growth is supported by increased transit service to historically disadvantaged communities through a vehicle miles traveled (VMT) tax and higher bridge tolls.

PLAN BAY AREA 2040 EIR ALTERNATIVES

The adopted Plan Bay Area 2040 contains two components: (1) a regional strategy for accommodating household and employment growth projected to occur the Bay Area by 2040 and (2) a transportation strategy for the region based on expected revenues. It was developed to achieve targets for greenhouse gas (GHG) emissions reductions, consistent with the Sustainable Communities and Climate Protection Act of 2008 (SB 375), lawsuit settlement agreements, and other regional goals.

The following alternatives were evaluated in the 2017 EIR:

- **No Project Alternative:** The No Project Alternative illustrates trends assumed under adopted local general plans and zoning without an adopted regional SCS plan, and assuming no new transportation projects beyond those currently under construction or those that have both full funding and environmental clearance.
- **Main Street Scenario:** This alternative disperses future household and job growth into the downtowns of all Bay Area communities and emphasizes the expansion of express lanes, increases in highway capacity, and increases to suburban bus service to dispersed job centers.
- **Big Cities Scenario**: This alternative concentrates future household and job growth into the Bay Area's three largest cities (San Jose, San Francisco, and Oakland) and emphasizes core capacity and connectivity by expanding the South Bay transit system and linking regional rail systems into the heart of San Francisco and San Jose.

- **Equity, Environment, and Jobs Alternative:** This alternative was brought forward from the 2013 EIR and updated to reflect input submitted during the Notice of Preparation process and to adhere to the planning assumptions in the proposed Plan (e.g., regional forecasts and transportation projects). This alternative aims to reduce the risk of displacement in urban Equity Priority Communities (formerly known as "Communities of Concern") and reduce adverse environmental impacts related to the expansion of the transportation system. In comparison to the proposed Plan, the Equity, Environment, and Jobs Alternative would result in higher household growth in East Bay and South Bay counties and higher job growth in East Bay and Peninsula counties

4.2 ALTERNATIVES CONSIDERED BUT NOT EVALUATED FURTHER

Alternatives were considered during scoping of the proposed Plan, including suggestions from stakeholders. CEQA Guidelines Section 15126.6(c) identifies three factors that may be used to eliminate alternatives from detailed consideration in an EIR: failure to meet most of the basic project objectives, infeasibility, and inability to avoid significant environmental impacts. "Feasible" is defined as "capable of being accomplished within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (CEQA Guidelines Section 15364). The feasibility of an alternative may be determined based on a variety of factors, including economic viability, availability of infrastructure, and other plans or regulatory limitations (CEQA Guidelines Section 15126.6[f][1]). The following discussion briefly describes each alternative suggested during the scoping process that was not evaluated further and states the reason why each has not been included for analysis.

4.2.1 COVID-19 Alternative

The City of Palo Alto and the Santa Clara Valley Transportation Authority suggested an alternative whereby the region did not recover from the COVID-19 pandemic, resulting in lower regional growth and transportation revenues. Each of the alternatives is constrained by the same planning assumptions as the proposed Plan and housing units maintain the same regional growth forecasts—population, employment, households—and maintains the same forecast of reasonably available transportation revenues. These planning assumptions are considered exogenous factors and ensure the alternatives analysis provides an "apples to apples" comparison with the proposed Plan. In addition, the proposed Plan is obligated to set forth a forecasted development pattern for the region that includes the Regional Housing Control Total, as explained in **Table 1-1**. Because this alternative would be legally infeasible, it is not identified for further study in the EIR.

4.2.2 Lower Transportation Funding

The Sierra Club and Pat Pias suggested an alternative that did not include new transportation revenues from a regional "mega-measure." This alternative would result in lower transportation funding for investments. Each of the alternatives is constrained by the same planning assumptions as the proposed Plan that housing units maintain the same regional growth forecasts—population, employment, households—and maintain the same forecast of reasonably available transportation revenues. In addition, Alternative 1, Alternative 2, and the No Project Alternative have smaller

transportation footprints than the proposed Plan. Because this alternative would not contribute to a reasonable range of alternatives, it is not identified for further study in the EIR.

4.2.3 Lower Regional Growth Alternative(s)

The Sierra Club and TRANSDEF suggested alternatives with lower levels or regional population, household, and employment growth. Each of the alternatives is constrained by the same planning assumptions as the proposed Plan. These planning assumptions are considered exogenous factors and ensure the alternatives analysis provides an "apples to apples" comparison with the proposed Plan. In addition, the proposed Plan is obligated to set forth a forecasted development pattern for the region that includes the Regional Housing Control Total, as explained in **Table 1-1**. Because this alternative would be legally infeasible, it is not identified for further study in the EIR.

4.2.4 Wildland-Urban Interface Avoidance Alternative

The Midpeninsula Regional Open Space District (Midpen) suggested a Wildland-Urban Interface Avoidance Project Alternative that shifts all Growth Geographies outside of the wildland-urban interface (WUI) zone, including the WUI located within rural and sparsely developed portions of unincorporated counties. This alternative is expected to perform similar to the proposed Plan and Alternative 1. Because this alternative would not contribute to a reasonable range of alternatives, it is not identified for further study in the EIR.

4.2.5 Equal City Growth Rate Alternative

This alternative was suggested by the City of Palo Alto in its scoping comment letter. The City suggested an alternative whereby each city jurisdiction in the Bay Area grows at the same rate, except for the three largest cities (San Francisco, San Jose, and Oakland). This potential alternative would result in a less compact development pattern, compared to the proposed Plan, it may increase certain impacts related to increased commute distance, such as impacts related to air quality; climate change, GHG, and energy; and transportation. This alternative would not be expected to reduce significant environmental effects compared to the proposed Plan. Thus, it is not considered in further detail in this EIR.

4.2.6 Reduced Housing Development Alternative

This alternative was recommended by the City of Palo Alto in its scoping comment letter. It assumes that the South Bay and West Bay cities do not meet their regional housing needs assessment targets of the next cycle and subsequent cycles and/or do not build as much housing as anticipated in Plan Bay Area 2050. This alternative would be inconsistent with objectives of the Plan to accommodate projected population growth through 2050. As discussed in Chapter 1, "Introduction," ABAG is responsible for identifying areas in the region sufficient to house an 8-year projection of the regional housing need for the region pursuant to California Government Code Section 65584. In addition, the proposed Plan is obligated to set forth a forecasted development pattern for the region that includes the Regional Housing Control Total, as explained in **Table 1-1**. Because this alternative would be legally infeasible, it is not identified for further study in the EIR.

4.2.7 Moratorium on Flood Zone Development Alternative

This alternative was recommended in the Citizens Committee to Complete the Refuge's scoping comment letter. Placing a moratorium on flood zone development would limit the area of developable land within the Plan area. Although the majority of growth under the proposed Plan would take place outside these hazard areas, there are areas within the land use growth footprint and TPAs that have been mapped as being in the 100-year and 500-year flood hazard zones. Developments proposed within the 100-year flood zone would be required to meet local, State, and federal flood control design requirements, including avoiding the 100-year flood zones or providing building pads elevated above the flood zone. As discussed in Section 3.10, "Hydrology and Water Quality," impacts related to development in the flood zones would not result in significant impacts. Because this alternative would not reduce significant environmental effects compared to the proposed Plan, it is not considered in further detail in this EIR.

4.2.8 Reduced-Emissions Alternative

This alternative was suggested by TRANSDEF. A series of elements were identified to reduce or eliminate growth in VMT and GHG emissions. The elements in the scoping letter align with strategies included in the proposed Plan, Alternative 1, and/or Alternative 2. Express buses in HOV lanes, unbundling parking from housing, mixed-flow freeway tolling, parking fees, and reduced transit fares are consistent with the proposed Plan. Eliminating or reducing funding for express lanes and highway capacity is consistent with Alternative 1, as is increasing funding on transit. Eliminating funding for megaprojects and imposing a regional transportation mitigation fee are consistent with Alternative 2. The elements of this alternative are anticipated to have similar environmental effects as the proposed Plan, Alternative 1, and/or Alternative 2. Because this alternative would not contribute to a reasonable range of alternatives, it is not considered in further detail in this EIR.

4.2.9 "Climate Smart Alternative"

Together Bay Area, Save the Bay, and Greenbelt Alliance suggested the "Climate Smart Alternative" in their joint scoping letter. The suggested alternative incorporates climate mitigation and adaptation measures into all proposed Plan strategies, including a focus on natural solutions for climate resilience. This alternative is anticipated to perform similar to the proposed Plan. Because this alternative would not contribute to a reasonable range of alternatives, it is not considered in further detail in this EIR.

4.2.10 Plan Bay Area 2040 (2017 RTP/SCS)

This alternative is a variation of the No Project Alternative. It assumes that implementation of the previous Plan Bay Area would continue to be in effect. This alternative includes a similar land use distribution and a similar mix of transportation projects and programs, relative to the proposed Plan. However, compared to all the other alternatives, this alternative has a lower amount of anticipated growth of households and employment, as well as a lower amount of transportation revenues for investments in highways and transit.

Implementing this alternative is expected to result in similar types of environmental impacts as the proposed Plan. However, because of the lower assumed development and infrastructure investment

under this alternative, it would not meet the requirement to house 100 percent of the region's projected growth. Because it would not reduce or avoid significant environmental impacts relative to the proposed Plan and because it would be legally infeasible, this alternative is not identified for further study in this EIR.

This Alternative differs from the No Project Alternative because it would involve continuation of Plan Bay Area 2040, whereas the No Project Alternative assumes that there would be no RTP/SCS.

4.2.11 Other Suggested Alternatives

Numerous alternatives were suggested to modify or add strategies to the proposed Plan. These alternatives are anticipated to perform similar to the proposed Plan or alternatives and therefore would not reduce significant environmental impacts nor contribute to a reasonable range of alternatives. As a result, the following alternatives are not considered in further detail in this EIR:

- **Modified EN7 Alternative:** The City of Palo Alto, City and County of San Francisco, County of San Mateo, Santa Clara Valley Transportation Authority, and a joint letter by SPUR, TransForm, Seamless Bay Area, and Friends of Caltrain comments suggested alternatives that modified Strategy EN07 and telecommuting assumptions.
- **Modified EC1 Alternative:** The City of Palo Alto suggested an alternative that evaluates the effects of not including Strategy EC1.
- **Modified EC5 Alternative:** The City of Palo Alto suggested an alternative that would increase the investment in Strategy EC5 and shift more jobs to housing-rich areas.
- **Modified T01 Alternative:** A joint comment letter by SPUR, TransForm, Seamless Bay Area, and Friends of Caltrain suggested an alternative that brings transit service levels up to 2019 levels on a faster timeline than assumed in Strategy T01.
- **Modified T05 Alternative:** The County of San Mateo suggested an alternative that implemented Strategy T05 to be implemented when transit alternatives are funded rather than planned.
- **Modified T06 Alternative:** The City and County of San Francisco and a joint comment letter by SPUR, TransForm, Seamless Bay Area, and Friends of Caltrain suggested alternatives that would reduce investments in Strategy T06 and instead increase investments in transit strategies (T10, T11, T12).
- **Modified T08/T09 Alternative:** The County of San Mateo suggested an alternative to remove Strategy T09 and instead using funding to augment Strategy T8.
- **Modified T10, T11, T12 Alternative:** This alternative was suggested in Tom Conlin's scoping letter. This alternative would increase funding to transit strategies (T10, T11, T12).
- **Modified T12 Alternative:** This alternative was suggested in a joint comment letter by SPUR, TransForm, Seamless Bay Area, and Friends of Caltrain. This alternative would modify Strategy T12 to prioritize lane conversions in building out the express lane network and redirect investments to transit strategies.
- **Regional Parking Tax Alternative:** The City and County of San Francisco and SPUR suggested alternatives that would implement a regional parking tax on vehicular parking spaces, which could be in the form of an indirect source rule.

- **Bay Area Transit Assessment District Fiscal Alternative:** This alternative was suggested in TRANSDEF's scoping letter. The alternative would explore a more reliable source of revenue for transit districts.

- **CA/AV Alternative:** The City and County of San Francisco suggested an alternative that would revise assumptions and strategies regarding autonomous vehicles so that these vehicles are connected, electric, and shared.

- **Modified PDA (Sonoma) Alternative:** This alternative was suggested in Victoria DeSmet's scoping letter. This alternative would remove Sonoma County's Springs Specific Plan as a PDA and as proposed Plan growth geography.

4.3 ALTERNATIVES SELECTED FOR DETAILED ANALYSIS

The proposed Plan's core strategy is "focused growth" in existing communities along the existing transportation network, as well as in communities with well-resourced schools and easy access to jobs, parks, and other amenities. This approach is evidenced by the descriptions and general locations of the growth geographies described below. This focused growth strategy helps to achieve key regional economic, environmental, and equity goals by building upon existing community characteristics and leveraging existing infrastructure while reducing effects on areas with less development. The proposed Plan designates specific geographic areas—known as growth geographies—in order to guide where future household and job growth would be focused under the proposed Plan's strategies over the next 30 years. The growth geographies are a mix of a) Areas designated by local jurisdictions—Priority Development Areas (PDAs) and Priority Production Areas (PPAs); and b) areas defined by criteria related to transit service and access to opportunity—Transit-Rich Areas (TRAs) and High-Resource Areas (HRAs).

The following alternatives to the proposed Plan are analyzed in this EIR:

- No Project Alternative,
- Alternative 1 - Transit-Rich Area (TRA) Focus Alternative, and
- Alternative 2 - High-Resource Area (HRA) Focus Alternative.

Similar to the proposed Plan, the alternatives are defined by a unique set of strategies across the four elements—housing, the economy, transportation, and the environment—to accommodate future growth. These differences in strategies result in different future conditions, including forecasted land use development pattern ("land use growth footprint"), sea level rise adaptation infrastructure ("sea level rise adaptation footprint"), and transportation projects and programs ("transportation projects footprint"). Each of the alternatives is constrained by the same planning assumptions as the proposed Plan and maintain the same regional growth forecasts—population, employment, households, and housing units—and maintains the same forecast of reasonably available transportation revenues. These planning assumptions are considered exogenous factors and ensure the alternatives analysis provides an "apples to apples" comparison with the proposed Plan. These alternatives represent a reasonable range of alternatives to the proposed Plan. A comparison of the performance of the alternatives is presented in Section 4.4, "Alternatives Comparisons."

4.3.1 No Project Alternative

Analysis of the No Project Alternative is required under CEQA (CEQA Guidelines, Section 15126.6[e]). The purpose of the No Project Alternative is to allow a comparison of the environmental impacts of approving the proposed project with the effects of not approving it. This alternative represents a future land use pattern and suite of transportation and resilience investments if the proposed Plan is not adopted.

Under the No Project Alternative, growth is assumed to occur consistent with local general plans and zoning without an adopted RTP/SCS, and assumes no new transportation or sea level infrastructure projects beyond those currently under construction or those that have both full funding and environmental clearance ("committed"). Under the No Project Alternative, housing growth would be more dispersed, while job growth would be slightly more concentrated in the region's two largest job centers of San Francisco and Silicon Valley. In comparison to the proposed Plan, the No Project Alternative would result in higher household growth primarily in Contra Costa County, with higher job growth in San Francisco and Santa Clara Counties.

NO PROJECT ALTERNATIVE: TRANSPORTATION MODELING ASSUMPTIONS

The No Project Alternative includes substantially lower investments for transportation strategies than the proposed Plan. It does not advance the new policies included in the proposed Plan, such as all-lane tolling, seamless transfers, or reduced speed limits, and it assumes implementation only of committed regionally-significant transportation and sea level infrastructure projects. This alternative would result in a substantially smaller transportation project footprint than the proposed Plan.

NO PROJECT ALTERNATIVE: HOUSING AND ECONOMY MODELING ASSUMPTIONS

Unlike the proposed Plan, the No Project Alternative includes no regional strategies to focus growth in specific geographic areas within the region. Instead, growth would occur consistent with current general plans and zoning, and without consideration of a consolidated strategy that considers all nine counties and 101 cities in the Bay Area.

NO PROJECT ALTERNATIVE: ENVIRONMENT MODELING ASSUMPTIONS

The No Project Alternative includes substantially lower funding for environment strategies than the proposed Plan because it funds only committed resilience investments. This alternative would result in less construction of sea level rise adaptation infrastructure and subsequently a substantially smaller sea level rise adaptation footprint than the proposed Plan. As a result, communities at risk without committed investments would be inundated by rising sea levels. At the same time, local jurisdictions would be anticipated to expand urban growth boundaries in line with historical growth rates, increasing the land use footprint of this EIR alternative.

4.3.2 Alternative 1 – TRA Focus Alternative

The TRA Focus Alternative would concentrate growth in areas that contain high-quality transit services. This alternative is characterized as providing a compact growth pattern, with the greatest share of housing and job growth in TRAs within walking distance of regional rail stations. To support this more urban-oriented growth pattern, additional core capacity transit investments are funded in

lieu of highway projects that add lane-mileage to the system. This alternative would result in higher levels of household and job growth in the growth geographies than under the proposed Plan, with substantially more housing growth in TRAs. In comparison to the proposed Plan, the TRA Focus Alternative would result in higher household growth in San Francisco and San Mateo Counties and higher job growth in Contra Costa County.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE: TRANSPORTATION STRATEGIES

The TRA Focus Alternative modifies three strategies in the proposed Plan in order to accommodate demand for local transit services in the urban core, while reducing funding for highway expansion projects to reduce environmental impacts.

The modifications are as follows:

- **Modify Strategy: Improve Interchanges and Address Highway Bottlenecks:** Remove $3.4 billion in funding for interchange expansion projects at I-80/I-680/SR 12, I-680/SR 4, and U.S. 101/I-580 and for widening projects on SR 262, SR 37, SR 4, and SR 239.
- **Modify Strategy: Enhance Local Transit Frequency, Capacity and Reliability:** Add $8.1 billion in funding for core capacity frequency increases on crowded lines operated by the San Francisco Municipal Transportation Agency, Santa Clara Valley Transportation Authority, and AC Transit, and add $1.8 billion in funding for programmatic transit signal priority and other operational improvements to boost the speed and reliability of bus service.
- **Modify Strategy: Build an Integrated Regional Express Lane and Express Bus Network:** Remove $1.5 billion in funding for express lane projects, and convert all uncommitted express lane widening projects to general-purpose lane conversions unless there are only two existing general-purpose lanes.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE: HOUSING STRATEGIES

The TRA Focus Alternative modifies four strategies in the proposed Plan in order to focus a greater share of housing growth near high-quality transit services and to grow the amount of affordable housing in TRAs. The modifications are as follows:

- **Modify Strategy: Allow a Greater Mix of Housing Densities and Types in Growth Geographies**: Further increase allowable developable capacity in TRAs.
- **Modify Strategy: Build Adequate Affordable Housing to Ensure Homes for All:** Increase the share of deed-restricted affordable housing units located in TRAs.
- **Modify Strategy: Transform Aging Malls and Office Parks into Neighborhoods**: Remove mall and office park redevelopment projects outside of TRAs.
- **Modify Strategy: Accelerate Reuse of Public and Community-Owned Land for Mixed-Income Housing and Essential Services**: Remove public land projects outside of TRAs.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE: ECONOMY STRATEGIES

The TRA Focus Alternative modifies one strategy in and adds one strategy to the proposed Plan in order to focus a greater share of job growth near frequent regional rail stations and to discourage office construction in locations with high levels of VMT per worker. The modifications are as follows:

- **Modify Strategy: Allow Greater Commercial Densities in Growth Geographies:** Further increase allowable developable capacity in TRAs with the most frequent regional rail services.
- **Add Strategy: Charge a Regional Office Development Fee:** Implement regional development fees for new office construction based upon the workplace VMT impacts (previously referred to as an indirect source rule).

ALTERNATIVE 1 – TRA FOCUS ALTERNATIVE: ENVIRONMENT STRATEGIES

The TRA Focus Alternative modifies two strategies in the proposed Plan in order to reduce environmental impacts from resilience projects that involve new highway capacity and to reduce the size of the urban footprint by protecting unincorporated areas from lower-density growth. The modifications are as follows:

- **Modify Strategy: Adapt to Sea Level Rise:** Remove $5.1 billion in funding for highway widening/resilience projects on SR 37.
- **Modify Strategy: Shrink Urban Growth Boundaries:** Shrink current urban growth boundaries to align with existing city boundaries, and eliminate unincorporated county growth areas approved by voters.

4.3.3 Alternative 2 – HRA Focus Alternative

This alternative focuses a substantially higher share of growth in HRAs, especially in the South Bay. To support this growth pattern and advance regional equity goals, infrastructure funding for major regional and interregional rail expansion projects would be reduced, and greater funding would be provided to local bus frequency increases, new express bus lines, expanded transit fare discount programs, and enhanced nonmotorized infrastructure.

This alternative features levels of household and job growth in growth geographies similar to those of the proposed Plan, with substantially more housing growth and substantially less job growth in HRAs. In comparison to the proposed Plan, Alternative 2 would result in higher household growth in Santa Clara County and higher job growth in San Francisco County.

ALTERNATIVE 2 – HRA FOCUS ALTERNATIVE: TRANSPORTATION STRATEGIES

The HRA Focus Alternative modifies five strategies in the proposed Plan to align transportation funding with projects that advance equity and climate goals. Transportation investments under this alternative would seek to support additional lower-VMT growth in historically exclusionary job-rich areas while funding express bus projects to provide regional connectivity without contributing to urban displacement pressures.

The modifications are as follows:

- **Modify Strategy: Reform Regional Transit Fare Policy:** Add $9.5 billion in funding to expand eligibility for means-based fare discount to all lower-income households.
- **Modify Strategy: Build a Complete Streets Network:** Add $3.0 billion in funding for pedestrian infrastructure with a focus on job-rich and job-rich-adjacent communities.

- **Modify Strategy: Enhance Local Transit Frequency, Capacity, and Reliability:** Add $9.0 billion in funding for priority development areas and HRA frequency boosts to reach 15-minute headways in all Growth Geographies and 5-minute headways in job-rich and job-rich-adjacent Growth Geographies, and add $4.9 billion in funding for Santa Clara Valley Transportation Authority Orange Line frequency boosts and grade separations in north Santa Clara County.

- **Modify Strategy: Expand and Modernize the Regional Rail Network:** Remove $33.8 billion in funding for regional and interregional rail projects; delay Period 1 projects (Caltrain Downtown Extension, Valley Link, South Bay Connect) to Period 2, and remove Period 2 projects (Link21, Dumbarton Group Rapid Transit, Caltrain/HSR Modernization-Tamien to Pacheco Pass).

- **Modify Strategy: Build an Integrated Regional Express Lane and Express Bus Network:** Add $7.3 billion in funding to achieve 15-minute or better AC Transit transbay frequencies, increased ReX Green Line frequencies (Vallejo to SFO), and upgrades to the ReX Blue Line project (Salesforce Transit Center to Diridon Station) to create a premium high-frequency service.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE: HOUSING STRATEGIES

The HRA Focus Alternative modifies four strategies in the proposed Plan in order to focus a greater share of housing growth near job-rich exclusionary jurisdictions identified in the Regional Housing Need Allocation process, while discouraging housing growth in Equity Priority Communities, to address concerns associated with displacement risk. The modifications are as follows:

- **Modify Strategy: Allow a Greater Mix of Housing Densities and Types in Growth Geographies:** Further increase allowable developable capacity in job-rich exclusionary cities and neighboring cities, and do not increase allowable developable capacity beyond the capacity allowed under existing local zoning in Equity Priority Communities.

- **Modify Strategy: Build Adequate Affordable Housing to Ensure Homes for All:** Increase the share of deed-restricted affordable housing units located in HRAs

- **Modify Strategy: Transform Aging Malls and Office Parks into Neighborhoods:** Scale back the number of mall and office park redevelopment projects outside of HRAs.

- **Modify Strategy**: Accelerate Reuse of Public and Community-Owned Land for Mixed-Income Housing and Essential Services: Scale back the number of public land projects outside of HRAs.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE: ECONOMY STRATEGIES

The HRA Focus Alternative removes one strategy from and adds one strategy to the proposed Plan in order to discourage additional job growth in job-rich cities and to ensure maximum developable capacity for housing in these communities. The modifications are as follows:

- **Remove Strategy: Allow Greater Commercial Densities in Growth Geographies:** Do not increase allowable developable capacity beyond the capacity allowed under existing local zoning.

- **Add Strategy: Implement Office Development Caps in Job-Rich Cities:** Disallow construction of new office buildings in jurisdictions with a jobs-housing ratio of 2.0 or higher.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE: ENVIRONMENT STRATEGIES

The HRA Focus Alternative would contain the same sea level rise adaptation infrastructure as the proposed Plan.

4.4 ALTERNATIVES COMPARISONS

4.4.1 Comparative Demographic Forecasts

All of the alternatives are designed to accommodate the same population and employment in the year 2050 based on the regional growth forecast adopted in fall 2020, with varying locational distributions of growth. Growth forecasts from 2015 through 2050 are provided in **Table 4-1**.

Table 4-1: Regional Growth Forecast of Population, Employment, Households, and Housing Units

	Year 2015	Year 2050
Population	7,660,000	10,330,000
Employment	4,010,000	5,410,000
Households	2,680,000	4,040,000
Housing Units	2,710,000	4,250,000

Source: Data compiled by MTC and ABAG in 2021

4.4.2 Households

Table 4-2 compares the household distribution in the years 2015 and 2050 for each alternative, along with each county's proportion of the region's population, as modeled by Bay Area UrbanSim 2.0 after taking each alternative's strategies into account. The household distribution by superdistrict is presented in **Table 4-3.** The nine-county Bay Area is divided into 34 subcounty areas, called "superdistricts." Superdistricts are combinations of cities, towns and unincorporated areas that allow the public to see the more localized growth pattern in Plan Bay Area 2050.

At the county scale, household growth patterns would remain similar to the 2015 conditions. That is, the greatest number of households would be in Santa Clara, Alameda, San Francisco, and Contra Costa Counties. Distribution of households would change slightly among the alternatives. Although each county is projected to gain households between 2015 and 2050 in every alternative, notable differences in the land use pattern, compared to the proposed Plan, are summarized as follows:

- Under the No Project Alternative, there would be a greater number of households in Contra Costa, Solano, and Sonoma Counties and a smaller number in Alameda, Marin, San Francisco, and Santa Clara Counties.
- Under Alternative 1, a greater number of households would be in San Francisco County and a smaller number in Contra Costa and Santa Clara Counties.
- Under Alternative 2, a greater number of households would be in Santa Clara County and a smaller number in Contra Costa, Marin, and San Francisco Counties.

The relative location of households and employment centers in the region informs characteristics of residents, such as auto ownership, based on numerous factors, including access to transit, income,

and parking availability. The results of the different growth patterns on auto ownership are included below in **Table 4-4**.

Table 4-2: Forecasted Households by Alternative and County in 2050

	Proposed Plan		No Project Alternative		Alternative 1		Alternative 2	
	Total	Share	Total	Share	Total	Share	Total	Share
Alameda	847,000	21%	802,000	20%	856,000	21%	839,000	21%
Contra Costa	551,000	14%	669,000	17%	505,000	12%	532,000	13%
Marin	146,000	4%	130,000	3%	152,000	4%	136,000	3%
Napa	56,000	1%	61,000	1%	56,000	1%	55,000	1%
San Francisco	578,000	14%	507,000	13%	627,000	16%	520,000	13%
San Mateo	394,000	10%	391,000	10%	420,000	10%	392,000	10%
Santa Clara	1,075,000	27%	1,064,000	26%	1,056,000	26%	1,168,000	29%
Solano	177,000	4%	184,000	5%	153,000	4%	179,000	4%
Sonoma	220,000	5%	235,000	6%	219,000	5%	224,000	6%
Regional Total	4,043,000	100%	4,043,000	100%	4,043,000	100%	4,043,000	100%

Note: The percentages and number of forecasted households is rounded. Figures may not sum because of independent rounding.
Source: Data compiled by MTC and ABAG in 2021

Table 4-3: Forecasted Households by Superdistrict by Alternative in 2050

County	SD	Name	Proposed Plan		No Project Alternative		Alternative 1		Alternative 2	
			Total	Share	Total	Share	Total	Share	Total	Share
Alameda	15	East	132,000	3%	124,000	3%	134,000	3%	139,000	3%
Alameda	16	South	152,000	4%	130,000	3%	145,000	4%	155,000	4%
Alameda	17	Central	160,000	4%	142,000	4%	162,000	4%	150,000	4%
Alameda	18	North	287,000	7%	297,000	7%	296,000	7%	284,000	7%
Alameda	19	Northwest	115,000	3%	109,000	3%	119,000	3%	111,000	3%
Contra Costa	20	West	123,000	3%	161,000	4%	123,000	3%	117,000	3%
Contra Costa	21	North	134,000	3%	164,000	4%	120,000	3%	127,000	3%
Contra Costa	22	Southwest	89,000	2%	92,000	2%	83,000	2%	89,000	2%
Contra Costa	23	South	70,000	2%	80,000	2%	58,000	1%	70,000	2%
Contra Costa	24	East	136,000	3%	173,000	4%	122,000	3%	130,000	3%
Marin	32	North	30,000	1%	34,000	1%	29,000	1%	29,000	1%
Marin	33	Central	66,000	2%	48,000	1%	75,000	2%	58,000	1%
Marin	34	South	50,000	1%	47,000	1%	47,000	1%	49,000	1%
Napa	27	South	40,000	1%	43,000	1%	39,000	1%	38,000	1%
Napa	28	North	16,000	0%	17,000	0%	16,000	0%	16,000	0%
San Francisco	1-4	Combined	578,000	14%	507,000	13%	627,000	16%	520,000	13%
San Mateo	5	North	166,000	4%	133,000	3%	180,000	4%	156,000	4%
San Mateo	6	Central	121,000	3%	126,000	3%	127,000	3%	118,000	3%
San Mateo	7	South	106,000	3%	132,000	3%	113,000	3%	118,000	3%
Santa Clara	8	Northwest	102,000	3%	102,000	3%	103,000	3%	143,000	4%
Santa Clara	9	North	320,000	8%	204,000	5%	303,000	7%	335,000	8%
Santa Clara	10	Southwest	172,000	4%	161,000	4%	177,000	4%	201,000	5%

County	SD	Name	Proposed Plan		No Project Alternative		Alternative 1		Alternative 2	
			Total	Share	Total	Share	Total	Share	Total	Share
Santa Clara	11	Central	168,000	4%	245,000	6%	161,000	4%	176,000	4%
Santa Clara	12	Northeast	180,000	4%	195,000	5%	179,000	4%	180,000	4%
Santa Clara	13	South	91,000	2%	102,000	3%	89,000	2%	91,000	2%
Santa Clara	14	Southeast	43,000	1%	56,000	1%	44,000	1%	42,000	1%
Solano	25	South	57,000	1%	61,000	1%	56,000	1%	54,000	1%
Solano	26	North	119,000	3%	124,000	3%	97,000	2%	124,000	3%
Sonoma	29	South	83,000	2%	85,000	2%	83,000	2%	81,000	2%
Sonoma	30	Central	98,000	2%	112,000	3%	98,000	2%	104,000	3%
Sonoma	31	North	39,000	1%	39,000	1%	38,000	1%	39,000	1%

Source: Data compiled by MTC and ABAG in 2021

Table 4-4: Forecasted Household Auto-Ownership by Alternative and County in 2050

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Households with Zero Autos	13%	11%	14%	13%
Households with One Auto	34%	34%	34%	33%
Households with Multiple Autos	53%	54%	52%	53%
Average Vehicles per Household	1.48	1.49	1.47	1.49

Note: The percentages are rounded.
Source: Data compiled by MTC and ABAG in 2021

4.4.3 Jobs

Similar to population and household growth, the alternatives all accommodate the same number of jobs in the year 2050. **Table 4-5** shows the projected job distribution by county for each alternative. The employment distribution by superdistrict is presented in **Table 4-6** In all alternatives, Santa Clara, Alameda, and San Francisco Counties account for the majority of the region's jobs in year 2050. With the notable exception of Marin County, all other counties gain jobs in every alternative. Notable differences in the land use pattern, compared to the proposed Plan, are summarized as follows:

- Under the No Project Alternative, a greater number of jobs would be located in San Francisco County and a smaller number in Alameda County.
- Under Alternative 1, a greater number of jobs would be located in Contra Costa County and a smaller number in Santa Clara County.
- Under Alternative 2, a greater proportion of jobs would be located in Alameda and San Francisco Counties and a smaller number in Santa Clara County.

Table 4-5: Forecasted Employment Counts by Alternative and County in 2050

	Proposed Plan		No Project Alternative		Alternative 1		Alternative 2	
	Total	Share	Total	Share	Total	Share	Total	Share
Alameda	1,182,000	22%	1,125,000	21%	1,172,000	22%	1,194,000	22%
Contra Costa	534,000	10%	496,000	9%	588,000	11%	530,000	10%
Marin	117,000	2%	118,000	2%	128,000	2%	121,000	2%
Napa	87,000	2%	92,000	2%	87,000	2%	88,000	2%
San Francisco	918,000	17%	969,000	18%	902,000	17%	1,007,000	19%
San Mateo	507,000	9%	495,000	9%	489,000	9%	482,000	9%
Santa Clara	1,610,000	30%	1,654,000	31%	1,594,000	29%	1,534,000	28%
Solano	201,000	4%	175,000	3%	199,000	4%	201,000	4%
Sonoma	251,000	5%	285,000	5%	249,000	5%	252,000	5%
Regional Total	5,408,000	100%	5,408,000	100%	5,408,000	100%	5,408,000	100%

Note: The percentages and number of forecasted jobs are rounded.
Source: Data compiled by MTC and ABAG in 2021

Table 4-6: Forecasted Employment by Superdistrict by Alternative in 2050

County	SD	Name	Proposed Plan		No Project Alternative		Alternative 1		Alternative 2	
			Total	Share	Total	Share	Total	Share	Total	Share
Alameda	15	East	156,000	3%	151,000	3%	156,000	3%	156,000	3%
Alameda	16	South	221,000	4%	204,000	4%	226,000	4%	217,000	4%
Alameda	17	Central	285,000	5%	272,000	5%	255,000	5%	280,000	5%
Alameda	18	North	358,000	7%	323,000	6%	364,000	7%	378,000	7%
Alameda	19	Northwest	162,000	3%	175,000	3%	171,000	3%	163,000	3%
Contra Costa	20	West	132,000	2%	103,000	2%	143,000	3%	120,000	2%
Contra Costa	21	North	184,000	3%	168,000	3%	189,000	4%	186,000	3%
Contra Costa	22	Southwest	74,000	1%	86,000	2%	86,000	2%	74,000	1%
Contra Costa	23	South	60,000	1%	67,000	1%	75,000	1%	61,000	1%
Contra Costa	24	East	84,000	2%	73,000	1%	96,000	2%	88,000	2%
Marin	32	North	29,000	1%	30,000	1%	29,000	1%	29,000	1%
Marin	33	Central	49,000	1%	52,000	1%	56,000	1%	52,000	1%
Marin	34	South	40,000	1%	36,000	1%	43,000	1%	41,000	1%
Napa	27	South	66,000	1%	68,000	1%	67,000	1%	68,000	1%
Napa	28	North	20,000	0%	24,000	0%	20,000	0%	20,000	0%
San Francisco	1-4	Combined	918,000	17%	969,000	18%	902,000	17%	1,007,000	19%
San Mateo	5	North	188,000	3%	186,000	3%	181,000	3%	177,000	3%
San Mateo	6	Central	123,000	2%	126,000	2%	120,000	2%	120,000	2%
San Mateo	7	South	196,000	4%	183,000	3%	188,000	3%	185,000	3%
Santa Clara	8	Northwest	207,000	4%	199,000	4%	205,000	4%	173,000	3%
Santa Clara	9	North	629,000	12%	695,000	13%	629,000	12%	619,000	11%
Santa Clara	10	Southwest	197,000	4%	195,000	4%	194,000	4%	173,000	3%

County	SD	Name	Proposed Plan		No Project Alternative		Alternative 1		Alternative 2	
			Total	Share	Total	Share	Total	Share	Total	Share
Santa Clara	11	Central	263,000	5%	253,000	5%	258,000	5%	264,000	5%
Santa Clara	12	Northeast	170,000	3%	160,000	3%	165,000	3%	162,000	3%
Santa Clara	13	South	77,000	1%	77,000	1%	77,000	1%	74,000	1%
Santa Clara	14	Southeast	68,000	1%	75,000	1%	67,000	1%	70,000	1%
Solano	25	South	62,000	1%	54,000	1%	62,000	1%	61,000	1%
Solano	26	North	139,000	3%	121,000	2%	137,000	3%	140,000	3%
Sonoma	29	South	80,000	1%	92,000	2%	80,000	1%	82,000	2%
Sonoma	30	Central	131,000	2%	147,000	3%	129,000	2%	130,000	2%
Sonoma	31	North	40,000	1%	46,000	1%	40,000	1%	40,000	1%

Source: Data compiled by MTC and ABAG in 2021

4.4.4 Jobs-Housing Ratios

The jobs to housing ratio indicates the balance between jobs and housing within a certain area. Higher ratios are generally related to a greater number of workers commuting into a county. The distribution of jobs to housing ratios by alternative for each county in 2050 is presented in **Table 4-7.**

Table 4-7: Jobs to Housing Ratios by Alternative and County in 2050

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Alameda	1.4	1.4	1.4	1.4
Contra Costa	1.0	0.7	1.2	1.0
Marin	0.8	0.9	0.8	0.9
Napa	1.6	1.5	1.6	1.6
San Francisco	1.6	1.9	1.4	1.9
San Mateo	1.3	1.3	1.2	1.2
Santa Clara	1.5	1.6	1.5	1.3
Solano	1.1	1.0	1.3	1.1
Sonoma	1.1	1.2	1.1	1.1
Regional Total	1.3	1.3	1.3	1.3

Source: Data compiled by MTC and ABAG in 2021

4.4.5 Household and Employment Growth in TPAs

Table 4-8 and **Table 4-9** show the expected distribution of household growth and employment growth in TPAs for each alternative.

Table 4-8: Total Households and Household Growth by Share in TPAs

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Total Households (2050)	4,043,000	4,043,000	4,043,000	4,043,000
Total Households in TPAs (2050)	2,049,000	1,809,000	2,164,000	1,991,000
Share of Households in TPAs (2050)	51%	45%	54%	49%
New Regional Household Growth (2015-2050)	1,367,000	1,367,000	1,367,000	1,367,000
New Household Growth in TPAs (2015-2050)	1,038,000	798,000	1,152,000	980,000
Share of New Household Growth in TPAs (2015-2050)	76%	58%	84%	72%

Note: TPAs are presented as a subset of the regional and county totals. The percentages and number of forecasted households are rounded.
Source: Data compiled by MTC and ABAG in 2021

Compared to the proposed Plan, the share of household growth in TPAs would vary across the alternatives. Household growth in TPAs would be greater under Alternative 1 than under the proposed Plan, whereas implementing the No Project Alternative or Alternative 2 would result in less household growth in TPAs than implementing the proposed Plan.

Table 4-9: Total Employment and Employment Growth by Share in TPAs

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Total Employment (2050)	5,408,000	5,408,000	5,408,000	5,408,000
Total Employment in TPAs (2050)	2,972,000	2,962,000	2,980,000	2,992,000
% of Employment in TPAs (2050)	55%	55%	55%	55%
New Regional Employment Growth (2015-2050)	1,403,000	1,403,000	1,403,000	1,403,000
New Employment Growth in TPAs (2015-2050)	838,000	828,000	846,000	858,000
Share of New Employment Growth in TPAs (2015-2050)	60%	59%	60%	61%

Note: TPAs are presented as a subset of the regional and county totals. The percentages and number of forecasted jobs are rounded.
Source: Data compiled by MTC and ABAG in 2021

Compared to the proposed Plan, the share of employment growth in TPAs would be similar between Alternative 1 and Alternative 2. Employment growth in TPAs would be greater under Alternative 1 and Alternative 2 than under the proposed Plan, and less employment growth in TPAs would occur under the No Project Alternative than under the proposed Plan.

4.4.6 Land Use Growth Footprint

The land use growth footprint would differ among the alternatives. As shown in **Table 4-10**, the total land use growth footprint area, land use growth footprint area within TPAs, and overall increase in developed land (i.e., projected development in areas not currently considered developed, according to the Farmland Mapping and Monitoring Program) also vary among the alternatives.

Table 4-10: Summary of Land Use Growth Footprint by Alternative and County

	Land Use Growth Footprint	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Alameda	Total Area	7,100	8,700	6,000	6,800
	Within Growth Geography	5,700	4,600	3,100	4,000
	Within TPAs	3,300	2,800	3,000	3,100
	New Developed Land	1,500	1,900	1,300	1,400
Contra Costa	Total Area	9,700	22,000	6,800	8,800
	Within Growth Geography	4,700	5,600	3,100	4,000
	Within TPAs	1,400	1,300	1,000	1,200
	New Developed Land	5,300	11,400	4,100	4,700
Marin	Total Area	1,300	3,600	900	980
	Within Growth Geography	990	280	750	780
	Within TPAs	470	190	450	360
	New Developed Land	130	2,300	90	30
Napa	Total Area	790	1,500	720	770
	Within Growth Geography	420	400	390	380
	Within TPAs	70	50	70	40
	New Developed Land	490	700	480	510
San Francisco	Total Area	3,400	1,500	3,400	2,500
	Within Growth Geography	3,400	1,400	3,400	2,500
	Within TPAs	2,700	1,200	2,700	1,800
	New Developed Land	<1	<1	<1	<1
San Mateo	Total Area	2,700	4,800	2,600	2,900
	Within Growth Geography	1,900	1,500	2,100	2,200
	Within TPAs	1,300	970	1,500	1,200
	New Developed Land	360	1,000	220	270
Santa Clara	Total Area	8,500	14,200	8,000	10,900
	Within Growth Geography	6,200	6,600	6,000	8,700
	Within TPAs	5,300	6,200	5,100	6,300
	New Developed Land	920	2,400	880	1,100
Solano	Total Area	4,100	5,900	1,900	3,000
	Within Growth Geography	2,300	600	1,400	2,100
	Within TPAs	160	30	190	130
	New Developed Land	3,100	4,100	1,100	2,200
Sonoma	Total Area	1,900	2,800	1,700	2,000
	Within Growth Geography	820	820	720	960
	Within TPAs	260	200	240	220
	New Developed Land	510	810	590	520
Regional	Total Area	39,400	65,100	32,100	38,900
	Within Growth Geography	26,500	21,800	22,700	26,900
	Within TPAs	15,000	13,000	14,200	14,500
	New Developed Land	12,300	24,700	8,800	10,700

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding.

TPAs are presented as a subset of the regional and county totals. Information provided by county includes both incorporated and unincorporated areas in the county.

Acreage that results in "new developed land" indicates the area of the land use growth footprint for the alternative that would be located within areas not currently designated Urban Built-Up according the FMMP.

Source: Data compiled by MTC and ABAG in 2021

4.4.7 Sea Level Rise Adaptation Footprint

The relative comparison of the sea level rise adaptation footprint acreage associated with each alternative is provided in **Table 4-11**.

Table 4-11 Acreage of Sea Level Rise Adaptation Projects Footprint by Alternative

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Acres	5,500	1,400	5,500	5,500

Notes: Whole numbers between 1,000 and 1,000,000 have been rounded to the nearest 100.
Source: Data compiled by MTC and ABAG in 2021

4.4.8 Transportation Strategies and Project Footprints

As discussed above, each alternative would focus on different types of transportation strategies designed to align with other land use–related strategies. **Table 4-12** presents the relative funding for each strategy across the various alternatives.

Table 4-12: Relative Funding of Transportation Strategies by Alternative

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
T01. Restore, Operate, and Maintain the Existing System	$$	$	$$	$$
T02. Support Community-Led Transportation Enhancements in Equity Priority Communities	$$	$	$$	$$
T03. Enable a Seamless Mobility Experience	$$	N/A	$$	$$
T04. Reform Regional Transit Fare Policy	$$	N/A	$$	$$$
T05. Implement Per-Mile Tolling on Congested Freeways with Transit Alternatives	$$	N/A	$$	$$
T06. Improve Interchanges and Address Highway Bottlenecks	$$	$	$	$$
T07. Advance Other Regional Programs and Local Priorities	$$	$	$$	$$
T08. Build a Complete Streets Network	$$	$	$$	$$$
T09. Advance Regional Vision Zero Policy through Street Design and Reduced Speeds	$$	$	$$	$$$
T10. Enhance Local Transit Frequency, Capacity, and Reliability	$$	$	$$$	$$$
T11. Expand and Modernize the Regional Rail Network	$$	$	$$	$
T12. Build an Integrated Regional Express Lane and Express Bus Network	$$	$	$	$$$

Source: Data compiled by MTC and ABAG in 2021

The funding levels shown above indicate the relative investment in roadway-lane miles and total daily transit seat-miles. As shown in **Table 4-13**, there would be substantially less investment in roadway lane-miles under the No Project Alternative and Alternative 1 compared to the proposed Plan. In terms of total daily transit seat-miles, there would be a greater investment in capacity of daily transit seat-miles under Alternative 1 and Alternative 2 compared to the proposed Plan, and substantially lower added capacity of daily transit seat-miles under the No Project Alternative.

Table 4-13: Added Transportation System Capacity by Alternative (2015–2050)

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Freeway Lane-Miles	450	60	220	450
Expressway Lane-Miles	40	-20	40	40
Arterial Lane-Miles	-30	-40	-20	-20
Collector Lane-Miles		-10	-10	-
Total Roadway Lane-Miles	460	-20	230	470
Daily Local Bus Seat-Miles	4,089,000	833,000	5,459,000	6,308,000
Daily Express Bus Seat-Miles	2,772,000	524,000	2,715,000	7,350,000
Daily Light Rail Seat-Miles	1,239,000	50,000	1,239,000	1,655,000
Daily Heavy Rail Seat-Miles	9,230,000	3,667,000	9,230,000	9,230,000
Daily Commuter Rail Seat-Miles	14,598,000	968,000	14,598,000	3,397,000
Daily Ferry Seat-Miles	2,196,000	-37,000	2,196,000	2,196,000
Total Daily Transit Seat-Miles	34,125,000	6,016,000	35,438,000	30,136,000

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum because of independent rounding. Negative values in No Project alternative represent reductions due closures from sea level rise inundation.
Source: Data compiled by MTC and ABAG in 2021

The relative comparison of transportation projects acreage associated with each alternative is provided in **Table 4-14**.

Table 4-14: Acreage of Transportation Projects Footprint by Alternative

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Acres	14,300	2,200	10,400	12,200

Notes: Whole numbers between 1,000 and 1,000,000 have been rounded to the nearest 100.
Source: Data compiled by MTC and ABAG in 2021

This analysis considers the major transportation projects (i.e., projects that cost greater than $250 million) when comparing the alternatives. **Table 4-15** provides a breakdown of the major projects associated with Alternatives 1 and 2.

Table 4-15: Major Transportation Projects by Alternative

Strategy	System	Project Name	County	Alternative 1	Alternative 2
T06. Improve Interchanges & Address Highway Bottlenecks	Roadway	I-80/I-680/SR 12 | Interchange Improvements + Widening | Phases 3, 5-7	SOL	Removed	No Change
	Roadway	I-680/SR 4 | Interchange Improvements | Phases 1, 2, 4, & 5	CC	Removed	No Change
	Roadway	SR 4 | Operational Improvements | EB & WB	CC	Removed	No Change
	Roadway	SR 4/Vasco Road | Widening	CC	Removed	No Change
	Roadway	SR 37 | Interim Project (e.g., Widening + Tolling)	SOL, NAP	Removed	No Change
	Roadway	SR 262 Safety & Interchange Improvements	ALA	Removed	No Change
	Roadway	U.S. 101/I-580 | Direct Connector	MRN	Removed	No Change
	Roadway	Vasco Road/Byron Highway | New Connector Road	CC	Removed	No Change
T11. Expand & Modernize the Regional Rail Network	Public Transit	Caltrain/High Speed Rail | Electrification & Modernization (Tamien to Pacheco Pass)	SCL	No Change	Removed
	Public Transit	Dumbarton Rail Group Rapid Transit	ALA, SM	No Change	Removed
	Public Transit	Transbay Rail | New San Francisco-Oakland Crossing ("Link21")	ALA, SF	No Change	Removed

Strategy	System	Project Name	County	Alternative 1	Alternative 2
T12. Build an Integrated Regional Express Lane & Express Bus Network	Roadway	I-80 | Express Lanes	SOL	Rescoped	No Change
	Roadway	I-680 | Express Lanes	ALA, CC, SCL	Rescoped	No Change
	Roadway	I-880 | Express Lanes	ALA, SCL	Rescoped	No Change
EN01. Adapt to Sea Level Rise	Other	SR 37 | Long-Term Project (e.g., Sea Level Rise Adaptation)	SOL, NAP, SON, MRN	Removed	No Change

Notes: ALA = Alameda; CC = Contra Costa; MRN = Marin; NAP = Napa; SF = San Francisco; SM = San Mateo; SCL = Santa Clara; SOL = Solano; SON = Sonoma.
Source: Data compiled by MTC and ABAG in 2021

4.5 COMPARATIVE IMPACT ANALYSIS OF ALTERNATIVES

The following discussion provides an analysis of impacts of the alternatives compared to the proposed Plan. Quantified data is provided to the extent it is available. Each of these alternatives is intended to accommodate projected growth, sea level rise adaptation infrastructure, and transportation projects and programs, with one alternative (No Project, Alternative 1) reflecting forecasted future conditions without an adopted Plan in place and the other alternatives reflecting various modifications to the proposed Plan. The format of this analysis is structured to examine how impacts from each alternative would compare to impacts of the proposed Plan. The analysis compares impacts of the alternatives to the proposed Plan assuming no mitigation is in place. Mitigation measures presented in the impact discussions for the proposed Plan should be implemented for any alternative selected that would result in similar impacts, to reduce the adverse effect of significant impacts. However, MTC and ABAG cannot require local implementing agencies to adopt mitigation measures, and it is ultimately the responsibility of the implementing agencies to adopt mitigation.

Where quantified information or analysis is provided, the same source or method was followed as was used for presenting information and analysis on the proposed Plan (see Section 3.1, "Approach to the Analysis"). The analysis compares the potential effects of the land use growth footprint, sea level rise adaptation footprint, and the transportation projects footprint associated with each alternative.

4.5.1 Approach to Assessing Alternatives

Assessment of the Plan alternatives involved modeling to develop the land use growth footprint and traffic-related outputs. These efforts are described below.

MODELING

See Section 2.5.3, "Analysis Tools," for a detailed overview of the modeling methodology.

LAND USE FORECASTING MODEL – BAY AREA URBANSIM 2.0

MTC and ABAG developed the Regional Growth Forecast—forecasted numbers of population, jobs, households, and housing units—for 2050, as described in Section 2.5.2, "Planning Assumptions." Bay Area UrbanSim 2.0, the regional land use forecasting model, relied on these long-range forecasts as model inputs. Based on the assumed levels of household and job growth in the region, Bay Area UrbanSim analyzed the impact of economic, housing, and transportation strategies for each of the alternatives' forecasted growth pattern ("land use growth footprint").

TRAVEL DEMAND FORECASTING MODEL – TRAVEL MODEL 1.5

The MTC demand model, Travel Model 1.5, is a regional activity-based travel model for the San Francisco Bay Area. Integrating the effects of transportation strategies and associated investments, the model produced all of the key outputs used in assessing the significance of transportation impacts for all alternatives (e.g., VMT).

INTEGRATION OF TRAVEL MODEL 1.5 AND BAY AREA URBANSIM 2.0

To appropriately consider the integrated relationship of transportation and land use, Bay Area UrbanSim 2.0 and Travel Model 1.5 are unified in an integrated model framework. This allows for analysis of how transportation projects affect the surrounding land use pattern, as well as how changes to household and employment locations affect transportation demand—the evaluation required of an SCS. See Chapter 2, "Project Description," for more detail on this process.

For calculations relying on outputs from Travel Model 1.5 and population totals (i.e., per capita VMT or per capita energy use), model-simulated population levels were used to ensure consistency. Simulated population may be slightly different from overall population forecasts for the proposed Plan and alternatives because of slight variability in modeling tools. Similarly, for calculations relying on household and/or housing unit totals, model-simulated totals from UrbanSim 2.0 were used to ensure consistency. Alike model-simulated population levels, households, and housing units may be slightly different than the regional growth forecast because of slight variability in modeling tools.

4.5.2 Aesthetics and Visual Resources

NO PROJECT ALTERNATIVE

Under the No Project Alternative, the forecasted development pattern, sea level rise adaptation infrastructure, and transportation projects would not substantially change the existing scenic vistas in the Bay Area at the regional scale because views of landforms and constructed features would generally remain similar to the existing conditions. However, development would sprawl into existing undeveloped areas including onto areas of relatively higher topography, which are visible to larger viewsheds than flatter areas. Impacts to scenic vistas would be substantial from discrete locations due to the presence of construction-related activities and introduction of new features in a localized viewshed. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). With respect to planned infrastructure, the No Project Alternative would have a substantially reduced number of sea level rise adaptation and transportation projects, which would reduce the footprint related to these types of projects and require less construction. Under the No Project Alternative, modeling indicates that, without any adaptation projects and an assumed 2-foot sea level rise, the greatest degree of inundation would include inland areas along the bayside south of State Route (SR) 92, the San Francisco International Airport, the Oakland International Airport, and lands surrounding SR 37 (BCDC 2020). Implementation of sea level rise infrastructure would reduce inundation throughout the Plan Area but would do so by elevating some existing roadways and constructing vertical levees, which in some places would require considerable construction that could substantially affect scenic vistas. The No Project Alternative would result in greater levels of sea level rise impacts, but fewer sea level rise infrastructure projects than under the proposed Plan. Overall, implementation of the No Project Alternative would impact more Bay Area acreage than the proposed Plan; thus, this impact would be significant and unavoidable for the reasons described under Impact AES-1 and **greater** than the impact that would occur under the proposed Plan.

Construction of developments within view of scenic highways would generally cause similar types of short-term visual impacts resulting from construction equipment and scaffolding, temporary lighting, and exposed excavation and slope faces. However, the area of development would be greater under the No Project Alternative than the proposed Plan due to a larger forecasted growth footprint. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). Modeling indicates that the State scenic highways SR 37 and SR 1 in Marin County would be inundated due to sea level rise by 2050 (BCDC 2020). While impacts to scenic resources within a State scenic highway generally pertain to nearby changes involving trees, rock outcroppings, and historical buildings within view of an identified roadway, under the No Project Alternative, scenic highways could potentially be inundated and unusable, which is not expected to occur under the proposed Plan. In contrast, the proposed Plan would include infrastructure projects that would allow for continued use of affected roadways while affecting surrounding views. This impact would be significant and unavoidable for the reasons described under Impact AES-2 and **greater** than the impact that would occur under the proposed Plan because a greater area would be developed.

Projected development has the potential to cause changes that could alter visual character. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). In contrast, as it relates to transportation projects, the No Project Alternative includes a decreased number of transportation projects that could affect visual character. In addition, modeling indicates that without any adaptation infrastructure and a forecasted 98-percent confidence that sea level rise will be 2 feet or less, the greatest degree of inundation would include inland areas along the bayside south of SR 92, the San Francisco International Airport, the Oakland International Airport, and lands surrounding SR 37 (BCDC 2020). Inundation could lead to abandonment and destruction of existing business districts, homes, and other types of developed areas. Generally, the effect of sea level rise could affect the visual character of localized areas by rendering them undevelopable or otherwise unusable. In contrast, the proposed Plan includes sea level rise adaptation infrastructure that would generally allow for the continued use of developed lands; however, these projects may substantially alter undeveloped lands depending on the type of infrastructure improvement. Regardless, because the No Project Alternative would substantially increase the amount of land that would be converted from undeveloped to developed uses, this impact would be significant and unavoidable for the reasons described under Impact AES-3 and **greater** than the impact that would occur under the proposed Plan because a greater area of currently undeveloped land would be developed.

Projected development of new residential or commercial structures would involve new sources of light and glare, which would cover a greater area of land under the No Project Alternative as compared to the proposed Plan. However, the No Project Alternative includes fewer transportation projects than the proposed Plan and would thus make a smaller contribution to regional light and glare impacts. In terms of sea level rise adaptation impacts, both the No Project and proposed Plan would result in minimal sources of new light and glare due to the limited need for lighting of resiliency infrastructure. Overall, as shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres), which would be substantially greater than any reduced effects from the limited number of new transportation projects. This impact would be significant and unavoidable for the reasons described under Impact AES-4 and **greater** than the impact that would occur under the proposed Plan because a greater area of currently undeveloped land would be developed.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

Impacts to scenic vistas would be substantial from discrete locations due to the presence of construction-related activities and introduction of new feature in a localized viewshed. As shown in **Table 4-10**, the TRA Focus Alternative would result in a lesser area of land being converted from undeveloped to developed uses compared to the proposed Plan (8,800 acres versus 12,300 acres). In addition, the TRA Focus Alternative would reduce funding for the highway widening/resilience project on SR 37. This could result in less developed infrastructure along SR 37 and a greater risk of inundation of this roadway, which may put it in disrepair or disuse. Overall, the TRA Focus Alternative would reduce changes to undeveloped areas compared to the proposed Plan. This impact would be significant and unavoidable for the reasons described under Impact AES-1 and **less** than the impact that would occur under the proposed Plan.

Construction of developments within view of scenic highways would generally cause similar types of short-term visual impacts resulting from construction equipment and scaffolding, temporary lighting, and exposed excavation and slope faces. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). In addition, the TRA Focus Alternative would eliminate funding for the highway widening/resilience project on SR 37. This could result in less developed infrastructure along SR 37 and a greater risk of inundation of this roadway, which may put it in disrepair or disuse and thus eliminate use of a scenic highway. While impacts to scenic resources within a State scenic highway generally pertain to nearby changes involving trees, rock outcroppings, and historical buildings within view of an identified roadway, under the TRA Focus Alternative, scenic highways could potentially be destroyed or rendered unusable due to flooding. In contrast, the proposed Plan would include infrastructure projects that would allow for continued use of SR 37, while affecting surrounding views. This impact would be significant and unavoidable for the reasons described under Impact AES-2 and **less** than the impact that would occur under the proposed Plan because the area of projected growth would be relatively decreased.

Projected development has the potential to cause changes that could alter visual character. As shown in **Table 4-10**, the TRA Focus Alternative would result in a lesser area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). As discussed above the TRA Focus Alternative would decrease funding for improvements to SR 37, which is projected to be inundated due to sea level rise by 2050. This may affect the visual character or quality of public views in future conditions; however, development of adaptation infrastructure included in the proposed Plan could require tree removal or earthwork. These activities could alter or degrade existing visual quality in the region depending on their location by introducing new built elements in existing natural landscapes or increasing the vertical profile of existing infrastructure. Regardless, though the TRA Focus Alternative would result in a lesser area of land converted from undeveloped to developed uses, compared to the proposed Plan, this impact would be significant and unavoidable for the reasons described under Impact AES-3 and **less** than the impact that would occur under the proposed Plan because a smaller area of currently undeveloped land would be developed.

Development and transportation projects could create new substantial sources of light and glare at the regional scale that cause a public hazard, disrupt scenic vistas, and brighten the night sky. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses when compared to the proposed Plan (8,800 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact AES-4 and **less** than the impact that would occur under the proposed Plan because a smaller area of currently undeveloped land would be developed.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

Impacts to scenic vistas would be substantial from discrete locations due to the presence of construction-related activities and introduction of new features in a localized viewshed. As shown in **Table 4-10**, the HRA Focus Alternative would result in a lesser area of land being converted from undeveloped to developed uses compared to the proposed Plan (10,700 acres versus 12,300 acres). In terms of sea level rise adaptation projects, both the proposed Plan and HRA Focus Alternative contain the same list of projects and would result in the same level of environmental effects. Overall, the HRA Focus Alternative would reduce changes to undeveloped areas compared to the proposed Plan. This impact would be significant and unavoidable for the reasons described under Impact AES-1 and **less** than the impact that would occur under the proposed Plan.

Construction of developments within view of scenic highways would generally cause similar types of short-term visual impacts resulting from construction equipment and scaffolding, temporary lighting, and exposed excavation and slope faces. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). In terms of sea level rise adaptation projects, both the proposed Plan and HRA Focus Alternative contain the same list of projects and would result in the same level of environmental effects. This impact would be significant and unavoidable for the reasons described under Impact AES-2 and **less** than the impact that would occur under the proposed Plan because the area of projected growth would be relatively decreased.

Projected development has the potential to cause changes that could alter visual character. As shown in **Table 4-10**, the HRA Focus Alternative would result in a lesser area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). In terms of sea level rise adaptation projects, both the proposed Plan and HRA Focus Alternative contain the same proposed infrastructure and would result in the same level of environmental effects. Impacts on visual character would be significant and unavoidable for the reasons described under Impact AES-3 and **less** than the impact that would occur under the proposed Plan because a smaller area of currently undeveloped land would be developed.

Development and transportation projects could create new substantial sources of light and glare at the regional scale that cause a public hazard, disrupt scenic vistas, and brighten the night sky. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses when compared to the proposed Plan (10,700 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact AES-4 and **less** than the impact that would occur under the proposed Plan because a smaller area of currently undeveloped land would be developed.

4.5.3 Agriculture and Forestry Resources

The relative magnitude of differences in the impacts between alternatives is generally related to the land use growth, sea level rise adaptation, and transportation project footprints related to each alternative. **Table 4-16** provides data related to Farmland and agricultural zoning district acreages and **Table 4-17** provides data related to forest land. The comparison of non-quantified impacts are discussed qualitatively, below.

Table 4-16: Summary of Farmland and Agricultural Zoning District Acreage by Plan Alternative

	Land Use Growth Footprint	Sea Level Rise Adaptation Footprint	Transportation Projects Footprint	Total
Proposed Plan	1,600 (2,700)	0 (590)	270 (1,900)	1,900 (5,300)
No Project Alternative	2,900 (6,200)	0	30 (220)	2,900 (6,400)
Alternative 1	980 (930)	0 (590)	220 (1,200)	1,200 (2,700)
Alternative 2	1,100 (2,200)	0 (590)	110 (1,400)	1,200 (4,200)

Notes: Farmland is defined as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. Data is presented as acreage of Farmland (acreage of land located in agricultural zoning)
Source: Data compiled by MTC and ABAG in 2021

Table 4-17: Affected Forest Land Acreage by Plan Alternative

	Land Use Growth Footprint	Sea Level Rise Adaptation Footprint	Transportation Projects Footprint
Proposed Plan	280	2	100
No Project Alternative	3,600	<1	2
Alternative 1	240	2	100
Alternative 2	230	2	8

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100).
Sources: Data compiled by MTC and ABAG in 2021 based on data from U.S. Department of Agriculture 2019

NO PROJECT ALTERNATIVE

Development of new residential and commercial land uses, sea level rise adaptation infrastructure, and transportation projects has the potential to convert Prime or Unique Farmland or Farmland of Statewide Importance to other uses. The conversion may conflict with zoning or a Williamson Act Contract. As shown in **Table 4-16**, compared to the proposed Plan, the No Project Alternative would convert more agricultural land to non-agricultural uses (2,900 acres versus 1,900 acres). This impact would be significant and unavoidable for the reasons described under Impact AG-1 and **greater** than the impact that would occur under the proposed Plan because more farmland would be affected.

Development of new residential and commercial land uses, sea level rise adaptation infrastructure, and transportation projects has the potential to convert has the potential to convert forest lands and timberlands to developed uses. Compared to the proposed Plan, the No Project Alternative would convert more forest lands to developed uses (3,600 acres versus 280 acres, **Table 4-17**). This impact would be significant and unavoidable for the reasons described under Impact AG-2 and **greater** than the impact that would occur under the proposed Plan because more forest land would be affected.

Anticipated growth under the proposed Plan would result in conversion of Important Farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) to non-agricultural use and conversion of forest land to non-forest use. Lands that remain agricultural but located adjacent to developed uses may feel pressure to develop, as nearby land values increase or as nuisances from urban development spread to agricultural lands. Further, expanded transportation infrastructure capacity and the implementation of sea level rise infrastructure could remove obstacles to growth in existing agricultural areas. A range of local conservation plans, habitat conservation agencies and State/federal park designated areas provide protection for a substantial amount of forest land and farmland. However, a substantial amount of land on the urban and suburban fringe is vulnerable to development, if not within the boundaries of protected lands, and face additional development pressure as adjacent lands are converted from undeveloped to developed uses. Therefore,

development projects anticipated to occur under the No Project Alternative could have the potential to cause other changes in the existing environment that could result in conversion of important Farmland to non-agricultural use or conversion of forest land to non-forest use. Because the pressure to develop on the suburban fringe would be similar between the alternatives, this impact would be significant and unavoidable for the reasons described under Impact AG-3 and **similar** to the impact that would occur under the proposed Plan.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

Development of new residential and commercial land uses, sea level rise adaptation infrastructure, and transportation projects has the potential to convert Prime or Unique Farmland or Farmland of Statewide Importance to other uses. The conversion may conflict with zoning or a Williamson Act Contract. Compared to the proposed Plan, the TRA Focus Alternative would convert less agricultural land to non-agricultural uses (1,200 acres versus 1,900 acres, **Table 4-16**). This impact would be significant and unavoidable for the reasons described under Impact AG-1 and **less** than the impact that would occur under the proposed Plan because less farmland would be affected.

Development of new residential and commercial land uses, sea level rise adaptation infrastructure, and transportation projects has the potential to convert forest lands and timberlands to urban uses. Compared to the proposed Plan, the TRA Focus Alternative would convert a smaller area of forest lands to urban uses (240 acres versus 280 acres, **Table 4-17**). This impact would be significant and unavoidable for the reasons described under Impact AG-2 and **less** than the impact that would occur under the proposed Plan because less forest land would be affected.

Anticipated growth under the proposed Plan would result in conversion of Important Farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) to non-agricultural use and conversion of forest land to non-forest use. Lands that remain agricultural but located adjacent to urban uses, may feel pressure to develop, as nearby land values increase or as nuisances from urban development spread to agricultural lands. Further, expanded transportation infrastructure capacity and the implementation of sea level rise infrastructure could remove obstacles to growth in existing agricultural areas. A range of local conservation plans, habitat conservation agencies and State/federal park designated areas provide protection for a substantial amount of forest land and farmland. However, a substantial amount of land on the urban and suburban fringe is vulnerable to development, if not within the boundaries of protected lands, and face additional development pressure as adjacent lands are converted from undeveloped to developed uses. Therefore, development projects anticipated to occur under the proposed Plan could have the potential to cause other changes in the existing environment that could result in conversion of important Farmland to non-agricultural use or conversion of forest land to non-forest use. Because the pressure to develop on the suburban fringe would be similar between the alternatives, this impact would be significant and unavoidable for the reasons described under Impact AG-3 and **similar** to the impact that would occur under the proposed Plan.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

Development of new residential and commercial land uses, sea level rise adaptation infrastructure, and transportation projects has the potential to convert Prime or Unique Farmland or Farmland of Statewide Importance to other uses. The conversion may conflict with zoning or a Williamson Act Contract. Compared to the proposed Plan, the HRA Focus Alternative would convert less agricultural land to non-agricultural uses (1,200 acres versus 1,900 acres, **Table 4-16**). This impact would be

significant and unavoidable for the reasons described under Impact AG-1 and **less** than the impact that would occur under the proposed Plan because less farmland would be affected.

Development of new residential and commercial land uses, sea level rise adaptation infrastructure, and transportation projects has the potential to convert forest lands and timberlands to urban uses. Compared to the proposed Plan, the HRA Focus Alternative would convert a smaller area of forest lands to urban uses (230 acres versus 280 acres, **Table 4-17**). This impact would be significant and unavoidable for the reasons described under Impact AG-2 and **less** than the impact that would occur under the proposed Plan because less forest land would be affected.

Anticipated growth under the proposed Plan would result in conversion of Important Farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) to non-agricultural use and conversion of forest land to non-forest use. Lands that remain agricultural but located adjacent to urban uses, may feel pressure to develop, as nearby land values increase or as nuisances from urban development spread to agricultural lands. Further, expanded transportation infrastructure capacity and the implementation of sea level rise infrastructure could remove obstacles to growth in existing agricultural areas. A range of local conservation plans, habitat conservation agencies and State/federal park designated areas provide protection for a substantial amount of forest land and farmland. However, a substantial amount of land on the urban and suburban fringe is vulnerable to development, if not within the boundaries of protected lands, and face additional development pressure as adjacent lands are converted from undeveloped to developed uses. Therefore, development projects anticipated to occur under the HRA Focus Alternative could have the potential to cause other changes in the existing environment that could result in conversion of important Farmland to non-agricultural use or conversion of forest land to non-forest use. Because the pressure to develop on the suburban fringe would be similar between the alternatives, this impact would be significant and unavoidable for the reasons described under Impact AG-3 and **similar** to the impact that would occur under the proposed Plan.

4.5.4 Air Quality

These data are presented for changes to levels of exhaust emissions, fine particulate matter ($PM_{2.5}$), and VMT within Community Air Risk Evaluation (CARE) communities and the region in **Table 4-18** compared to the existing conditions, based on the land use growth footprints. The overlap of the land use growth footprint within TAC risk areas by community in provided in **Table 4-19.** The comparison of non-quantified impacts are discussed qualitatively, below.

Table 4-18: CARE Communities and Region Analysis by Alternative Compared to Existing Conditions

County	CARE Status	Exhaust Emissions				Total $PM_{2.5}$	VMT
		Exhaust Only $PM_{2.5}$	Diesel PM	Benzene	1, 3 Butadiene		
Proposed Plan	CARE Community	-88%	-93%	-76%	-73%	-8%	+18%
	Remainder of Region	-74%	-91%	-71%	-70%	+14%	+15%
	Total	-83%	-93%	-74%	-71%	+9%	+16%
No Project Alternative	CARE Community	-84%	-90%	-69%	-66%	+12%	+44%
	Remainder of Region	-69%	-88%	-65%	-64%	+28%	+33%
	Total	-78%	-90%	-67%	-65%	+24%	+36%
Alternative 1 – TRA Focus Alternative	CARE Community	-88%	-93%	-76%	-73%	-9%	+16%
	Remainder of Region	-66%	-91%	-72%	-71%	+12%	+14%
	Total	-83%	-93%	-74%	-71%	+7%	+14%

County	CARE Status	Exhaust Emissions				Total $PM_{2.5}$	VMT
		Exhaust Only $PM_{2.5}$	Diesel PM	Benzene	1, 3 Butadiene		
Alternative 2 – HRA Focus Alternative	CARE Community	-88%	-93%	-76%	-73%	-8%	+17%
	Remainder of Region	-66%	-91%	-72%	-71%	+13%	+14%
	Total	-83%	-93%	-74%	-71%	+8%	+15%

Notes: CARE = Community Air Risk Evaluation, $PM_{2.5}$ = fine particulate matter, PM = particulate matter, VMT = vehicle miles travelled; Percentages rounded to nearest whole number; Total $PM_{2.5}$ includes vehicle exhaust, re-entrained road dust, tire and brake wear; Marin, Napa, San Mateo and Sonoma Counties do not have CARE-designated areas; Emissions rates from EMFAC2021.

Sources: Data compiled by MTC and ABAG in 2021; BAAQMD 2014

Table 4-19: Acreage of Land Use Growth Footprint within Toxic Air Contaminant Risk Areas by Alternative

	County	Total Acres
Land Use Growth Footprint	Proposed Plan	8,800
	No Project Alternative	10,400
	Alternative 1 - TRA Focus Alternative	7,800
	Alternative 2 - HRA Focus Alternative	8,900

Note: Whole numbers have been rounded to the nearest 100.

Sources: Data compiled by MTC and ABAG in 2021

NO PROJECT ALTERNATIVE

This impact addresses conflicts with the 2017 Clean Air Plan. The 2017 Clean Air Plan contains a list of programs that protect public health and the climate, with the overall goal of reducing GHG emissions in the Bay Area by 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. This framework assumes that state policies, plans, and programs that address air quality and climate protection would be implemented, including SB 375 requirements. Under the No Project Alternative, there would be no adopted RTP/SCS and reduction goals would not be met (i.e., 19 percent reduction in VMT emissions from cars and light trucks). Without meeting SB 375 goals, implementation of the 2017 Clean Air Plan would be obstructed and, as a result, this impact would be significant and **greater** than the proposed Plan (AQ-1). *(This impact would be less-than-significant under the proposed Plan)*

Impacts of the proposed Plan related to construction-related emissions are generally localized in nature. Construction equipment and processes are generally similar between land use and transportation projects,. and could occur over a short period of time, resulting in substantial construction-related emissions on a daily basis. Because construction-related emissions are generally localized and would occur throughout the regional during the planning period, this impact would be significant and unavoidable for the reasons described under Impact AQ-2 and **similar** to the impact that would occur under the proposed Plan.

The area-source emissions of criteria pollutants and precursors would increase over the planning horizon of the Plan due to the net increase in land use development and transportation projects. As shown in **Table 4-18**, the increase of regional VMT would be greater under the No Project Alternative than under the proposed Plan (36-percent regional increase versus 16-percent regional increase). Because the No Project Alternative would emit a greater level of criteria air pollutants than the proposed Plan, due to greater VMT, this impact would be significant and unavoidable for the reasons described under Impact AQ-3 and **greater** than the impact that would occur under the proposed Plan.

TAC Risk Areas are locations where cancer risk levels and/or $PM_{2.5}$ concentrations are exceeded. In general, TAC Risk Areas tend to occur along high-volume freeways and roadways, high-use rail lines, locations near numerous stationary-sources, and locations where a single stationary-source has very high estimated cancer risk levels or $PM_{2.5}$ concentration. As indicated in **Table 4-19**, the No Project Alternative would result in a greater land use growth footprint within TAC risk areas than the proposed Plan (10,400 acres versus 8,800 acres). In addition, as shown in **Table 4-18**, there would be an increase of 12 percent in total $PM_{2.5}$ in CARE Communities under the No Project Alternative, which indicates a greater level of $PM_{2.5}$ emissions than the decrease of 8 percent in total $PM_{2.5}$ expected under the proposed Plan. This impact would be significant and unavoidable for the reasons described under Impact AQ-4 and **greater** than the impact that would occur under the proposed Plan because emissions would be greater.

Development of new residential and commercial uses, sea level rise adaptation infrastructure, and transportation projects could generate odorous diesel exhaust emissions from construction equipment and odors associated with asphalt paving. These types of construction-generated odorous emissions, however, would be temporary and not be generated at any one location for an extended period. Diesel exhaust fumes would also dissipate rapidly from the source with an increase in distance. Therefore, this impact would be less than significant for the reasons described under Impact AQ-5 and **similar** to the impact that would occur under the proposed Plan because construction-related emissions are generally localized and would occur throughout the regional during the planning period.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

This impact addresses conflicts with the 2017 Clean Air Plan. The 2017 Clean Air Plan contains a list of programs that protect public health and the climate, with the overall goal of reducing GHG emissions in the Bay Area by 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. This framework assumes that state policies, plans, and programs that address air quality and climate protection would be implemented, including SB 375 requirements. Because the TRA Focus Alternative would meet the GHG emission reduction goals of SB 375 (i.e., 19 percent reduction in VMT emissions from cars and light trucks), this impact would be less-than-significant for the reasons described in Impact AQ-1 and **similar** to the proposed Plan.

Construction-related air emissions are generally localized in nature. Construction equipment and processes are generally similar between land use and transportation projects, except that transportation projects and could potentially occur over a short period of time, resulting in substantial construction-related emissions on a daily basis. Because construction-related emissions are generally localized and would occur throughout the regional during the planning period, this impact would be significant and unavoidable for the reasons described under Impact AQ-2 and **similar** to the impact that would occur under the proposed Plan.

The area-source emissions of criteria pollutants and precursors would increase over the planning horizon of the Plan due to the net increase in land use development and transportation projects. As shown in **Table 4-18**, the increase of regional VMT would be less under the TRA Focus Alternative than the proposed Plan (14-percent regional increase versus 16-percent regional increase). Because the TRA Focus Alternative would emit a lower level of criteria air pollutant than the proposed Plan, due to a lower VMT, this impact would be significant and unavoidable for the reasons described under Impact AQ-3 and **less** than the impact that would occur under the proposed Plan because emissions would be less.

TAC Risk Areas are locations where cancer risk levels and/or $PM_{2.5}$ concentrations are exceeded. In general, TAC Risk Areas tend to occur along high-volume freeways and roadways, high-use rail lines, locations near numerous stationary-sources, and locations where a single stationary-source has very high estimated cancer risk levels or $PM_{2.5}$ concentration. As indicated in **Table 4-19**, the TRA Focus Alternative would result in a smaller land use growth footprint within TAC risk areas than the proposed Plan (7,800 acres versus 8,800 acres). In addition, as shown in **Table 4-18**, there would be a decrease of 9 percent in total $PM_{2.5}$ in CARE Communities under the TRA Focus Alternative, which indicates a greater reduction in $PM_{2.5}$ than the decrease of 8 percent in total $PM_{2.5}$ expected under the proposed Plan. This impact would be significant and unavoidable for the reasons described under Impact AQ-4 and **less** than the impact that would occur under the proposed Plan because emissions would be less in TAC Risk Areas under the TRA Focus Alternative.

Development of new residential and commercial uses, sea level rise adaptation infrastructure, and transportation projects could generate odorous diesel exhaust emissions from construction equipment and odors associated with asphalt paving. These types of construction-generated odorous emissions, however, would be temporary and not be generated at any one location for an extended period. Diesel exhaust fumes would also dissipate rapidly from the source with an increase in distance. Therefore, this impact would be less than significant for the reasons described under Impact AQ-5 and **similar** to the impact that would occur under the proposed Plan because construction-related emissions are generally localized and would occur throughout the regional during the planning period.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

This impact addresses conflicts with the 2017 Clean Air Plan. The 2017 Clean Air Plan contains a list of programs that protect public health and the climate, with the overall goal of reducing GHG emissions in the Bay Area by 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. This framework assumes that state policies, plans, and programs that address air quality and climate protection would be implemented, including SB 375 requirements. Because the HRA Focus Alternative would meet the GHG emission reduction goals of SB 375 (i.e., 19 percent reduction in VMT emissions from cars and light trucks)., this impact would be less-than-significant for the reasons described in Impact AQ-1 and **similar** to the proposed Plan.

Construction-related air emissions are generally localized in nature. Construction equipment and processes are generally similar between land use and transportation projects, except that transportation projects and could potentially occur over a short period of time, resulting in substantial construction-related emissions on a daily basis. Because construction-related emissions are generally localized and would occur throughout the regional during the planning period, this impact would be significant and unavoidable for the reasons described under Impact AQ-2 and **similar** to the impact that would occur under the proposed Plan.

The area-source emissions of criteria pollutants and precursors would increase over the planning horizon of the Plan due to the net increase in land use development and transportation projects. As shown in **Table 4-18**, the increase of regional VMT would be less under the HRA Focus Alternative than the proposed Plan (15-percent regional increase versus 16-percent regional increase). Because the HRA Focus Alternative would emit a lower level of criteria air pollutant than the proposed Plan, due to a lower VMT, this impact would be significant and unavoidable for the reasons described under Impact AQ-3 and **less** than the impact that would occur under the proposed Plan because emissions would be less.

TAC Risk Areas are locations where cancer risk levels and/or $PM_{2.5}$ concentrations are exceeded. In general, TAC Risk Areas tend to occur along high-volume freeways and roadways, high-use rail lines,

locations near numerous stationary-sources, and locations where a single stationary-source has very high estimated cancer risk levels or $PM_{2.5}$ concentration. As indicated in **Table 4-19**, the HRA Focus Alternative would result in a greater land use growth footprint within TAC risk areas than the proposed Plan (8,900 acres versus 8,800 acres). In addition, as shown in **Table 4-18**, there would be a decrease of 8 percent in total $PM_{2.5}$ in CARE Communities under the HRA Focus Alternative, which indicates a similar reduction in $PM_{2.5}$ as the decrease of 8 percent in total $PM_{2.5}$ expected under the proposed Plan. This impact would be significant and unavoidable for the reasons described under Impact AQ-4 and **similar** to the impact that would occur under the proposed Plan.

Development of new residential and commercial uses, sea level rise adaptation infrastructure, and transportation projects could generate odorous diesel exhaust emissions from construction equipment and odors associated with asphalt paving. These types of construction-generated odorous emissions, however, would be temporary and not be generated at any one location for an extended period. Diesel exhaust fumes would also dissipate rapidly from the source with an increase in distance. Therefore, this impact would be less than significant for the reasons described under Impact AQ-5 and **similar** to the impact that would occur under the proposed Plan because construction-related emissions are generally localized and would occur throughout the regional during the planning period.

4.5.5 Biological Resources

Table 4-20 provides a summary of the affect acreage of wetland feature by alternative**. Table 4-21** provides the area of affected essential connectivity by alternative.

Table 4-20: Affected Acreage of Wetland Features by Alternative

		Estuarine and Marine Deepwater	Estuarine and Marine Wetland	Freshwater Emergent Wetland	Freshwater Forested/ Shrub Wetland	Freshwater Pond	Lake	Riverine
Land Use Growth Footprint	Proposed Plan	170	50	180	40	160	10	150
	No Project Alternative	60	70	210	100	240	110	490
	Alternative 1	150	60	160	30	130	9	100
	Alternative 2	160	50	180	50	160	20	120
Sea Level Rise Adaptation Footprint	Proposed Plan	400	1,100	260	1	100	540	80
	No Project Alternative	100	280	50	-	20	250	20
	Alternative 1	400	1,100	260	1	100	540	80
	Alternative 2	400	1,100	260	1	100	540	80
Transportation Projects Footprint	Proposed Plan	310	150	50	20	30	20	110
	No Project Alternative	10	7	3	1	1	<1	20
	Alternative 1	280	100	40	20	20	1	80
	Alternative 2	110	70	50	20	20	20	90

Total Acreage of Wetland Features	
Proposed Plan	3,900
No Project Alternative	2,000
Alternative 1	3,600
Alternative 2	3,600

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum due to independent rounding.
Source: data compiled by MTC and ABAG in 2021

Table 4-2110: Affected Acreage of Essential Connectivity Areas by Alternative

	Land Use Growth Footprint	Sea Level Rise Adaptation Footprint	Transportation Projects Footprint	Total
Proposed Plan	1,700	380	1,900	4,000
No Project Alternative	6,600	30	340	6,900
Alternative 1	1,400	380	1,100	2,900
Alternative 2	1,600	380	1,600	3,600

Notes: Whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum due to independent rounding.
Source: data compiled by MTC and ABAG in 2021

NO PROJECT ALTERNATIVE

Impacts on special-status species could occur within areas of new residential and commercial development, sea level adaptation infrastructure, and transportation project footprints, including the temporary and permanent removal or conversion of vegetation and habitat necessary for species breeding, feeding, dispersal, or sheltering. Construction and/or ongoing operations could result in direct mortality of special-status plants and wildlife, entrapment in open trenches, and general disturbance due to noise or vibration during pile-driving, earthmoving, and other construction activities. Construction-generated fugitive dust accumulation on surrounding vegetation and construction-related erosion, runoff, and sedimentation could degrade the quality of adjacent vegetation communities, affecting their ability to support special-status plants and wildlife. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). By contrast, the No Project Alternative would have far fewer sea level rise adaptation and transportation projects, which would reduce the footprint related to these types of projects and require less construction. Overall, the No Project Alternative would disturb a greater area of undeveloped land, resulting in the potential for increased impacts to special-status species. This impact would be significant and unavoidable for the reasons described under Impact BIO-1a and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would become developed.

Impacts on critical habitat could include temporary or permanent habitat loss. Degradation of areas that have high conservation value for these species could also occur in association with development, where such development occurs within or adjacent to critical habitat, through the introduction of night lighting, increases in ambient noise levels, and the introduction of invasive species and predators. Potential impacts on salmonid critical habitat could include stream degradation in association with increased impervious surfaces and surface runoff, decreases in water quality due to increased point source pollution, and erosion and sedimentation during construction. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). Overall, the No Project Alternative footprint would be greater than the proposed Plan footprint in areas potentially designated as critical habitat. This impact would be less than significant with mitigation for the reasons described under Impact BIO-1b but **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would become developed.

Potential impacts on wetlands include the temporary disturbance or permanent loss of jurisdictional waters, including wetlands; loss or degradation of stream or wetland function; incremental degradation of wetland habitats; and fragmentation of streams and wetlands. Jurisdictional waters in the region vary from relatively small, isolated roadside areas, wet meadows, and vernal pools to major streams and rivers, bays and estuaries, to tidal, brackish, and freshwater marshes. As shown in **Table**

4-20, due primarily to reduced sea level rise infrastructure relative to the proposed Plan, there would be a smaller area of wetland features affected by the No Project Alternative (2,000 acres) than the proposed Plan (3,900 acres). While the proposed Plan includes wetland restoration projects, acreages of affected wetland in this analysis considers only those that occur under the existing conditions. This impact would be less than significant with mitigation for the reasons described under Impact BIO-2 and **less** than the impact that would occur under the proposed Plan because less wetland features would overlap with the growth footprint.

The Bay Area encompasses large areas of wildlands that provide habitat for both common and rare plants and wildlife and some of these areas were mapped as Essential Connectivity Areas (ECAs). The ECAs are not regulatory delineations but are identified as lands likely important to wildlife movement between large, mostly natural areas at the Statewide level. As shown in **Table 4-21**, implementation of the No Project Alternative would result in a greater area of affected ECAs (6,900 acres) than the proposed Plan (4,000 acres). There would also be adverse effects on ECAs due to implementation of transportation projects. This impact would be significant and unavoidable for the reasons described under Impact BIO-3 and **greater** than the impact that would occur under the proposed Plan because larger area of ECAs would be affected.

The potential for land use development and implementation of transportation projects under the proposed Plan could each result in potentially significant conflicts with local ordinances or policies protective of biological resources Habitat Conservation Plan/Natural Community Conservation Plans (HCP/NCCPs), Conservation Strategies, and Local Coastal Programs (LCPs) on a localized basis as well as regionwide. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact BIO-4 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would become developed.

As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). Overall, this impact would be significant and unavoidable for the reasons described under Impact BIO-5 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would become developed.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

Impacts on special-status species could occur within areas of new residential and commercial development, sea level adaptation infrastructure, and transportation project footprints, including the temporary and permanent removal or conversion of vegetation and habitat necessary for species breeding, feeding, dispersal, or sheltering. Construction and/or ongoing operations could result in direct mortality of special-status plants and wildlife, entrapment in open trenches, and general disturbance due to noise or vibration during pile- driving, earthmoving, and other construction activities. Construction-generated fugitive dust accumulation on surrounding vegetation and construction-related erosion, runoff, and sedimentation could degrade the quality of adjacent vegetation communities, affecting their ability to support special-status plants and wildlife. As shown in **Table 4-10**, the TRA Focus Alternative would result in a lesser area of land being converted from undeveloped to developed uses compared to the proposed Plan (8,800 acres versus 12,300 acres). Therefore, the TRA Focus Alternative would have the potential to result in fewer impacts to special-status species. This impact would be significant and unavoidable for the reasons described under

Impact BIO-1a and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would become developed.

Impacts on critical habitat could include temporary or permanent habitat loss. Degradation of areas that have high conservation value for these species could also occur in association with development, where such development occurs within or adjacent to critical habitat, through the introduction of night lighting, increases in ambient noise levels, and the introduction of invasive species and predators. Potential impacts on salmonid critical habitat could include stream degradation in association with increased impervious surfaces and surface runoff, decreases in water quality due to increased point source pollution, and erosion and sedimentation during construction. As shown in **Table 4-10**, the TRA Focus Alternative would result in less land conversion from undeveloped to developed uses compared to the proposed Plan (8,800 acres versus 12,300 acres). Overall, the TRA Focus Alternative footprint would be less than the proposed Plan footprint in areas potentially designated as critical habitat. This impact would be less than significant with mitigation for the reasons described under Impact BIO-1b and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would become developed.

Potential impacts on wetlands include the temporary disturbance, or permanent loss, of jurisdictional waters, including wetlands; loss or degradation of stream or wetland function; incremental degradation of wetland habitats; and fragmentation of streams and wetlands. Jurisdictional waters in the region vary from relatively small, isolated roadside areas, wet meadows, and vernal pools to major streams and rivers, bays and estuaries, to tidal, brackish, and freshwater marshes. As shown in **Table 4-20**, the TRA Focus Alternative would affect a smaller area of wetland features (3,600 acres) than the proposed Plan (3,900 acres). While the proposed Plan includes wetland restoration projects, acreages of affected wetland in this analysis considers only those that occur under the existing conditions. This impact would be less than significant with mitigation for the reasons described under Impact BIO-2 and **less** than the impact that would occur under the proposed Plan because less wetland features would overlap with the growth footprint.

The Bay Area encompasses large areas of wildlands that provide habitat for both common and rare plants and wildlife and some of these areas were mapped as ECAs. The ECAs are not regulatory delineations but are identified as lands likely important to wildlife movement between large, mostly natural areas at the Statewide level. As shown in **Table 4-21**, implementation of the TRA Focus Alternative would result in a smaller area of affected ECAs (2,900 acres) than the proposed Plan (4,000 acres). There would also be adverse effects on ECAs due to implementation of transportation projects. This impact would be significant and unavoidable for the reasons described under Impact BIO-3 and **less** than the impact that would occur under the proposed Plan because a smaller area of ECAs would be affected.

The potential for land use development and implementation of transportation projects under the proposed Plan could each result in potentially significant conflicts with local ordinances or policies protective of biological resources HCP/NCCPs, Conservation Strategies, and LCPs on a localized basis as well as regionwide. As shown in **Table 4-10**, the TRA Focus would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact BIO-4 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would become developed.

As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). Overall, this impact

would be significant and unavoidable for the reasons described under Impact BIO-5 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would become developed.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

Impacts on special-status species could occur within areas of new residential and commercial development, sea level adaptation infrastructure, and transportation project footprints, including the temporary and permanent removal or conversion of vegetation and habitat necessary for species breeding, feeding, dispersal, or sheltering. Construction and/or ongoing operations could result in direct mortality of special-status plants and wildlife, entrapment in open trenches, and general disturbance due to noise or vibration during pile- driving, earthmoving, and other construction activities. Construction-generated fugitive dust accumulation on surrounding vegetation and construction-related erosion, runoff, and sedimentation could degrade the quality of adjacent vegetation communities, affecting their ability to support special-status plants and wildlife. As shown in **Table 4-10**, the HRA Focus Alternative would result in a lesser area of land being converted from undeveloped to developed uses compared to the proposed Plan (10,700 acres versus 12,300 acres). In terms of sea level rise adaptation projects, both the proposed Plan and HRA Focus Alternative contain the same list of projects and would result in the same level of environmental effects. Therefore, the HRA Focus Alternative would have the potential to result in fewer impacts to special-status species compared to the proposed Plan. This impact would be significant and unavoidable for the reasons described under Impact BIO-1a and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would become developed.

Impacts on critical habitat could include temporary or permanent habitat loss. Degradation of areas that have high conservation value for these species could also occur in association with development, where such development occurs within or adjacent to critical habitat, through the introduction of night lighting, increases in ambient noise levels, and the introduction of invasive species and predators. Potential impacts on salmonid critical habitat could include stream degradation in association with increased impervious surfaces and surface runoff, decreases in water quality due to increased point source pollution, and erosion and sedimentation during construction. As shown in **Table 4-10**, the HRA Focus Alternative would result in less land conversion from undeveloped to developed uses compared to the proposed Plan (10,700 acres versus 12,300 acres). Overall, the HRA Focus Alternative footprint would be less than the proposed Plan footprint in areas potentially designated as critical habitat. This impact would be less than significant with mitigation for the reasons described under Impact BIO-1b and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would become developed.

Potential impacts on wetlands include the temporary disturbance, or permanent loss, of jurisdictional waters, including wetlands; loss or degradation of stream or wetland function; incremental degradation of wetland habitats; and fragmentation of streams and wetlands. Jurisdictional waters in the region vary from relatively small, isolated roadside areas, wet meadows, and vernal pools to major streams and rivers, bays and estuaries, to tidal, brackish, and freshwater marshes. As shown in **Table 4-20**, the HRA Focus Alternative would affect a smaller area of wetland features (3,600 acres) than the proposed Plan (3,900 acres). While the proposed Plan includes wetland restoration projects, acreages of affected wetland in this analysis considers only those that occur under the existing conditions. This impact would be less than significant for the reasons described under Impact BIO-2 and **less** than the impact that would occur under the proposed Plan because a smaller area of wetland features would overlap with the growth footprint.

The Bay Area encompasses large areas of wildlands that provide habitat for both common and rare plants and wildlife and some of these areas were mapped as ECAs. The ECAs are not regulatory delineations but are identified as lands likely important to wildlife movement between large, mostly natural areas at the Statewide level. As shown in **Table 4-21**, implementation of the HRA Focus Alternative would result in a smaller area of affected ECAs (3,600 acres) than the proposed Plan (4,000 acres). There would also be adverse effects on ECAs due to implementation of transportation projects. This impact would be significant and unavoidable for the reasons described under Impact BIO-3 and **less** than the impact that would occur under the proposed Plan because a larger area of ECAs would be affected.

The potential for land use development and implementation of transportation projects under the proposed Plan could each result in potentially significant conflicts with local ordinances or policies protective of biological resources HCP/NCCPs, Conservation Strategies, and LCPs on a localized basis as well as region-wide. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact BIO-4 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would become developed.

As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). Overall, this impact would be significant and unavoidable for the reasons described under Impact BIO-5 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would become developed.

4.5.6 Climate Change, Greenhouse Gases, and Energy

Table **4-22** presents metric tons of carbon dioxide equivalent ($MTCO_2e$) per capita emissions related to mobile sources for each alternative. The comparison of non-quantified impacts are discussed qualitatively, below. **Table 4-23** shows the Plan alternatives' ability to meet the SB 375 goal of reducing GHG emissions per capita by 19 percent.

Table 4-22: Mobile Source Emissions by Vehicle Source ($MTCO_2e$) for Each Alternative

	2015 Baseline	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Passenger Vehicles	15,518,000	10,223,000	12,126,000	10,055,000	10,158,000
Trucks	4,102,000	3,672,000	4,280,000	3,610,000	3,651,000
Buses	345,000	265,000	311,000	262,000	262,000
Other Vehicles	129,000	109,000	129,000	107,000	108,000
Total	20,094,000	14,269,000	16,846,000	14,034,000	14,179,000

Note: Numbers are rounded. Figures may not sum due to independent rounding. Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations such as prison inmates.
Source: data compiled by MTC and ABAG in 2021

Table 4-23: SB 375 GHG Emissions Reductions Relative to 2005 Baseline for Each Alternative

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Modeled Passenger Vehicles Emissions (2035)	69,000	79,900	68,600	68,300
Emissions Per Capita (2035)	13.5	17.4	13.4	13.4
Reductions in Emissions Per Capita Relative to 2005	-22%	+1%	-22%	-23%

Note: Numbers are rounded. Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations such as prison inmates.
Source: data compiled by MTC and ABAG in 2021

NO PROJECT ALTERNATIVE

Construction-related and operational GHG emissions associated with the forecasted development pattern, sea level rise adaptation infrastructure, and transportation projects would contribute to GHG emissions. In terms of operational GHG emissions, the Plan alternatives primarily differ due to the number and type of transportation projects and types of mobile source-based GHG emission reduction programs. As shown in **Table 4-22**, relative to baseline (20,094,000 $MTCO_2e$) mobile source emissions under the No Project Alternative would be reduced (16,846,000), although to a lesser extent than under the proposed Plan (14,269,000). Similarly to the proposed Plan, construction emissions may not be reduced to net zero in all cases. This impact would be significant and unavoidable for the reasons described in Impact GHG-1 and **greater** than the impact that would occur under the proposed Plan because mobile source emissions would be greater under the No Project Alternative.

The No Project Alternative would increase CO_2 emissions per capita passenger vehicle and light trucks by 1 percent between 2005 and 2035, and thus would not meet SB 375 goals to reduce per capita passenger vehicle and light duty truck CO_2 emissions by over 19 percent by 2035 as compared to 2005 baseline (**Table 4-23**). This impact would be significant and **greater** than the impact that would occur under the proposed Plan because emissions would be greater. *(Impact GHG-2 would be less than significant under the proposed Plan.)*

The proposed Plan meets SB 375 goals and places the Bay Area on a downward trajectory in GHG emissions, but CARB has identified that meeting SB 375 goals alone will not meet Statewide goals under the Scoping Plan. Neither the proposed Plan nor the No Project Alternative have additional land use strategies to feasibly bridge the gap between the proposed Plan GHG emissions and 2030 (and beyond) targets. This gap would remain larger under the No Project Alternative than under the proposed Plan (**Table 23**). Because GHG emissions from mobile sources would be greater under the No Project Alternative, this impact would be significant and unavoidable for the reasons described in Impact GHG-3 and **greater** than the impact that would occur under the proposed Plan.

Local climate action plans or GHG reduction plans are adopted by local jurisdictions to comply with the goals set for local governments in CARB's Scoping Plan. CARB's Scoping Plan includes implementation of SB 375. Because the No Project Alternative would not comply with SB 375, as it would not implement an RTP/SCS, this impact would be significant and **greater** than the impact that would occur under the proposed Plan (GHG-4). *(This impact would be less-than-significant under the proposed Plan.)*

Construction and operation of the land uses, sea-level rise adaptation, and transportation system projects under the No Project Alternative would not result in the wasteful, unnecessary, or inefficient use of energy because the energy associated with these projects would be serving necessary regional needs and would comply with applicable regulations and standards (e.g., Renewable Portfolio

Standard, California Energy Code). Because individual projects would comply with applicable regulations and standards, this impact would be less than significant for the reasons described in Impact EN-1 and **similar** to the impact that would occur under the proposed Plan.

Consideration of per capita energy consumption associated with the proposed Plan and alternatives is related to electricity and natural gas use and per capita VMT, which is directly related to use of petroleum-based fuels. VMT per capita would be greater under the No Project Alternative and the proposed Plan. This impact would be less than significant for the reasons discussed under Impact EN-2 and **greater** than the impact that would occur under the proposed Plan because more fuel would be needed to support a higher VMT per capita.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

Construction-related and operational GHG emissions associated with the forecasted development pattern, sea level rise adaptation infrastructure, and transportation projects would contribute to GHG emissions. In terms of operational GHG emissions, the Plan alternatives primarily differ due to the number and type of transportation projects and types of mobile source-based GHG emission reduction programs. As shown in **Table 4-22**, relative to baseline (20,094,000 $MTCO_2e$) mobile source emissions under the TRA Focus Alternative would be reduced (14,034,000) to a greater extent than under the proposed Plan (14,269,000). Similar to the proposed Plan, construction emissions may not be reduced to net zero in all cases. This impact would be significant and unavoidable for the reasons described in Impact GHG-1 and **less** than the impact that would occur under the proposed Plan because mobile-source emissions would be lower under the TRA Focus Alternative.

The TRA Focus Alternative would decrease CO_2 emissions per capita passenger vehicle and light trucks by 22 percent between 2005 and 2035, thereby meeting SB 375 goals to reduce per capita passenger vehicle and light duty truck CO_2 emissions by over 19 percent by 2035 as compared to 2005 baseline (**Table 4-23**). This impact would be less than significant for the reasons described under Impact GHG-2 and **similar** to the impact that would occur under the proposed Plan because per capita emissions from passenger vehicles and light trucks would be the same.

The proposed Plan meets SB 375 goals and places the Bay Area on a downward trajectory in GHG emissions, but CARB has identified that meeting SB 375 goals alone will not meet Statewide goals under the Scoping Plan. Compared to the proposed Plan, the TRA Focus Alternative includes higher levels of household and job growth in the growth geographies, with substantially more housing growth in TRAs. As shown in **Table 4-23**, the TRA Focus Alternative would reduce GHG emissions per capita by 22 percent, relative to the 2005 baseline, which is the same as the proposed Plan. However, this would not provide enough of a reduction in GHG emissions to meet Statewide goals under the Scoping Plan. This impact would be significant and unavoidable for the reasons described in Impact GHG-3 and **similar** to the impact that would occur under the proposed Plan because emissions would be similar.

Local climate action plans or GHG reduction plans are adopted by local jurisdictions to comply with the goals set for local governments in CARB's Scoping Plan. The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the TRA Focus Alternative would not conflict with local climate action or GHG reduction plans. This impact would be less than significant for the reasons described in Impact GHG-4 and **similar** to the impact that would occur under the proposed Plan because individual projects would not conflict with local climate action or GHG reduction plans.

Construction and operation of the land uses, sea-level rise adaptation, and transportation system projects under the TRA Focus Alternative would not result in the wasteful, unnecessary, or inefficient use of energy because the energy associated with these projects would be serving necessary regional needs and would comply with applicable regulations and standards (e.g., Renewable Portfolio Standard, California Energy Code). This impact would be less than significant for the reasons described in Impact EN-1 and **similar** to the impact that would occur under the proposed Plan because individual project would comply with applicable regulations and standards.

Consideration of per capita energy consumption associated with the proposed Plan and alternatives is related to electricity and natural gas use and per capita VMT, which is directly related to use of petroleum-based fuels. VMT per capita would be the same under the TRA Focus Alternative and the proposed Plan. This impact would be less than significant for the reasons discussed under EN-2 and **similar** to the impact that would occur under the proposed Plan because VMT per capita would be the same.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

Construction-related GHG emissions associated with the forecasted development pattern, sea level rise adaptation infrastructure, and transportation projects would contribute to GHG emissions. In terms of operational GHG emissions, the Plan alternatives primarily differ due to the number and type of transportation projects and types of mobile source-based GHG emission reduction programs. As shown in **Table 4-22**, relative to baseline (20,094,000 $MTCO_2e$) mobile source emissions under the HRA Focus Alternative would be reduced (14,179,000) to a greater extent than under the proposed Plan (14,269,000). Similar to the proposed Plan, construction emissions may not be reduced to net zero in all cases. This impact would be significant and unavoidable for the reasons described in Impact GHG-1 and **less** than the impact that would occur under the proposed Plan because emissions would be less.

The HRA Focus Alternative would decrease CO_2 emissions per capita passenger vehicle and light trucks by 23 percent between 2005 and 2035, thereby meeting SB 375 goals to reduce per capita passenger vehicle and light duty truck CO_2 emissions by over 19 percent by 2035 as compared to 2005 baseline (**Table 4-23**). This impact would be less than significant for the reasons described in Impact GHG-2 and **less** than the impact that would occur under the proposed Plan because per capita emissions from passenger vehicles and light trucks would be comparatively lower under the HRA Focus Alternative.

The proposed Plan meets SB 375 goals and places the Bay Area on a downward trajectory in GHG emissions, but CARB has identified that meeting SB 375 goals alone will not meet Statewide goals under the Scoping Plan. Compared to the proposed Plan, the HRA Focus Alternative includes higher levels of household and job growth in the growth geographies, with substantially more housing growth in HRAs. As shown in **Table 4-23**, the HRA Focus Alternative would reduce GHG emissions per capita by 23 percent, relative to the 2005 baseline, which represents a comparatively greater reduction than the proposed Plan. However, this would not provide enough of a reduction in GHG emissions to meet Statewide goals under the Scoping Plan. This impact would be significant and unavoidable for the reasons described in Impact GHG-3 and **less** than the impact that would occur under the proposed Plan because emissions would be less.

Local climate action plans or GHG reduction plans are adopted by local jurisdictions to comply with the goals set for local governments in CARB's Scoping Plan. The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation

of the HRA Focus Alternative would not conflict with local climate action or GHG reduction plans. This impact would be less than significant for the reasons described in Impact GHG-4 and **similar** to the impact that would occur under the proposed Plan because individual projects would not conflict with local climate action or GHG reduction plans.

Construction and operation of the land uses, sea-level rise adaptation, and transportation system projects under the HRA Focus Alternative would not result in the wasteful, unnecessary, or inefficient use of energy because the energy associated with these projects would be serving necessary regional needs and would comply with applicable regulations and standards (e.g., Renewable Portfolio Standard, California Energy Code). This impact would be less than significant for the reasons described in Impact EN-1 and **similar** to the impact that would occur under the proposed Plan because individual project would comply with applicable regulations and standards.

Consideration of per capita energy consumption associated with the proposed Plan and alternatives is related to electricity and natural gas use and per capita VMT, which is directly related to use of petroleum-based fuels. VMT per capita would be the same under the HRA Focus Alternative and the proposed Plan. This impact would be less than significant for the reasons discussed under Impact EN-2 and **similar** to the impact that would occur under the proposed Plan because VMT per capita would be the same.

4.5.7 Cultural Resources and Tribal Cultural Resources

NO PROJECT ALTERNATIVE

Projects located in areas with known historical sites, or located in communities with established historic preservation programs, or involving activities that would introduce new visual elements or disturb the existing terrain have the potential to result in substantial historic resource impacts. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact CUL-1 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

New development, sea level rise adaptation infrastructure, and transportation projects could result in archaeological impacts if construction activities include the disturbance of previously-identified or unidentified archaeological resources. Projects involving excavation, grading, or soil removal in previously undisturbed areas have the greatest likelihood to encounter significant archaeological resources which could represent important examples of periods of California's prehistory. Likewise, the establishment of staging areas, temporary roads, and other temporary facilities necessary for construction activities has the potential to impact these cultural resources. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact CUL-2 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

In general, potential impacts on human remains would be similar to those discussed for archaeological resource impacts discussed above. New development, sea level rise adaptation infrastructure, and transportation projects involving construction activities that would disturb native terrain, including excavation, grading, or soil removal, would have the greatest likelihood to encounter human remains. Compliance with California Health and Safety Code Sections 7050.5 and 7052 and

PRC Section 5097 would provide an opportunity to avoid or minimize the disturbance of human remains, and to appropriately treat any remains that are discovered. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact CUL-3 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

MTC requested consultation meetings with three tribes that requested contact or consultation. To date the consultation has not resulted in identification of tribal cultural resources that would be affected by the Plan. However, it is possible that TCRs could still be identified, including during analysis of subsequent projects. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact CUL-5 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

Projects located in areas with known historical sites, or located in communities with established historic preservation programs, or involving activities that would introduce new visual elements or disturb the existing terrain have the potential to result in substantial historic resource impacts. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact CUL-1 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

New development, sea level rise adaptation infrastructure, and transportation projects could result in archaeological impacts if construction activities include the disturbance of previously-identified or unidentified archaeological resources. Projects involving excavation, grading, or soil removal in previously undisturbed areas have the greatest likelihood to encounter significant archaeological resources which could represent important examples of periods of California's prehistory. Likewise, the establishment of staging areas, temporary roads, and other temporary facilities necessary for construction activities has the potential to impact these cultural resources. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact CUL-2 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

In general, potential impacts on human remains would be similar to those discussed for archaeological resource impacts discussed above. New development, sea level rise adaptation infrastructure, and transportation projects involving construction activities that would disturb native terrain, including excavation, grading, or soil removal, would have the greatest likelihood to encounter human remains. Compliance with California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097 would provide an opportunity to avoid or minimize the disturbance of human remains, and to appropriately treat any remains that are discovered. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact CUL-3 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

MTC requested consultation meetings with three tribes that requested contact or consultation. To date the consultation has not resulted in identification of tribal cultural resources that would be affected by the Plan. However, it is possible that TCRs could still be identified, including during analysis of subsequent projects. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact CUL-5 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

Projects located in areas with known historical sites, or located in communities with established historic preservation programs, or involving activities that would introduce new visual elements or disturb the existing terrain have the potential to result in substantial historic resource impacts. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact CUL-1 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

New development, sea level rise adaptation infrastructure, and transportation projects could result in archaeological impacts if construction activities include the disturbance of previously-identified or unidentified archaeological resources. Projects involving excavation, grading, or soil removal in previously undisturbed areas have the greatest likelihood to encounter significant archaeological resources which could represent important examples of periods of California's prehistory. Likewise, the establishment of staging areas, temporary roads, and other temporary facilities necessary for construction activities has the potential to impact these cultural resources. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact CUL-2 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

In general, potential impacts on human remains would be similar to those discussed for archaeological resource impacts discussed above. New development, sea level rise adaptation infrastructure, and transportation projects involving construction activities that would disturb native terrain, including excavation, grading, or soil removal, would have the greatest likelihood to encounter human remains. Compliance with California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097 would provide an opportunity to avoid or minimize the disturbance of human remains, and to appropriately treat any remains that are discovered. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact CUL-3 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

MTC requested consultation meetings with three tribes that requested contact or consultation. To date the consultation has not resulted in identification of tribal cultural resources that would be affected by the Plan. However, it is possible that TCRs could still be identified, including during analysis of subsequent projects. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). This impact would be significant and unavoidable for the reasons described under Impact CUL-5 and

less than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

4.5.8 Geology, Seismicity, and Mineral Resources

Tables 4-24 through 4-27 provide quantifiable data related to geology and seismicity impacts.

Table 4-24: Alquist-Priolo Zone Acreage by Alternative

	Land Use Growth Footprint	Sea Level Rise Adaptation Footprint	Transportation Projects Footprint	Total Footprint
Proposed Plan	670	30	250	950
No Project Alternative	1,300	-	60	1360
Alternative 1	370	30	100	510
Alternative 2	540	30	250	820

Notes: Whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100). Figures may not sum due to independent rounding.
Source: data compiled by MTC and ABAG in 2021

Table 4-25: Ground Shaking Potential Acreage by Alternative

		Strong – MMI 7	Very Strong – MMI 8	Violent – MMI 9
Land Use Growth Footprint	Proposed Plan	1,300	27,800	10,400
	No Project Alternative	1,800	47,200	16,100
	Alternative 1	670	22,100	9,300
	Alternative 2	950	27,600	10,300
Sea Level Rise Adaptation Footprint	Proposed Plan	0	2,800	1,700
	No Project Alternative	0	780	180
	Alternative 1	0	2,800	1,700
	Alternative 2	0	2,800	1,700
Transportation Projects Footprint	Proposed Plan	420	9,300	4,200
	No Project Alternative	0	1,000	1,100
	Alternative 1	260	6,300	3,500
	Alternative 2	230	8,100	3,800

Notes: Whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100).
Source: data compiled by MTC and ABAG in 2021

Table 4-26: Liquefaction Potential Acreage by Alternative

		Very Low Potential	Low Potential	Medium Potential	High Potential	Very High Potential
Land Use Growth Footprint	Proposed Plan	8,500	4,700	19,000	2,400	4,700
	No Project Alternative	24,200	7,700	25,800	3,300	4,000
	Alternative 1	6,200	3,400	16,000	2,300	4,200
	Alternative 2	7,700	5,200	19,000	2,400	4,500
Sea Level Rise Adaptation Footprint	Proposed Plan	90	50	2,400	60	1,600
	No Project Alternative	40	10	570	0	280
	Alternative 1	90	50	2,400	60	1,600
	Alternative 2	90	50	2,400	60	1,600

		Very Low Potential	Low Potential	Medium Potential	High Potential	Very High Potential
Transportation Projects Footprint	Proposed Plan	2,600	2,000	7,200	520	1,600
	No Project Alternative	360	310	890	60	530
	Alternative 1	1,800	1,500	4,900	450	1,400
	Alternative 2	2,300	1,700	6,200	340	1,400

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100).
Source: data compiled by MTC and ABAG in 2021

Table 4-27: Landslide Zones Potential Acreage by Alternative

		Few	Many
Land Use Growth Footprint	Proposed Plan	5,500	900
	No Project Alternative	16,100	4,500
	Alternative 1	3,600	690
	Alternative 2	5,100	770
Sea Level Rise Adaptation Footprint	Proposed Plan	100	4
	No Project Alternative	30	<1
	Alternative 1	100	4
	Alternative 2	100	4
Transportation Projects Footprint	Proposed Plan	1,900	310
	No Project Alternative	380	4
	Alternative 1	1,400	290
	Alternative 2	1,800	200

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100).
Source: data compiled by MTC and ABAG in 2021

No Project Alternative

Surface fault rupture could occur along any of the active fault traces or within the associated Alquist-Priolo Zone for the active faults within the Plan area. Although fault rupture is not entirely confined to the boundaries of an Alquist-Priolo Zone, the likelihood of rupture occurring outside of these zones is very low based on historical evidence and geologic records. The land use growth footprint under the No Project Alternative overlaps with a larger portion of Alquist-Priolo Zones (1,300 acres) compared to the proposed Plan (670 acres) (see **Table 4-24**) and fewer acres of land (60 acres) compared to the proposed Plan (280 acres) associated with the transportation and sea level rise adaptation infrastructure footprints. Overall, the No Project Alternative would result in development in a greater area associated with Alquist-Priolo Zones compared to the proposed Plan. Regulatory agencies with oversight of development associated with the proposed Plan have developed regulations and engineering design specifications that address and substantially reduce hazards associated with site-level geological and seismic conditions. This impact would be less than significant for the reasons described under Impact GEO-1 and **greater** than the impact that would occur under the proposed Plan because the land use growth footprint would occur within a greater area of Alquist-Priolo Zones.

According to modeling conducted by the U.S. Geological Survey (USGS) in conjunction with the California Geologic Survey (CGS), the Bay Area is predicted to experience at least one major earthquake (greater than moment magnitude 6.7) within the next 20 years. The intensity of such an event would depend on the causative fault and the distance to the epicenter, the magnitude, the

duration of shaking, and the characteristics of the underlying geologic materials. The entire Bay Area is classified as potentially experiencing strong to violent ground shaking (MMI 7-9). **Table 4-25** quantifies the area within the land use growth footprint based on this data. As shown, the No Project Alternative would have a greater area of land use growth footprint located within areas subject to strong, very strong, or violent ground shaking compared to the proposed Plan. However, existing regulatory requirements specify mandatory actions that must occur during project development. This impact would be less than significant for the reasons described under Impact GEO-2 and **greater** than the impact that would occur under the proposed Plan because the land use growth footprint would occur within a greater area of potential ground shaking.

Liquefaction typically occurs in areas underlain with loose, saturated, cohesionless soils within the upper 50 feet of subsurface materials. These soils, when subjected to ground shaking, can lose their strength due to buildup of excess pore water pressure, causing them to function in a manner closer to a liquefied state. **Table 4-26** shows the area of land use growth footprint that would be subject to potential liquefaction. As shown, the No Project Alternative would have a smaller area of land use, sea level rise infrastructure, and transportation project footprints within areas classified as very high liquefaction zones and a slightly greater area within a high liquefaction potential zone. However, subsequent development would be required to conform to the current seismic design provisions of the California Building Code (CBC) to reduce potential losses from ground failure as a result of an earthquake. These future projects would also be required to adhere to the local general plans and local building code requirements that contain seismic safety policies to resist ground failure through modern construction techniques. This impact would be less than significant for the reasons described under Impact GEO-3 and **less** than the impact that would occur under the proposed Plan because a smaller area would be within a high liquefaction potential zone.

The Plan area includes a wide range of topographical conditions, and landslide hazards vary from very low in low lying areas to very high in some upland areas, especially areas with slopes that exceed 15 percent. **Table 4-27** shows acreage of land use growth footprint where there is potential for landslides. As shown, the No Project Alternative would have a greater risk for landslides than the proposed Plan for land use growth footprint and sea level rise adaptation infrastructure and a higher risk for landslides for transportation projects footprint, with a total acreage of 4,500 versus 1,200. This impact would be less than significant for the reasons described under Impact GEO-4 and **greater** than the impact that would occur under the proposed Plan because a greater area would be within higher risk landslide zones.

Buildout of the land use growth footprint and construction of sea level rise adaptation infrastructure and transportation projects would include earthwork activities that could expose soils to the effects of erosion or loss of topsoil. Once disturbed, either through removal of vegetation, asphalt, or demolition of a structure, stockpiled soils may be exposed to the effects of wind and water. However, construction activities are required to adhere to National Pollutant Discharge Elimination System permit requirements for construction, as well as any local grading ordinance requirements that may include erosion prevention measures. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact GEO-5 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

The proposed changes in land use and the proposed sea level rise adaptation infrastructure and transportation projects would be located on a range of different geologic materials and conditions. Hazards associated with unstable soils or geologic units are dependent on site- specific conditions, as

well as the specific nature of the individual project proposed. With adherence to grading permit and building code requirements, including seismic design criteria as required by the CBC, Caltrans, Special Publication 117A, and local building code requirements, the improvements and development associated with the proposed Plan would be designed to minimize potential risks related to unstable soils and geologic units. Existing regulatory requirements specify mandatory and relatively prescriptive actions that must occur during project development and would effectively reduce the inherent hazard. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact GEO-6 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

New development, sea level rise adaptation infrastructure, and transportation projects could result in discovery and disturbance of paleontological resources. Projects involving excavation, grading, or soil removal in previously undisturbed areas have the greatest likelihood to encounter these resources. As shown in **Table 4-10**, the TRA Focus Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres), which could result in land conversion in greater areas of paleontological sensitivity. This impact would be significant and unavoidable for the reasons described under Impact GEO-7 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

Local jurisdictions have general plan policies to manage mineral resources and are required under the Surface Mining and Reclamation Act (SMARA) to consider significant mineral deposits identified by CGS. Local general plans, specific plans, and other land use plans include policies to protect existing and planned future mineral production and extraction activities from surrounding uses, and require that future projects near mining activities have compatible land uses. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses (24,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact MR-1 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

Alternative 1 - TRA Focus Alternative

Surface fault rupture could occur along any of the active fault traces or within the associated Alquist-Priolo Zone for the active faults within the Plan area. Although fault rupture is not entirely confined to the boundaries of an Alquist-Priolo Zone, the likelihood of rupture occurring outside of these zones is very low based on historical evidence and geologic records. The land use growth footprint under the TRA Focus Alternative overlaps with a smaller portion of Alquist-Priolo Zones (370 acres) compared to the proposed Plan (670 acres) (see **Table 4-24**) and fewer acres of land (130 acres) compared to the proposed Plan (280 acres) associated with the transportation and sea level rise adaptation infrastructure footprints. Overall, the TRA Focus Alternative would have a smaller area associated with Alquist-Priolo Zones compared to the proposed Plan. Regulatory agencies with oversight of development associated with the proposed Plan have developed regulations and engineering design specifications that address and substantially reduce hazards associated with site-level geological and seismic conditions. This impact would be less than significant for the reasons described under Impact GEO-1 and **less** than the impact that would occur under the proposed Plan because the land use growth footprint would occur within a smaller area of Alquist-Priolo Zones.

According to modeling conducted by USGS in conjunction with CGS, the Bay Area is predicted to experience at least one major earthquake (greater than moment magnitude 6.7) within the next 20 years. The intensity of such an event would depend on the causative fault and the distance to the

epicenter, the magnitude, the duration of shaking, and the characteristics of the underlying geologic materials. The entire Bay Area is classified as potentially experiencing strong to violent ground shaking (MMI 7-9). **Table 4-25** quantifies the area within the land use growth footprint based on this data. As shown, the TRA Focus Alternative would have a smaller area of land use growth footprint located within areas subject to strong, very strong, or violent ground shaking compared to the proposed Plan. However, existing regulatory requirements specify mandatory actions that must occur during project development. This impact would be less than significant for the reasons described under Impact GEO-2 and **less** than the impact that would occur under the proposed Plan because the land use growth footprint would occur within a smaller area of potential ground shaking.

Liquefaction typically occurs in areas underlain with loose, saturated, cohesionless soils within the upper 50 feet of subsurface materials. These soils, when subjected to ground shaking, can lose their strength due to buildup of excess pore water pressure, causing them to function in a manner closer to a liquefied state. **Table 4-26** shows the area of land use growth footprint that would be subject to potential liquefaction. As shown, the TRA Focus Alternative would have a smaller area of land use growth footprint, sea level rise infrastructure, and transportation project footprint within areas classified as high or very high liquefaction hazard compared to the proposed Plan (10,010 and 10,880 acres, respectively). However, subsequent development would be required to conform to the current seismic design provisions of the CBC to reduce potential losses from ground failure as a result of an earthquake. These future projects would also be required to adhere to the local general plans and local building code requirements that contain seismic safety policies to resist ground failure through modern construction techniques. This impact would be less than significant for the reasons described under Impact GEO-3 and **less** than the impact that would occur under the proposed Plan because a smaller area would be within a high liquefaction potential zone.

The Plan area includes a wide range of topographical conditions, and landslide hazards vary from very low in low lying areas to very high in some upland areas, especially areas with slopes that exceed 15 percent. **Table 4-27** shows acreage of land use growth footprint, sea level rise infrastructure, and transportation projects footprint where there is potential for landslides. As shown, the TRA Focus Alternative would have a lower risk for landslides than the proposed Plan (1,000 versus 1,200 acres for land rated as many). This impact would be less than significant for the reasons described under Impact GEO-4 and **less** than the impact that would occur under the proposed Plan because a smaller area would be within higher risk landslide zones.

Buildout of the land use growth footprint and construction of sea level rise adaptation infrastructure and transportation projects would include earthwork activities that could expose soils to the effects of erosion or loss of topsoil. Once disturbed, either through removal of vegetation, asphalt, or demolition of a structure, stockpiled soils may be exposed to the effects of wind and water. However, construction activities are required to adhere to National Pollutant Discharge Elimination System permit requirements for construction, as well as any local grading ordinance requirements that may include erosion prevention measures. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact GEO-5 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

The proposed changes in land use and sea level rise adaptation infrastructure and transportation projects would be located on a range of different geologic materials and conditions. Hazards associated with unstable soils or geologic units are dependent on site- specific conditions, as well as the specific nature of the individual project proposed. With adherence to grading permit and building

code requirements, including seismic design criteria as required by the CBC, Caltrans, Special Publication 117A, and local building code requirements, the improvements and development associated with Alternative 1 would be designed to minimize potential risks related to unstable soils and geologic units. Existing regulatory requirements specify mandatory and relatively prescriptive actions that must occur during project development and would effectively reduce the inherent hazard. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact GEO-6 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

New development, sea level rise adaptation infrastructure, and transportation projects could result in discovery and disturbance of paleontological resources. Projects involving excavation, grading, or soil removal in previously undisturbed areas have the greatest likelihood to encounter these resources. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres), which could result in land conversion in fewer areas of paleontological sensitivity. This impact would be significant and unavoidable for the reasons described under Impact GEO-7 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Local jurisdictions have general plan policies to manage mineral resources and are required under SMARA to consider significant mineral deposits identified by CGS. Local general plans, specific plans, and other land use plans include policies to protect existing and planned future mineral production and extraction activities from surrounding uses, and require that future projects near mining activities have compatible land uses. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (8,800 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact MR-1 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Alternative 2 - HRA Focus Alternative

Surface fault rupture could occur along any of the active fault traces or within the associated Alquist-Priolo Zone for the active faults within the Plan area. Although fault rupture is not entirely confined to the boundaries of an Alquist-Priolo Zone, the likelihood of rupture occurring outside of these zones is very low based on historical evidence and geologic records. The land use growth footprint under the HRA Focus Alternative overlaps with a smaller portion of Alquist-Priolo Zones (540 acres) than the proposed Plan (670 acres) (see **Table 4-24**); and the same acres of land compared to the proposed Plan (280 acres) associated with the transportation and sea level rise adaptation infrastructure footprints. Overall, the HRA Focus Alternative would have a smaller area associated with Alquist-Priolo Zones compared to the proposed Plan. Regulatory agencies with oversight of development associated with the proposed Plan have developed regulations and engineering design specifications that address and substantially reduce hazards associated with site-level geological and seismic conditions. This impact would be less than significant for the reasons described under Impact GEO-1 and **less** than the impact that would occur under the proposed Plan because the land use growth footprint would occur within a smaller area of Alquist-Priolo Zones.

According to modeling conducted by USGS in conjunction with CGS, the Bay Area is predicted to experience at least one major earthquake (greater than moment magnitude 6.7) within the next 20 years. The intensity of such an event would depend on the causative fault and the distance to the epicenter, the magnitude, the duration of shaking, and the characteristics of the underlying geologic

materials. The entire Bay Area is classified as potentially experiencing strong to violent ground shaking (MMI 7-9). **Table 4-25** quantifies the area within the land use growth footprint based on this data. As shown, the HRA Focus Alternative would have a smaller area of footprint located within areas subject to strong, very strong, or violent ground shaking compared to the proposed Plan. However, existing regulatory requirements specify mandatory actions that must occur during project development. This impact would be less than significant for the reasons described under Impact GEO-2 and **less** than the impact that would occur under the proposed Plan because the land use growth footprint would occur within a smaller area of potential ground shaking.

Liquefaction typically occurs in areas underlain with loose, saturated, cohesionless soils within the upper 50 feet of subsurface materials. These soils, when subjected to ground shaking, can lose their strength due to buildup of excess pore water pressure, causing them to function in a manner closer to a liquefied state. **Table 4-26** shows the area of land use growth footprint that would be subject to potential liquefaction. As shown, the HRA Focus Alternative would have a smaller area of land use growth footprint, sea level rise infrastructure, and transportation project footprint within areas classified as high or very high liquefaction hazard compared to the proposed Plan (10,300 and 10,880 acres, respectively). However, subsequent development would be required to conform to the current seismic design provisions of the CBC to reduce potential losses from ground failure as a result of an earthquake. These future projects would also be required to adhere to the local general plans and local building code requirements that contain seismic safety policies to resist ground failure through modern construction techniques. This impact would be less than significant for the reasons described under Impact GEO-3 and **less** than the impact that would occur under the proposed Plan because a smaller area would be within a high liquefaction potential zone.

The Plan area includes a wide range of topographical conditions, and landslide hazards vary from very low in low lying areas to very high in some upland areas, especially areas with slopes that exceed 15 percent. **Table 4-27** shows acreage of land use growth footprint where there is potential for landslides. As shown, the HRA Focus Alternative would have a lower risk for landslides than the proposed Plan (1,000 versus 1,200 for land rated as many). This impact would be less than significant for the reasons described under Impact GEO-4 and **less** than the impact that would occur under the proposed Plan because a smaller area would be within higher risk landslide zones.

Buildout of the land use growth footprint and construction of sea level rise adaptation infrastructure and transportation projects would include earthwork activities that could expose soils to the effects of erosion or loss of topsoil. Once disturbed, either through removal of vegetation, asphalt, or demolition of a structure, stockpiled soils may be exposed to the effects of wind and water. However, construction activities are required to adhere to National Pollutant Discharge Elimination System permit requirements for construction, as well as any local grading ordinance requirements that may include erosion prevention measures. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact GEO-5 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

The proposed changes in land use and sea level rise adaptation infrastructure and transportation projects would be located on a range of different geologic materials and conditions. Hazards associated with unstable soils or geologic units are dependent on site- specific conditions, as well as the specific nature of the individual project proposed. With adherence to grading permit and building code requirements, including seismic design criteria as required by the CBC, Caltrans, Special Publication 117A, and local building code requirements, improvements and development associated

with Alternative 2 would be designed to minimize potential risks related to unstable soils and geologic units. Existing regulatory requirements specify mandatory and relatively prescriptive actions that must occur during project development and would effectively reduce the inherent hazard. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact GEO-6 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

New development, sea level rise adaptation infrastructure, and transportation projects could result in discovery and disturbance of paleontological resources. Projects involving excavation, grading, or soil removal in previously undisturbed areas have the greatest likelihood to encounter these resources. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres), which could result in land conversion in a smaller area of paleontological sensitivity compared to the proposed Plan. This impact would be significant and unavoidable for the reasons described under Impact GEO-7 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Local jurisdictions have general plan policies to manage mineral resources and are required under SMARA to consider significant mineral deposits identified by CGS. Local general plans, specific plans, and other land use plans include policies to protect existing and planned future mineral production and extraction activities from surrounding uses, and require that future projects near mining activities have compatible land uses. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses (10,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact MR-1 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

4.5.9 Hazards and Wildfire

Table 4-28 shows acreage of ultramafic rock (which produces asbestos) within the land use growth footprint, sea level rise adaptation infrastructure footprint, and transportation projects footprint. **Table 4-29** shows the acreages within fire hazard severity zones for each alternative.

Table 4-28: Ultramafic Rock Acreage by Alternative

	Land Use Growth Footprint	Sea Level Rise Adaptation Footprint	Transportation Projects Footprint	Total
Proposed Plan	660	0	110	770
No Project Alternative	670	0	10	680
Alternative 1	650	-	80	730
Alternative 2	660	0	60	710

Notes: Whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10). Figures may not sum due to independent rounding.
Sources: data compiled by MTC and ABAG in 2021

Table 4-29: Fire Hazard Zones Acreage by Alternative

		Moderate	High	Very High
Land Use Growth Footprint	Proposed Plan	830	830	190
	No Project Alternative	3,300	4,300	2,700
	Alternative 1	800	360	90
	Alternative 2	820	680	180
Sea Level Rise Adaptation Footprint	Proposed Plan	30	30	30
	No Project Alternative	10	20	0
	Alternative 1	30	30	30
	Alternative 2	30	30	30
Transportation Projects Footprint	Proposed Plan	900	570	20
	No Project Alternative	100	30	<1
	Alternative 1	660	380	20
	Alternative 2	750	380	20

Notes: Numbers less than 1 are shown as "<1"; whole numbers have been rounded (between 0 and 10 to the nearest whole number, between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100).
Source: data compiled by MTC and ABAG in 2021

NO PROJECT ALTERNATIVE

The projected land use development pattern, sea level rise adaptation infrastructure, and transportation projects could increase the routine transport, use, storage, and disposal of hazardous wastes in the region. These impacts are subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be less than significant for the reasons described under Impact HAZ-1 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to hazardous materials would be implemented.

Construction associated with implementation of the No Project Alternative could result in impacts related to use of hazardous materials and disturbance of potentially hazardous materials, including naturally occurring asbestos (NOA). The most likely incidents involving construction-related hazardous materials are generally associated with minor spills or drips. Small fuel or oil spills are possible but would have a negligible impact on public health. All hazardous materials would be stored, handled, and disposed of according to the manufacturers' recommendations, and spills would be cleaned up in accordance with applicable regulations. As shown in **Table 4-28**, there would be a smaller area of the land located in areas that may result in dispersal of NOA (i.e., ultramafic rock) under the No Project Alternative (680 acres) compared to the proposed Plan (770 acres). This impact would be less than significant for the reasons described under Impact HAZ-2 and **less** than the impact that would occur under the proposed Plan due to the decreased risk for NOA dispersal.

During construction, demolition, and excavation activities, the changes in planned land use and transportation projects could potentially produce hazardous air emissions or involve the handling of extremely hazardous wastes. During operation, land use projects could use and produce hazardous materials that may be transported on roadways included in this Plan. However, all projects would comply with federal and State regulations that are designed to reduce the potential for the release of large quantities of hazardous materials and wastes into the environment to an acceptable level, and in particular to protect schools. Existing protective measures and regulations would be sufficient to ensure that hazardous materials stored, used, transported, and disposed of under the Plan would not pose a substantial hazard to the public or the environment, including children at schools, under normal conditions. These impacts are subject to regulations described in Section 3.9, which would

reduce the potential for adverse effects to occur. This impact would be less than significant for the reasons described under Impact HAZ-3 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to hazardous materials would be implemented.

Throughout the Plan Area there are many sites where historical releases of hazardous materials or wastes have occurred; these are listed in environmental databases pursuant to Government Code Section 65962.5. These sites range from small releases that have had localized effects on private property and have already been remediated to large scale releases from long-term historical industrial practices that have had wider ranging effects on groundwater. These impacts are subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be significant and unavoidable for the reasons described under Impact HAZ-4 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to hazardous materials would be implemented.

Projects within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport would not be approved by local agencies until project design plans have been reviewed and approved by the appropriate Airport Land Use Commission (ALUC). These impacts are subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be less than significant for the reasons described under Impact HAZ-5 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to airports would be implemented.

The forecasted increase to population and employment anticipated in the Plan Area could increase congestion on evacuation routes and slow evacuation. This could impair implementation of emergency response or evacuation plans, particularly if local plans rely on evacuation via personal vehicle. While changes in land use would be reflected in updated emergency and evacuation plans, it is not known if the changes would be sufficient to ensure adequate evacuation. Under the No Project Alternative, development patterns would be more spread out and would thus reduce the potential degree of congestion on local roadways during evacuation procedures. Because evacuation during emergency conditions would be less impeded by vehicular congestion under the No Project Alternative, this impact would be significant and unavoidable for the reasons described under Impact HAZ-6 and **less** than the impact that would occur under the proposed Plan.

Land development under the proposed Plan could result in exposure of people to loss, injury, or death and damage to property adjacent to wildlands or where residences are intermixed with wildlands. The No Project Alternative would result in a substantially greater land use growth footprint within a fire hazard severity zone rated moderate, high, or very high (2,700 acres) than the proposed Plan (190 acres) (**Table 4-29**). Due to this greater area of land use growth footprint within higher risk fire zones, this impact would be significant and unavoidable for the reasons described under Impact HAZ-7 and **greater** than the impact that would occur under the proposed Plan.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

The projected land use development pattern, sea level rise adaptation infrastructure, and transportation projects could increase the routine transport, use, storage, and disposal of hazardous wastes in the region. These impacts are subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be less than significant for the reasons described under Impact HAZ-1 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to hazardous materials would be implemented.

Construction associated with implementation of Alternative 1 could result in impacts related to use of hazardous materials and disturbance of potentially hazardous materials. The most likely incidents involving construction-related hazardous materials are generally associated with minor spills or drips. Small fuel or oil spills are possible but would have a negligible impact on public health. All hazardous materials would be stored, handled, and disposed of according to the manufacturers' recommendations, and spills would be cleaned up in accordance with applicable regulations. As shown in **Table 4-28**, there would be a smaller area of the land located in areas that may result in dispersal of NOA (i.e., ultramafic rock) under Alternative 1 (730 acres) compared to the proposed Plan (770 acres). Because the potential to disperse NOA would occur within a similar area of land, this impact would be less than significant for the reasons described under Impact HAZ-2 and **similar** to the impact that would occur under the proposed Plan.

During construction, demolition, and excavation activities, construction under Alternative 1 could potentially produce hazardous air emissions or involve the handling of extremely hazardous wastes. During operation, land use projects could use and produce hazardous materials that may be transported on roadways included in this Plan. However, all projects would comply with federal and State regulations that are designed to reduce the potential for the release of large quantities of hazardous materials and wastes into the environment to an acceptable level, and in particular to protect schools. Implementation of individual projects would require compliance with regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be less than significant for the reasons described under Impact HAZ-3 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to hazardous materials would be implemented.

Throughout the Plan Area there are many sites where historical releases of hazardous materials or wastes have occurred; these are listed in environmental databases pursuant to Government Code Section 65962.5. These sites range from small releases that have had localized effects on private property and have already been remediated to large scale releases from long-term historical industrial practices that have had wider ranging effects on groundwater. These impacts are subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be significant and unavoidable for the reasons described under Impact HAZ-4 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to hazardous materials would be implemented.

Projects within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport would not be approved by local agencies until project design plans have been reviewed and approved by the appropriate ALUC. These impacts are subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be less than significant for the reasons described under Impact HAZ-5 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to airports would be implemented.

The forecasted increase to population and employment anticipated in the Plan Area could increase congestion on evacuation routes and slow evacuation. This could impair implementation of emergency response or evacuation plans, particularly if local plans rely on evacuation via personal vehicle. While changes in land use would be reflected in updated emergency and evacuation plans, it is not known if the changes would be sufficient to ensure adequate evacuation. Under the TRA Focus Alternative, development patterns would be centered around existing developed areas, creating issues of potential congestion on local roadways during evacuation procedures that would be similar to the proposed Plan. Because evacuation during emergency conditions would be similarly impeded by vehicular congestion

under the TRA Focus Alternative, this impact would be significant and unavoidable for the reasons described under Impact HAZ-6 and **similar** to the impact that would occur under the proposed Plan.

Land development under Alternative 1 could result in exposure of people to loss, injury, or death and damage to property adjacent to wildlands or where residences are intermixed with wildlands. The TRA Focus Alternative would result in a substantially smaller land use growth footprint within a fire hazard severity zone rated moderate, high, or very high (90 acres) than the proposed Plan (190 acres) (**Table 4-29**). Due to the area of development within a high risk fire zone, this impact would be significant and unavoidable for the reasons described under Impact HAZ-7 and **less** than the impact that would occur under the proposed Plan.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

The projected land use development pattern, sea level rise adaptation infrastructure, and transportation projects could increase the routine transport, use, storage, and disposal of hazardous wastes in the region. These impacts are subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be less than significant for the reasons described under Impact HAZ-1 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to hazardous materials would be implemented.

Construction associated with implementation of Alternative 2 could result in impacts related to use of hazardous materials and disturbance of potentially hazardous materials, including NOA. The most likely incidents involving construction-related hazardous materials are generally associated with minor spills or drips. Small fuel or oil spills are possible but would have a negligible impact on public health. All hazardous materials would be stored, handled, and disposed of according to the manufacturers' recommendations, and spills would be cleaned up in accordance with applicable regulations. As shown in **Table 4-28**, there would be a smaller area of the land located in areas that may result in dispersal of NOA (i.e., ultramafic rock) under the HRA Focus Alternative (710 acres) compared to the proposed Plan (770 acres). This impact would be less than significant for the reasons described under Impact HAZ-2 and **similar** to the impact that would occur under the proposed Plan due to a smaller area where earth-moving activities may cause dispersal of NOA.

During construction, demolition, and excavation activities, the changes in planned land use and transportation projects could potentially produce hazardous air emissions or involve the handling of extremely hazardous wastes. During operation, land use projects could use and produce hazardous materials that may be transported on roadways included in this Plan. However, all projects would comply with federal and State regulations that are designed to reduce the potential for the release of large quantities of hazardous materials and wastes into the environment to an acceptable level, and in particular to protect schools. Individual projects would be subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be less than significant for the reasons described under Impact HAZ-3 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to hazardous materials would be implemented.

Throughout the Plan Area there are many sites where historical releases of hazardous materials or wastes have occurred; these are listed in environmental databases pursuant to Government Code Section 65962.5. These sites range from small releases that have had localized effects on private property and have already been remediated to large scale releases from long-term historical industrial practices that have had wider ranging effects on groundwater. These impacts are subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be significant and unavoidable for the reasons described under Impact HAZ-4 and

similar to the impact that would occur under the proposed Plan because regulations pertaining to hazardous materials would be implemented.

Projects within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport would not be approved by local agencies until project design plans have been reviewed and approved by the appropriate ALUC. These impacts are subject to regulations described in Section 3.9, which would reduce the potential for adverse effects to occur. This impact would be less than significant for the reasons described under Impact HAZ-5 and **similar** to the impact that would occur under the proposed Plan because regulations pertaining to airports would be implemented.

The forecasted increase to population and employment anticipated in the Plan Area could increase congestion on evacuation routes and slow evacuation. This could impair implementation of emergency response or evacuation plans, particularly if local plans rely on evacuation via personal vehicle. While changes in land use would be reflected in updated emergency and evacuation plans, it is not known if the changes would be sufficient to ensure adequate evacuation. Under the HRA Focus Alternative, development patterns would be centered around existing developed areas, creating issues of potential congestion on local roadways during evacuation procedures that would be similar to the proposed Plan. Because evacuation during emergency conditions would be similarly impeded by vehicular congestion under the HRA Focus Alternative, this impact would be significant and unavoidable for the reasons described under Impact HAZ-6 and **similar** to the impact that would occur under the proposed Plan.

Land development under the proposed Plan could result in exposure of people to loss, injury, or death and damage to property adjacent to wildlands or where residences are intermixed with wildlands. The HRA Focus Alternative would result in a slightly smaller land use growth footprint within a fire hazard severity zone rated moderate, high, or very high (180 acres) than the proposed Plan (190 acres) (**Table 4-29**). This impact would be significant and unavoidable for the reasons described under Impact HAZ-7 and **less** than the impact that would occur under the proposed Plan because a smaller area of development would occur within higher risk fire areas.

4.5.10 Hydrology and Water Quality

Table 4-30 provides quantifiable data related to hydrology impacts.

Table 4-30: Flood Zone Acreage by Alternative

	Plan/Alternative	100-Year
Land Use Growth Footprint	Proposed Plan	4,200
	No Project Alternative	5,500
	Alternative 1	3,500
	Alternative 2	4,100
Sea Level Rise Adaptation Footprint	Proposed Plan	4,300
	No Project Alternative	1,100
	Alternative 1	4,300
	Alternative 2	4,300
Transportation Projects Footprint	Proposed Plan	1,900
	No Project Alternative	290
	Alternative 1	1,400
	Alternative 2	1,400

Notes: Whole numbers have been rounded (between 11 and 999 to the nearest 10, between 1,000 and 1,000,000 to the nearest 100).
Sources: Data compiled by MTC and ABAG in 2021

NO PROJECT ALTERNATIVE

Compliance with water quality standards or waste discharge requirements could be affected by land development and construction of sea level rise adaptation infrastructure and transportation projects by increasing the amount of impervious surface in the region, such as new paved areas, building rooftops, and parking lots. This increase in impervious surface has the potential to generate additional stormwater runoff. Compared to the proposed Plan, the No Project Alternative has a greater area of new developed land use growth and could thus result in a greater increase of impervious surfaces (24,700 acres versus 12,300 acres, **Table 4-10**). Development of residential and commercial uses, sea level rise infrastructure, and transportation projects would not substantially degrade water quality in violation of water quality standards. Individual projects would adhere to existing regulations and would operate under the oversight of applicable regulatory agencies. This impact would be less than significant for the reasons described under Impact HYDRO-1 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

Groundwater levels can be affected by a decrease in recharge through increased impervious surfaces. Compared to the proposed Plan, the No Project Alternative would result in a greater area of new developed land and could thus result in a greater increase of impervious surfaces (24,700 acres versus 12,300 acres, **Table 4-10**). Development and use of sea level rise infrastructure and transportation projects would not substantially affect groundwater quality or quantity. Overall, this impact would be less than significant for the reasons described under Impact HYDRO-2 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

Construction and earth-moving activities associated with development, sea level rise adaptation infrastructure, and transportation projects would have the potential to alter existing drainage patterns, which could result in sediment loading in local waterways and subsequent effects on water quality. Individual development and transportation projects would comply with requirements (e.g. adopt BMPs appropriate to local conditions), which would prevent the degradation of water quality. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses compared to the proposed Plan (24,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact HYDRO-3 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

Construction and earth-moving activities associated with development, sea level rise adaptation infrastructure, and transportation projects would have the potential to alter existing drainage patterns, which could result in runoff that exceeds capacity of existing or planned stormwater drainage systems or results in flooding on- or off-site. Implementation of Plan alternatives could result in new development and redevelopment that would have the potential to result in project-specific changes to existing drainage patterns. Altered drainage patterns has the potential to cause exceedance in the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Before commencement of major construction activities, project applicants would submit a SWPPP to SWRCB that identifies the BMPs that would be used in construction of the planned project. The applicant must receive approval of the SWPPP and submit a notice of intent before initiating construction. Individual development and transportation projects are expected to adopt BMPs appropriate to local conditions. As shown in **Table 4-10**, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses compared to the proposed Plan (24,700 acres versus 12,300 acres). Potential sea level rise could cause inundation in developed areas, which could alter drainage patterns. Sea level rise adaptation

infrastructure would reduce this risk. The No Project Alternative includes fewer sea level rise adaptation projects and would thus have a lesser degree of protection against altered drainage patterns. This impact would be less than significant for the reasons described under Impact HYDRO-4 and **greater** than the impact that would occur under the proposed Plan because a greater area of undeveloped land would be developed.

Residential, commercial, and transportation projects in identified flood hazard areas could involve support structures or other aboveground improvements in the floodway that could potentially obstruct floodwaters in some locations. All projects implemented under the No Project Alternative would be required to adhere to the appropriate local and State requirements that are designed to ensure that flooding conditions are not exacerbated and that water quality is not adversely affected. Based on existing regulations, implementation of the No Project Alternative is not anticipated to increase the rate or amount of surface runoff in a manner that would result in on- or offsite flooding, or substantial erosion or siltation. As shown in **Table 4-30**, there would be a greater area of the land use growth footprint within the 100-year flood hazard zone under the No Project Alternative (5,500 acres) compared to the proposed Plan (4,200 acres) and less area within the 100-year flood hazard zone associated with transportation projects (290 acres versus 1,900 acres). Sea level rise adaptation infrastructure is intended to protect existing businesses, residences, and infrastructure from flooding. The No Project Alternative includes less sea level rise adaptation infrastructure than the proposed Plan and would, therefore, reduce future flood risks to a lesser degree. This impact would be less than significant for the reasons described under Impact HYDRO-5 and **greater** than the impact that would occur under the proposed Plan because a greater area of the land use growth footprint would occur with the 100-year flood hazard zone.

Existing regulations guide growth away from hazardous areas, thus limiting the potential for risk related to the release of pollutants attributable to flooding, seiche, or tsunami. The No Project Alternative does not have as much sea level rise adaptation infrastructure as the proposed Plan, and would thus not decrease the potential for inundation in flood hazard, tsunami, and seiche zones to the same extent as the proposed Plan. This impact would be less than significant for the reasons described under Impact HYDRO-6 and **greater** than the impact that would occur under the proposed Plan because a less sea level rise adaptation infrastructure would be developed.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

Compliance with water quality standards or waste discharge requirements could be affected by land development and construction of transportation projects by increasing the amount of impervious surface in the region, such as new paved areas, building rooftops, and parking lots. This increase in impervious surface has the potential to generate additional stormwater runoff. Compared to the proposed Plan, the TRA Focus Alternative has a smaller area of new developed land use growth and could thus result in a smaller increase of impervious surfaces (8,800 acres versus 12,300 acres, **Table 4-10**). Development of residential and commercial uses, sea level rise infrastructure, and transportation projects would not substantially degrade water quality in violation of water quality standards. Individual projects would adhere to existing regulations and would operate under the oversight of applicable regulatory agencies. This impact would be less than significant for the reasons described under Impact HYDRO-1 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Groundwater levels can be affected by a decrease in recharge through increased impervious surfaces. Compared to the proposed Plan, the TRA Focus Alternative would result in a smaller area of new developed land and could thus result in a smaller increase of impervious surfaces (8,800 acres versus

12,300 acres, **Table 4-10**). Development and use of sea level rise infrastructure and transportation projects would not substantially affect groundwater quality or quantity. Overall, this impact would be less than significant for the reasons described under Impact HYDRO-2 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Construction and earth-moving activities associated with development, sea level rise adaptation infrastructure, and transportation projects would have the potential to alter existing drainage patterns, which could result in sediment loading in local waterways and subsequent effects on water quality. Individual development and transportation projects would comply with requirements (e.g. adopt BMPs appropriate to local conditions), which would prevent the degradation of water quality. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses compared to the proposed Plan (8,800 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact HYDRO-3 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Construction and earth-moving activities associated with development, sea level rise adaptation infrastructure, and transportation projects would have the potential to alter existing drainage patterns, which could result in runoff that exceeds capacity of existing or planned stormwater drainage systems or results in flooding on- or off-site. Implementation of Plan alternatives could result in new development and redevelopment that would have the potential to result in project-specific changes to existing drainage patterns. Altered drainage patterns has the potential to cause exceedance in the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Before commencement of major construction activities, project applicants would submit a SWPPP to SWRCB that identifies the BMPs that would be used in construction of the planned project. The applicant must receive approval of the SWPPP and submit a notice of intent before initiating construction. Individual development and transportation projects are expected to adopt BMPs appropriate to local conditions. As shown in **Table 4-10**, the TRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses compared to the proposed Plan (8,800 acres versus 12,300 acres). Potential sea level rise could cause inundation in developed areas, which could alter drainage patterns. Sea level rise adaptation infrastructure would reduce this risk. The TRA Focus Alternative includes fewer sea level rise adaptation projects and would thus have a lesser degree of protection against altered drainage patterns. This impact would be less than significant for the reasons described under Impact HYDRO-4 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Residential, commercial, and transportation projects in identified flood hazard areas could involve support structures or other aboveground improvements in the floodway that could potentially obstruct floodwaters in some locations. All projects implemented under Alternative 1 would be required to adhere to the appropriate local and State requirements that are designed to ensure that flooding conditions are not exacerbated and that water quality is not adversely affected. Based on existing regulations, TRA Focus Alternative implementation is not anticipated to increase the rate or amount of surface runoff in a manner that would result in on- or offsite flooding, or substantial erosion or siltation. As discussed above, there would be a smaller area of the land use growth footprint within the 100-year flood hazard zone under the TRA Focus Alternative than the proposed Plan (**Table 4-30**, 3,500 acres versus 4,200 acres) and less area within the 100-year flood hazard zone associated with transportation projects (1,400 acres versus 1,900 acres). Sea level rise adaptation project are intended to protect existing businesses, residences, and infrastructure from flooding. The TRA Focus Alternative

includes fewer sea level rise adaptation infrastructure than the proposed Plan and would therefore reduce future flood risks to a lesser degree. This impact would be less than significant for the reasons described under Impact HYDRO-5 and **less** than the impact that would occur under the proposed Plan because a smaller area of land use growth footprint would occur within the 100-year flood hazard zone.

Existing regulations guide growth away from hazardous areas, thus limiting the potential for risk related to the release of pollutants attributable to flooding, seiche, or tsunami. The TRA Focus Alternative does not have as much sea level rise adaptation infrastructure as the proposed Plan and would thus not decrease the potential for inundation in flood hazard, tsunami, and seiche zones, to the same extent as the proposed Plan. This impact would be less than significant for the reasons described under Impact HYDRO-6 and **greater** than the impact that would occur under the proposed Plan because a less sea level rise adaptation infrastructure would be developed.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

Compliance with water quality standards or waste discharge requirements could be affected by land development and construction of transportation projects by increasing the amount of impervious surface in the region, such as new paved areas, building rooftops, and parking lots. This increase in impervious surface has the potential to generate additional stormwater runoff. Compared to the proposed Plan, the HRA Focus Alternative has a smaller area of new developed land use growth and could thus result in a smaller increase of impervious surfaces (10,700 acres versus 12,300 acres, **Table 4-10**). Development of residential and commercial uses, sea level rise infrastructure, and transportation projects would not substantially degrade water quality in violation of water quality standards. Individual projects would adhere to existing regulations and would operate under the oversight of applicable regulatory agencies. This impact would be less than significant for the reasons described under Impact HYDRO-1 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Groundwater levels can be affected by a decrease in recharge through increased impervious surfaces. Compared to the proposed Plan, the HRA Focus Alternative would result in a smaller area of new developed land and could thus result in a smaller increase of impervious surfaces (10,700 acres versus 12,300 acres, **Table 4-10**). Development and use of sea level rise infrastructure and transportation projects would not substantially affect groundwater quality or quantity. Overall, this impact would be less than significant for the reasons described under Impact HYDRO-2 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Construction and earth-moving activities associated with development, sea level rise adaptation infrastructure, and transportation projects would have the potential to alter existing drainage patterns, which could result in sediment loading in local waterways and subsequent effects on water quality. Individual development and transportation projects would comply with requirements (e.g. adopt BMPs appropriate to local conditions), which would prevent the degradation of water quality. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses compared to the proposed Plan (10,700 acres versus 12,300 acres). This impact would be less than significant for the reasons described under Impact HYDRO-3 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Construction and earth-moving activities associated with development, sea level rise adaptation infrastructure, and transportation projects would have the potential to alter existing drainage patterns, which could result in runoff that exceeds capacity of existing or planned stormwater drainage systems or results in flooding on- or off-site. Implementation of Plan alternatives could result in new development and redevelopment that would have the potential to result in project-specific changes to existing drainage patterns. Altered drainage patterns have the potential to cause exceedance in the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Before commencement of major construction activities, project applicants would submit a SWPPP to SWRCB that identifies the BMPs that would be used in construction of the planned project. The applicant must receive approval of the SWPPP and submit a notice of intent before initiating construction. Individual development and transportation projects are expected to adopt BMPs appropriate to local conditions. As shown in **Table 4-10**, the HRA Focus Alternative would result in a smaller area of land being converted from undeveloped to developed uses compared to the proposed Plan (10,700 acres versus 12,300 acres). Potential sea level rise could cause inundation in developed areas, which could alter drainage patterns. Sea level rise adaptation infrastructure would reduce this risk. The HRA Focus Alternative includes the same sea level rise adaptation projects and would thus have a similar effect on drainage patterns. This impact would be less than significant for the reasons described under Impact HYDRO-4 and **less** than the impact that would occur under the proposed Plan because a smaller area of undeveloped land would be developed.

Residential, commercial, and transportation projects in identified flood hazard areas could involve support structures or other aboveground improvements in the floodway that could potentially obstruct floodwaters in some locations. Projects implemented under Alternative 2 would be required to adhere to the appropriate local and State requirements that are designed to ensure that flooding conditions are not exacerbated and that water quality is not adversely affected. Based on existing regulations, implementation of Alternative 2 is not anticipated to increase the rate or amount of surface runoff in a manner that would result in on- or offsite flooding, or substantial erosion or siltation. As discussed above, there would be a smaller area of the land use growth footprint within the 100-year flood hazard zone under the HRA Focus (**Table 4-30**, 4,100 acres versus 4,200 acres) and less area within the 100-year flood hazard zone associated with transportation projects (1,400 acres versus 1,900 acres). Sea level rise adaptation project are intended to protect existing businesses, residences, and infrastructure from flooding. The HRA Focus Alternative includes fewer sea level rise adaptation infrastructure than the proposed Plan and would therefore reduce future flood risks to a lesser degree. This impact would be less than significant for the reasons described under Impact HYDRO-5 and **less** than the impact that would occur under the proposed Plan because a smaller area of land use growth footprint would occur within the 100-year flood hazard zone.

Existing regulations guide growth away from hazardous areas, thus limiting the potential for risk related to the release of pollutants attributable to flooding, seiche, or tsunami. The HRA Focus Alternative has the same sea level rise adaptation infrastructure as the proposed Plan, and would thus decrease the potential for inundation in flood hazard, tsunami, and seiche zones to the same extent as the proposed Plan. This impact would be less than significant for the reasons described under Impact HYDRO-6 and **similar** to the impact that would occur under the proposed Plan because a less sea level rise adaptation infrastructure would be developed.

4.5.11Land Use, Population, and Housing

The Plan alternatives assume the same projected housing and population levels in 2050; each alternative differs by where new housing and employment centers are located. Please see Section 4.7, "Ability to Meet Project Objective" for additional discussions related to displacement.

NO PROJECT ALTERNATIVE

Physical division of established communities is generally attributed to development of roadways or other impediments that prohibit or limit travel within a developed area. Compared to the proposed Plan, there would be fewer transportation projects that could require the acquisition of land in existing communities, but some projects could still divide established communities. This impact would be significant and unavoidable for the reasons described under Impact LU-1 for the impacts of transportation projects and **less** than the impact that would occur under the proposed Plan because there would be fewer transportation projects.

Implementation of the No Project Alternative assumes that the land use growth footprint, transportation projects, and sea level rise infrastructure would be consistent with general plan policies and zoning districts. This impact would be less than significant because development under the No Project Alternative would be consistent with land use plans, policies, and regulations adopted for the purpose of avoiding or mitigating an environmental effect, and **less** than the impact that would occur under the proposed Plan (LU-2). *(This impact is significant and unavoidable under the proposed Plan)*

Under the No Project Alternative, growth would occur consistent with current general plans and zoning, without an adopted regional plan, and assuming no new infrastructure projects beyond those currently under construction or those that have both full funding and environmental clearance. In comparison to the proposed Plan, there are no regional strategies in the No Project Alternative to focus growth into specific geographic areas within the region. Instead, growth would occur consistent with current general plans and zoning and would therefore not result in substantial unplanned growth. This impact would be less than significant for the reasons described under Impact LU-3 and **similar** to the impact that would occur under the proposed Plan.

Displacement risk is a function of the location and availability of affordable housing near major job centers in a growing regional economy. As the growth in jobs (particularly those that pay higher wages) outpaces the supply of housing (particularly those that are affordable to lower-income households), the cost of housing inevitably rises faster than wages for all workers. This causes a greater risk of displacement within Equity Priority Communities through 2050, despite an overall improvement in the risk of displacement regionwide compared to the proposed Plan. This alternative lacks any coordinated regional policies, such as Strategies H1, H2, H4 and H5, to build and integrate preserve and produce more adequate affordable housing and therefore help reduce displacement. Due to a relative reduction in redevelopment, implementation of the No Project Alternative would less construction of replacement housing, which could result in environmental impacts. The impact related to displacement of housing would be significant and unavoidable for the reasons described under Impact LU-4 and **less** than the impact that would occur under the proposed Plan because there would less construction of new housing compared to the proposed Plan.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

Physical division of established communities is generally attributed to development of roadways or other impediments that prohibit or limit travel within a developed area. Compared to the proposed

Plan, there would be fewer transportation projects that could require the acquisition of land in existing communities, but some projects could still divide established communities. This impact would be significant and unavoidable for the reasons described under Impact LU-1 for the impacts of transportation projects and **less** than the impact that would occur under the proposed Plan because there would be fewer transportation projects.

Implementation of the TRA Focus Alternative could result in planning of land use development pattern, sea level rise adaption infrastructure, and transportation projects in areas that are not consistent with existing long-range plans, including local general plans, the Bay Plan, and LCPs. As for the proposed Plan, MTC does not have the authority to adopt, approve, implement, or otherwise regulate local or regional land use plans. In addition, cities and counties are not required to change their land use plans and policies, including general plans, to be consistent with the TRA Focus Alternative. Therefore, the potential for inconsistencies with general plans and regional conservation plans would be the same under the TRA Focus Alternative as the proposed Plan, and this impact would be significant and unavoidable for the reasons described under Impact LU-2 and **similar** to the proposed Plan.

The TRA Focus Alternative would concentrate growth into areas that contain high-quality transit services. This alternative would respond to projected growth and would therefore not result in substantial unplanned growth. This impact would be less than significant for the reasons described under Impact LU-3 and **similar** to the impact that would occur under the proposed Plan because individual project would be consistent with general plan policies and zoning districts.

Displacement risk is a function of the location and availability of affordable housing near major job centers in a growing regional economy. As the growth in jobs (particularly those that pay higher wages) outpaces the supply of housing (particularly those that are affordable to lower-income households), the cost of housing inevitably rises faster than wages for all workers. Risk of displacement, overall and in Equity Priority Communities, is lower under the TRA Focus Alternative compared to the proposed Plan because the housing growth pattern enables more low-income residents to continue living in current communities due to an increase in deed-restricted affordable housing. An increase in deed-restricted affordable housing would reduce the need to develop replacement housing elsewhere because more low-income residents could continue living in current communities. Because more low-income residents would not be required to relocate, there would be less necessity for new construction that could result in environmental impacts, and the impact related to displacement of housing would be significant and unavoidable for the reasons described under Impact LU-4 and **less** than the impact that would occur under the proposed Plan.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

Physical division of established communities is generally attributed to development of roadways or other impediments that prohibit or limit travel within a developed area. Compared to the proposed Plan, there would be fewer transportation projects that could require the acquisition of land in existing communities, but some projects could still divide established communities. This impact would be significant and unavoidable for the reasons described under Impact LU-1 for the impacts of transportation projects and **less** than the impact that would occur under the proposed Plan because there would be fewer transportation projects.

Implementation of the HRA Focus Alternative could result in planning of land use development pattern, sea level rise adaption infrastructure, and transportation projects in areas that are not consistent with existing long-range plans, including local general plans, the Bay Plan, and LCPs. As for

the proposed Plan, MTC does not have the authority to adopt, approve, implement, or otherwise regulate local or regional land use plans. In addition, cities and counties are not required to change their land use plans and policies, including general plans, to be consistent with the HRA Focus Alternative. Therefore, there is a potential for inconsistencies with general plans and regional conservation plans would be the same under the HRA Focus Alternative as the proposed Plan, and this impact would be significant and unavoidable for the reasons described under Impact LU-2 and **similar** to the proposed Plan.

The HRA Focus Alternative would concentrate a substantially higher share of growth in HRAs, especially in the South Bay. This alternative would respond to projected growth and would therefore not result in substantial unplanned growth. This impact would be less than significant for the reasons described under Impact LU-3 and **similar** to the impact that would occur under the proposed Plan because individual project would be consistent with general plan policies and zoning districts.

Displacement risk is a function of the location and availability of affordable housing near major job centers in a growing regional economy. Under the HRA Focus Alternative, strategies shift more development, including deed-restricted affordable housing, toward High-Resource Areas, making these traditionally-exclusive communities somewhat more inclusive than the proposed Plan. This causes a greater risk of displacement within the existing Equity Priority Communities through 2050, despite an overall improvement in the risk of displacement regionwide compared to the proposed Plan. This shift in housing development toward High-Resource Areas indicates that less housing, including affordable housing, would be constructed in Equity Priority Communities, meaning that fewer residents in the existing low-income communities and communities of color are able to remain in place through 2050. This would require a greater degree of replacement housing construction elsewhere, and thus a greater potential for related environmental impacts. The impact related to displacement of housing would be significant and unavoidable for the reasons described under Impact LU-4 and **greater** than the impact that would occur under the proposed Plan because there would be a greater risk of displacement within the existing Equity Priority Communities through 2050 under the HRA Focus Alternative compared to the proposed Plan.

4.5.12 Noise

NO PROJECT ALTERNATIVE

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the Plan alternatives could result in substantial construction noise levels such that nearby receptors could be adversely affected and applicable noise standards exceeded. For the reasons described under Impact NOISE-1, construction from implementation of the No Project Alternative would be significant and unavoidable and **similar** to the impact that would occur under the proposed project.

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the Plan alternatives could result in regional average noise increases and localized traffic-related noise levels that exceed applicable thresholds, resulting in a substantial permanent increase in noise in some areas. Depending on the location of development, noise levels would increase or decrease along some roadways in some counties. In addition, the land use growth pattern under the No Project Alternative is spread out more than under the proposed Plan, which would distribute transportation noise throughout the region more, but may reduce it in areas that would become more dense under the proposed Plan. Because the Plan

alternatives would result in varying degrees of noise levels distributed throughout the Plan area, including traffic noise increases and threshold exceedances in some areas, substantial increases in stationary noise sources, and variations to the level of new or expanded transit services, it is not possible to determine the relative level of adverse effect for this area of impact. Furthermore, noise is assessed based on the presence of sensitive receptors to a noise generator, which cannot be reasonably determined within a large area and over a long period of time. In addition, noise levels decrease with distance and would not combine across the Plan area. This impact would be significant and unavoidable for the reasons discussed under Impact NOISE-2 and **similar** to the impact that would occur under the proposed Plan.

Construction activities could generate substantial vibration levels, and the potential exists for pile driving to occur within 50 feet of an older building, exceeding Caltrans-recommended levels for structural damage, and within 550 feet of an existing sensitive land use, exceeding levels for vibration annoyance recommended by the Federal Transit Administration (FTA) recommended. In addition, locating residential land uses in proximity to transit could also result in exposure of the future residents to vibration levels in excess of established standards. Information is not available to assess the relative difference to transit-related vibration levels under the No Project Alternative; nor the extent to which construction vibration would affect existing sensitive land uses. However, vibration impacts would occur under both the proposed Plan and No Project Alternative. Because these types of impacts are site specific, they are difficult to compare across a large site such as the Plan area. This impact would be significant and unavoidable for the reasons described under Impact NOISE-3 and **similar** to the impact that would occur under the proposed Plan.

There are 38 airports, including public, private, and military airports throughout the Bay Area. Projected development could potentially be located in close proximity to existing airports such that applicable exterior and interior noise standards would be exceeded. Local land use compatibility standards contained in City and County General Plans, would typically discourage or require specific site review for construction of sensitive land uses in areas potentially impacted by aircraft noise. However, it is possible that planned development could be exposed to exterior and interior noise levels from existing airports or airstrips that exceed applicable standards. This impact would be significant and unavoidable for the reasons described under Impact NOISE-4 and **similar** to the impact that would occur under the proposed Plan.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the Plan alternatives could result in substantial construction noise levels such that nearby receptors could be adversely affected and applicable noise standards exceeded. For the reasons described under Impact NOISE-1, construction from projected development, sea level rise adaptation infrastructure, and transportation projects would be significant and unavoidable and **similar** to the impact that would occur under the proposed project.

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the Plan alternatives could result in stationary noise increases in certain areas and localized traffic-related noise levels that exceed applicable thresholds, resulting in a substantial permanent increase in noise in some areas. Depending on the location of development, noise levels would increase on some roadways or decrease along some roadways in some counties. Generally, with consideration of traffic noise, the TRA Focus Alternative would result in similar levels of vehicle commuters and commuters using alternative modes of transportation (walk, transit, bike, telecommute)**.** In addition, this alternative would include the same major rail

expansion and modernization projects as the proposed Plan and thus result in similar levels of transit-related noise. However, because the land use growth pattern under the TRA Focus Alternative would focus growth within TRAs, the distribution of noise levels would be different than the proposed Plan. Noise is assessed based on the presence of sensitive receptors to a noise generator, which cannot be reasonably determined within a large area and over a long period of time. In addition, noise levels decrease with distance and would not combine across the Plan area. This impact would be significant and unavoidable for the reasons discussed under Impact NOISE-2 and **similar** to the impact that would occur under the proposed Plan.

Construction activities could generate substantial vibration levels, and the potential exists for pile driving to occur within 50 feet of an older building, exceeding Caltrans-recommended levels for structural damage, and within 550 feet of an existing sensitive land use, exceeding FTA-recommended levels for vibration annoyance. In addition, locating residential land uses in proximity to transit could also result in exposure of the future residents to vibration levels in excess of standards established by FTA or Caltrans. New households included in the land use growth footprint forecast could exceed the recommended threshold for human disturbance of 72 velocity level in decibels (VdB) for sensitive receptors that are exposed to a frequent amount of vibration events. Information is not available to assess the relative difference to transit-related vibration levels under the TRA Focus Alternative; nor the extent to which construction vibration would affect existing sensitive land uses. However, vibration impacts would occur under both the proposed Plan and TRA Focus Alternative. Because these types of impacts are site specific, they are difficult to compare across a large site such as the Plan area. This impact would be significant and unavoidable for the reasons described under Impact NOISE-3 and **similar** to the impact that would occur under the proposed Plan.

There are 38 airports, including public, private, and military airports throughout the Bay Area. Projected development could potentially be located in close proximity to existing airports such that applicable exterior and interior noise standards would be exceeded. Local land use compatibility standards contained in City and County General Plans, would typically discourage or require specific site review for construction of sensitive land uses in areas potentially impacted by aircraft noise. However, it is possible that planned development could be exposed to exterior and interior noise levels from existing airports or airstrips that exceed applicable standards. This impact would be significant and unavoidable for the reasons described under Impact NOISE-4 and **similar** to the impact that would occur under the proposed Plan.

HRA FOCUS ALTERNATIVE

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the Plan alternatives could result in substantial construction noise levels such that nearby receptors could be adversely affected and applicable noise standards exceeded. For the reasons described under Impact NOISE-1, construction from projected development, sea level rise adaptation infrastructure, and transportation projects would be significant and unavoidable and **similar** to the impact that would occur under the proposed project.

The land use development pattern, sea level rise adaptation infrastructure, and transportation projects that may result from implementation of the Plan alternatives could result in stationary noise increases in certain areas and localized traffic-related noise levels that exceed applicable thresholds, resulting in a substantial permanent increase in noise in some areas. Depending on the location of development, noise levels would increase along some roadways and decrease along other roadways in some counties. Generally, with consideration of traffic noise, the TRA Focus Alternative would result in similar levels of vehicle commuters and commuters using alternative modes of transportation

(walk, transit, bike, telecommute)**.** In addition, this alternative would include the same major rail expansion and modernization projects as the proposed Plan and thus result in similar levels of transit-related noise. However, because the land use growth pattern under the HRA Focus Alternative would focus growth within HRAs, the distribution of noise levels would be different than the proposed Plan. Noise is assessed based on the presence of sensitive receptors to a noise generator, which cannot be reasonably determined within a large area and over a long period of time. In addition, noise levels decrease with distance and would not combine across the Plan area. This impact would be significant and unavoidable for the reasons discussed under Impact NOISE-2 and **similar** to the impact that would occur under the proposed Plan.

Construction activities could generate substantial vibration levels, and the potential exists for pile driving to occur within 50 feet of an older building, exceeding Caltrans-recommended levels for structural damage, and within 550 feet of an existing sensitive land use, exceeding FTA-recommended levels for vibration annoyance. In addition, locating residential land uses in proximity to transit could also result in exposure of the future residents to vibration levels in excess of standards established by FTA or Caltrans. New households included in the land use growth footprint forecast could exceed the recommended threshold for human disturbance of 72 VdB for sensitive receptors that are exposed to a frequent amount of vibration events. Information is not available to assess the relative difference to transit-related vibration levels under the HRA Focus Alternative; nor the extent to which construction vibration would affect existing sensitive land uses. However, vibration impacts would occur under both the proposed Plan and HRA Focus Alternative. Because these types of impacts are site specific, they are difficult to compare across a large site such as the Plan area. This impact would be significant and unavoidable for the reasons described under Impact NOISE-3 and **similar** to the impact that would occur under the proposed Plan.

There are 38 airports, including public, private, and military airports throughout the Bay Area. Projected development could potentially be located in close proximity to existing airports such that applicable exterior and interior noise standards would be exceeded. Local land use compatibility standards contained in City and County General Plans, would typically discourage or require specific site review for construction of sensitive land uses in areas potentially impacted by aircraft noise. However, it is possible that planned development could be exposed to exterior and interior noise levels from existing airports or airstrips that exceed applicable standards. This impact would be significant and unavoidable for the reasons described under Impact NOISE-4 and **similar** to the impact that would occur under the proposed Plan.

4.5.13 Public Services and Recreation

NO PROJECT ALTERNATIVE

The regional growth forecast could result in increases in demand for public services that exceed existing service capabilities, and may require construction of new facilities or modifications to existing facilities to maintain adequate capital capacity, equipment, and personnel. Because MTC and ABAG do not have land use authority to adopt local land use plans or approve local land use development projects, land use development projects are ultimately controlled by local jurisdictions throughout the Plan area. Future land use development projects would be required to undergo an evaluation of their contribution to demand on public services prior to approval. In cases where a project results in increased demand, many jurisdictions require developers to pay impact fees to fund increased demand for public services; however, the amount and extent to which a project must mitigate additional demand would differ on a project-by-project basis depending on size and location and

would be the responsibility of the implementing agency/project applicant. The magnitude of this impact is dependent on changes to population levels, which would be the same under all Plan alternatives but would occur in different patterns. Forecasted population levels would result in the need for new public services facilities, the construction of which could cause significant environmental impacts, in different patterns between the No Project Alternative and proposed Plan, but with no discernable difference in the level of adverse effect for this area of impact. This impact would be significant and unavoidable for the reasons described under Impact PSR-1 and **similar** to the impact that would occur under the proposed Plan.

Land use development could increase demand on recreational services. Existing State requirements regarding development of a complete general plan, including Open Space and Conservation Elements, require local jurisdictions to address impacts on recreational facilities. The magnitude of this impact is dependent on changes to population levels, which would be the same under all Plan alternatives. Sea level rise adaptation infrastructure and transportation projects would not substantially affect recreation resources. Forecasted population levels would result in the need for new public services facilities in different patterns between the No Project Alternative and proposed Plan. The construction of new or expanded recreational facilities may result in environmental impacts. This impact would be significant and unavoidable for the reasons described under Impact PSR-2 and **similar** to the impact that would occur under the proposed Plan.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

The regional growth forecast could result in increases in demand for public services that exceed existing service capabilities, and may require construction of new facilities or modifications to existing facilities to maintain adequate capital capacity, equipment, and personnel. The magnitude of this impact is dependent on changes to population levels, which would be the same under all Plan alternatives but would occur in different patterns. Forecasted population levels would result in the need for new public services facilities in different patterns between the TRA Focus Alternative and proposed Plan, but with no discernable difference in the level of adverse effect for this area of impact. This impact would be significant and unavoidable for the reasons described under Impact PSR-1 and **similar** to the impact that would occur under the proposed Plan.

Land use development could increase demand on recreational services. Existing State requirements regarding development of a complete general plan, including Open Space and Conservation Elements, require local jurisdictions to address impacts on recreational facilities. The magnitude of this impact is dependent on changes to population levels, which would be the same under all Plan alternatives. Sea level rise adaptation infrastructure and transportation projects would not substantially affect recreation resources. Forecasted population levels would result in the need for new public services facilities in different patterns between the TRA Focus Alternative and proposed Plan. The construction of new or expanded recreational facilities may result in significant environmental impacts. This impact would be significant and unavoidable for the reasons described under Impact PSR-2 and **similar** to the impact that would occur under the proposed Plan.

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

The regional growth forecast could result in increases in demand for public services that exceed existing service capabilities, and may require construction of new facilities or modifications to existing facilities to maintain adequate capital capacity, equipment, and personnel. Because MTC and ABAG do not have land use authority to adopt local land use plans or approve local land use development projects, land use development projects are ultimately controlled by local jurisdictions throughout

the Plan area. Future land use development projects would be required to undergo an evaluation of their contribution to demand on public services prior to approval. In cases where a project results in increased demand, many jurisdictions require developers to pay impact fees to fund increased demand for public services; however, the amount and extent to which a project must mitigate additional demand would differ on a project-by-project basis depending on size and location and would be the responsibility of the implementing agency/project applicant. The magnitude of this impact is dependent on changes to population levels, which would be the same under all Plan alternatives but would occur in different patterns. Forecasted population levels would result in the need for new public services facilities in different patterns between the HRA Focus Alternative and proposed Plan, but with no discernable difference in the level of adverse effect for this area of impact. This impact would be significant and unavoidable for the reasons described under Impact PSR-1 and **similar** to the impact that would occur under the proposed Plan.

Land use development could increase demand on recreational services. Existing State requirements regarding development of a complete general plan, including Open Space and Conservation Elements, require local jurisdictions to address impacts on recreational facilities. The magnitude of this impact is dependent on changes to population levels, which would be the same under all Plan alternatives. Sea level rise adaptation infrastructure and transportation projects would not substantially affect recreation resources. Forecasted population levels would result in the need for new public services facilities in different patterns between the HRA Focus Alternative and proposed Plan. The construction of new or expanded recreational facilities may result in significant environmental impacts. This impact would be significant and unavoidable for the reasons described under Impact PSR-2 and **similar** to the impact that would occur under the proposed Plan.

4.5.14 Public Utilities and Facilities

NO PROJECT ALTERNATIVE

Impacts related to wastewater, stormwater, and solid waste are more localized in nature, and therefore the analysis is qualitative and focuses on the existing regulations, standards, and policy measures to address these localized impacts. The evaluation of public utilities and facilities impacts assumes that construction and development under the No Project Alternative would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Potential impacts on water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities would occur primarily from buildout under the land use development pattern that may result from implementation of the No Project Alternative. Development outside of urbanized areas could require the construction of new or expanded utilities infrastructure. Expansion of new infrastructure would be greater under the No Project Alternative than under the proposed Plan because there would be a larger area of undeveloped land converted to developed uses (24,700 acres versus 12,300 acres, **Table 4-10**). This impact would be significant and unavoidable for the reasons described under Impact PUF-1 and **greater** than the impact that would occur under the proposed Plan because there would be a larger area of undeveloped land that would be developed.

Increases to water demand are primarily associated with increased population levels. Landscaping features associated with transportation projects may also require water supplies, depending on the requirements of the plant species used. The No Project Alternative would result in the same increase to population levels as the proposed Plan. However, the land use growth footprint is greater under the No Project Alternative than under the proposed Plan (24,700 acres versus 12,300 acres, **Table 4-10**), which

would result in a less efficient water supply system (e.g., greater areas of irrigated landscaping). This impact would be significant and unavoidable for the reasons described under Impact PUF-2 and **greater** than the impact that would occur under the proposed Plan because there would be a larger area of undeveloped land that would be developed.

Wastewater treatment demand would increase due to increases in population levels of individual service districts. The proposed Plan and No Project Alternative include the same population projections, and thus a similar level of wastewater would be generated. The land use growth footprint would be different between the proposed Plan and No Project Alternative; however, it is not possible to determine the extent to which different service providers would be affected because the timeline for buildout of specific areas and future expansion plans of individual service districts is unknown. This impact would be significant and unavoidable for the reasons described under Impact PUF-3 and **similar** to the impact that would occur under the proposed Plan because population projections are the same between the proposed Plan and No Project Alternative.

Solid waste generated by land use development, sea level rise adaptation infrastructure, and transportation projects could reduce the capacity of existing landfills, leading to earlier closure dates than currently anticipated and a need for increased landfill capacity. The proposed Plan and No Project Alternatives include the same population projections, and a similar level of solid waste would be generated among the alternatives. This impact would be significant and unavoidable for the reasons described under Impact PUF-4 and **similar** to the impact that would occur under the proposed Plan.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

Potential impacts on water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities would occur primarily from the land use development pattern that may result from implementation of Alternative 1. Development outside of urbanized areas could require the construction of new or expanded utilities infrastructure. Expansion of new infrastructure would be smaller under the TRA Focus Alternative than the proposed Plan because there would be a smaller area of undeveloped land converted to developed uses (8,800 acres versus 12,300 acres, **Table 4-10**). This impact would be significant and unavoidable for the reasons described under Impact PUF-1 and **less** than the impact that would occur under the proposed Plan because there would be a smaller area of undeveloped land that would be developed.

Increases to water demand are primarily associated with increased population levels. Landscaping features associated with transportation projects may also require water supplies, depending on the requirements of the plant species used. The TRA Focus Alternative would result in the same increase to population levels as the proposed Plan. However, the land use growth footprint is smaller under the TRA Focus Alternative than under the proposed Plan (8,800 acres versus 12,300 acres, **Table 4-10**), which would result in a more efficient water supply system (e.g., less area of irrigated landscaping). This impact would be significant and unavoidable for the reasons described under Impact PUF-2 and **less** than the impact that would occur under the proposed Plan because there would be a smaller area of undeveloped land that would be developed.

Wastewater treatment demand would increase due to increases in population levels of individual service districts. The proposed Plan and TRA Focus Alternative include the same population projections, and thus a similar level of wastewater would be generated. The land use growth footprint would be different between the proposed Plan and TRA Focus Alternative; however, it is not possible to determine the extent to which different service providers would be affected because the timeline for buildout of specific areas and future expansion plans of individual service districts is unknown. This

impact would be significant and unavoidable for the reasons described under Impact PUF-3 and **similar** to the impact that would occur under the proposed Plan because population projections are the same between the proposed Plan and TRA Focus Alternative.

The solid waste generated by both land use development, sea level rise adaptation infrastructure, and transportation projects could reduce the capacity of existing landfills, leading to earlier closure dates than currently anticipated and a need for increased landfill capacity. The proposed Plan and TRA Focus Alternative include the same population projections, and thus a similar level of solid waste would be generated among the alternatives. This impact would be significant and unavoidable for the reasons described under Impact PUF-4 and **similar** to the impact that would occur under the proposed Plan.

HRA FOCUS ALTERNATIVE

Potential impacts on water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities would occur primarily from the land use development pattern that may result from implementation of the proposed Plan. Development outside of urbanized areas could require the construction of new or expanded utilities infrastructure. Expansion of new infrastructure would be smaller under the HRA Focus Alternative than the proposed Plan because there would be a smaller area of undeveloped land converted to developed uses (10,700 acres versus 12,300 acres, **Table 4-10**). This impact would be significant and unavoidable for the reasons described under Impact PUF-1 and **less** than the impact that would occur under the proposed Plan because there would be a smaller area of undeveloped land that would be developed.

Increases to water demand are primarily associated with increased population levels. Landscaping features associated with transportation projects may also require water supplies, depending on the requirements of the plant species used. The HRA Focus Alternative would result in the same increase to population levels as the proposed Plan. However, the land use growth footprint is less under the HRA Focus Alternative than under the proposed Plan (10,700 acres versus 12,300 acres, **Table 4-10**), which would result in a more efficient water supply system (e.g., smaller area of irrigated landscaping). This impact would be significant and unavoidable for the reasons described under Impact PUF-2 and **less** than the impact that would occur under the proposed Plan because there would be a smaller area of undeveloped land that would be developed.

Wastewater treatment demand would increase due to increases in population levels of individual service districts. The proposed Plan and HRA Focus Alternative include the same population projections, and thus a similar level of wastewater would be generated. The land use growth footprint would be different between the proposed Plan and HRA Focus Alternative; however, it is not possible to determine the extent to which different service providers would be affected because the timeline for buildout of specific areas and future expansion plans of individual service districts is unknown. This impact would be significant and unavoidable for the reasons described under Impact PUF-3 and **similar** to the impact that would occur under the proposed Plan because population projections are the same between the proposed Plan and HRA Focus Alternative.

The solid waste generated by both land use, sea level rise adaptation infrastructure, and transportation projects could reduce the capacity of existing landfills, leading to earlier closure dates than currently anticipated and a need for increased landfill capacity. The proposed Plan and HRA Focus Alternatives include the same population projections, and thus a similar level of solid waste would be generated among the alternatives. This impact would be significant and unavoidable for the reasons described under Impact PUF-4 and **similar** to the impact that would occur under the proposed Plan.

4.5.15 Transportation

Bay Area travel behavior in 2050 under the proposed Plan and each alternative, is summarized in **Table 4-31. Table 4-32** shows average trip length by Alternative. **Table 4-33** shows the journey to work method for each of the alternatives.

Table 4-31: Comparison of Bay Area Travel Behavior by Alternative in 2050

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Daily Commute Trips	9,324,000	10,709,000	9,317,000	9,302,000
Daily Non-Commute Trips	24,197,000	24,211,000	24,166,000	24,229,000
Total Daily Trips	33,521,000	34,920,000	33,482,000	33,531,000
Daily Vehicle Trips	23,487,000	26,466,000	23,258,000	23,488,000
Daily Vehicle Miles Traveled (VMT)	181,917,000	212,110,000	179,094,000	180,701,000
Daily Vehicle Miles Traveled per Capita	17.5	20.5	17.3	17.4
Daily Vehicle Hours of Recurring Delay	644,200	1,277,000	613,100	622,500
Daily Transit Boardings	3,964,000	3,146,000	4,155,000	4,177,000
Daily Transit Passenger Miles	30,245,000	24,051,000	30,667,000	33,133,000

Note: Whole numbers have been rounded, with the exception of VMT. Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations such as prison inmates.
Source: Data compiled by MTC and ABAG in 2021

Table 4-32: Comparison of Average Trip Length (Miles) by Purpose by Alternative in 2050

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Commute	9.6	10.1	9.3	9.7
Non-Commute	4.3	4.4	4.3	4.4
Total	5.8	6.1	5.7	5.9

Note: Figures may not sum due to independent rounding. Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations such as prison inmates.
Source: Data compiled by MTC and ABAG in 2021

Table 4-33: Comparison of Journey to Work by Mode by Alternative in 2050

	Proposed Plan	No Project Alternative	Alternative 1	Alternative 2
Auto ("Vehicle") – Drive Alone	36%	45%	35%	35%
Auto – Other	17%	18%	17%	17%
Transit	20%	17%	20%	21%
Active Modes (Bike/Walk)	10%	6%	10%	9%
Telecommute	17%	13%	17%	17%

Note: Figures may not sum due to independent rounding. Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations such as prison inmates.
Source: Data compiled by MTC and ABAG in 2021

NO PROJECT ALTERNATIVE

Under the No Project Alternative, housing growth would be more dispersed, while job growth would be slightly more concentrated in the region's two largest job centers of San Francisco and Silicon Valley. The No Project Alternative would include substantially lower funding for transportation

strategies and no regional strategies to focus growth into specific geographic areas within the region. In contrast to the proposed Plan, the No Project Alternative would not implement strategies that would reduce emissions, improve mobility and access, reduce congestion, and increase safety on the transportation system, consistent with federal, State, and local efforts. Because these strategies would not be implemented under the No Project Alternative, federal, State, and local efforts aimed at directing regional growth to infill areas and providing sustainable transportation options to reduce emissions, improve mobility and access, reduce congestion, and increase safety on the transportation system may not be promoted to the same extent as under the proposed Plan. However, although the No Project Alternative would not promote these efforts, it would not necessarily conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. This impact would be less than significant for the reasons described under Impact TRA-1 and **similar** to the impact that would occur under the proposed Plan.

The No Project Alternative would result in substantially lower levels of household growth in the proposed Plan's growth geographies than the proposed Plan and slightly higher levels of job growth in growth geographies. This means that housing growth would be more dispersed, while job growth would be slightly more concentrated in the region's two largest job centers of San Francisco and Silicon Valley. As shown above in **Table 4-31,** modeling indicates that the No Project Alternative would result in more daily trips (approximately 34.9 million versus 33.5 million) and less transit passenger use than the proposed Plan (approximately 24.1 daily passenger miles versus 30.2 daily passenger miles). In addition, under the No Project Alternative there would be longer trips (6.1 miles versus 5.8 miles [**Table 4-32**]) and a larger share of drive along, auto-based commuting (45 percent versus 36 percent [**Table 4-33**]). Overall, because VMT per capita would be greater under the No Project Alternative than the proposed Plan (20.5 versus 17.5, **Table 4-31**), this impact would be significant and unavoidable for the reasons described under Impact TRA-2 and **greater** than the impact that would occur under the proposed Plan.

Specific transportation projects under the No Project Alternative would be expected to follow the design guidelines and allowable uses established by the State or the local jurisdiction with authority over the project. The potential to increase transportation hazards due to geometric design feature or incompatible uses would be less than significant for the reasons described under Impact TRA-3 and **similar** to the impact that would occur under the proposed Plan.

Construction projects must conform to local regulations requiring maintenance of emergency access during construction and operation and would be required to produce and follow a construction transportation management plan. Therefore, the impact related to the potential to result in inadequate emergency access would be less than significant for the reasons described under Impact TRA-4 and **similar** to the impact that would occur under the proposed Plan.

ALTERNATIVE 1 - TRA FOCUS ALTERNATIVE

The TRA Focus Alternative features higher levels of household and job growth in the growth geographies than the proposed Plan, with substantially more housing growth in TRAs. Compared to the proposed Plan, three strategies would be modified to accommodate demand for local transit services in the urban core, while reducing funding for highway expansion projects to reduce environmental impacts. The TRA Focus Alternative's approach and strategies align with other regional programs, plans, and policies, including MTC programs administering State and federal programs. These policies would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. This impact would be less than

significant for the reasons described under Impact TRA-1 and **similar** to the impact that would occur under the proposed Plan.

The TRA Focus Alternative features the most compact growth pattern, with the greatest share of housing and job growth in TRAs—especially within walking distance of regional rail stations. To support this more urban-oriented growth pattern, additional core capacity transit investments are funded in lieu of highway projects that add lane-mileage to the system. As shown above in **Table 4-31,** modeling indicates that the TRA Focus Alternative would result in slightly fewer daily trips (approximately 33.48 million versus 33.52 million) and slightly more transit passenger use than the proposed Plan (approximately 30.67 daily passenger miles versus 30.25 daily passenger miles). In addition, under the TRA Focus Alternative there would be slightly shorter average trips (5.7 miles versus 5.8 miles [**Table 4-32**]) and a slightly smaller share of drive along auto-based commuting (35 percent versus 36 percent, **Table 4-33**). Because VMT would be less under the TRA Focus Alternative than the proposed Plan (17.3 versus 17.5, **Table 4-31),** this impact would be significant and unavoidable for the reasons described under Impact TRA-2 and **similar** to the impact that would occur under the proposed Plan.

Specific transportation projects under Alternative 1 would be expected to follow the design guidelines and allowable uses established by the State or the local jurisdiction with authority over the project. The potential to increase transportation hazards due to geometric design feature or incompatible uses would be less than significant for the reasons described under Impact TRA-3 and **similar** to the impact that would occur under the proposed Plan.

Construction projects must conform to local regulations requiring maintenance of emergency access during construction and operation. Therefore, the potential to result in inadequate emergency access would be less than significant for the reasons described under Impact TRA-4 and **similar** to the impact that would occur under the proposed Plan**.**

ALTERNATIVE 2 - HRA FOCUS ALTERNATIVE

The HRA Focus Alternative features substantially higher share of growth in HRAs, especially in the South Bay. To support this growth pattern and advance regional equity goals, infrastructure funding is shifted away from major regional and interregional rail expansion projects. In lieu of such investments, greater funding for local bus frequency increases, new express bus lines, expanded transit fare discount programs, and enhanced non-motorized infrastructure work to both make these communities lower-VMT places to live and work, while reducing concerns about displacement impacts from transportation megaprojects. The HRA Focus Alternative's approach and strategies align with other regional programs, plans, and policies, including MTC programs administering State and federal programs. Thus, it would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. Thus, the impact under TRA-1 would be less than significant and **similar** to the impact that would occur under the proposed Plan.

The HRA Focus Alternative would result in substantially lower levels of household growth in the proposed Plan's growth geographies than the proposed Plan and slightly higher levels of job growth in growth geographies. This means that housing growth would be more dispersed, while job growth would be slightly more concentrated in the region's two largest job centers of San Francisco and Silicon Valley. As shown above in **Table 4-31,** modeling indicates that the HRA Focus Alternative would result in slightly more daily trips (approximately 33.53 million versus 33.52 million) and more transit passenger use than the proposed Plan (approximately 33.13 daily passenger miles versus 30.25 daily

passenger miles). In addition, under the HRA Focus Alternative there would be slightly longer average trips (5.9 miles versus 5.8 miles [**Table 4-32**]) and a slightly smaller share of auto-based commuting (35 percent versus 36 percent, **Table 4-33**). Because VMT would be less under the HRA Focus Alternative than the proposed Plan (17.4 versus 17.5, **Table 4-31),** this impact would be significant and unavoidable for the reasons described under Impact TRA-2 and **similar** to the impact that would occur under the proposed Plan.

Specific transportation projects under Alternative 2 would be expected to follow the design guidelines and allowable uses established by the State or the local jurisdiction with authority over the project. The potential to increase transportation hazards due to geometric design feature or incompatible uses would be less than significant for the reasons described under Impact TRA-3 and **similar** to the impact that would occur under the proposed Plan.

Construction projects must conform to local regulations requiring maintenance of emergency access during construction and operation. Therefore, the potential to result in inadequate emergency access would be less than significant for the reasons described under Impact TRA-4 and **similar** to the impact that would occur under the proposed Plan**.**

4.6 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA Guidelines Section 15126.6(e)(2) states that if the environmentally superior alternative is the no project alternative, the EIR shall also identify an environmentally superior alternative from among the other alternatives analyzed. **Table 4-34** (included at the end of this chapter) provides a comparison of the environmental effects of the alternatives in relation to the proposed Plan to assist in understanding the relative differences in outcomes expected to result from implementation of the alternatives. This comparative information is useful in assessing environmental superiority among the alternatives.

The primary objectives of the Plan are to identify strategies that will enable the Bay Area to accommodate future growth and make the region more equitable and resilient in the face of unexpected challenges, such as the uncertainties posed by rising sea levels, economic cycles, and new technologies (see Section 4.7, “Ability to Meet Project Objective”). A substantial level of development is required to accommodate the growth forecasts. Consequently, most of the impacts of the proposed Plan and alternatives are similar in type and magnitude. Differences in impacts relate to the location and size of land use growth, sea level rise adaptation infrastructure, and transportation footprints and to the ability of feasible policies to influence how development forecasted in the Plan and its alternatives would proceed.

As discussed above in Section 4.5, “Comparative Impact Analysis of Alternative,” the No Project Alternative would result in two more significant and unavoidable impacts than the proposed Plan (Impact AQ-1 and GHG-4) and would result in one less significant and unavoidable impact than the proposed Plan (LU-2). Because the No Project Alternative would result in more significant and unavoidable impacts than the proposed Plan, it would not be the environmentally superior alternative. When this is the case, there is no further obligation under CEQA to assess the relative environmental superiority of other alternatives. However, as this information is useful in understanding the relative benefits and adverse effects of the other alternatives, MTC and ABAG have nevertheless chosen to provide this information as summarized below.

As shown in Table 4-23, the HRA Focus Alternative has the greatest reductions in per-capita GHG emissions in 2035 among the alternatives, followed by the TRA Focus Alternative, proposed Plan, and No Project Alternative. Furthermore, the TRA Focus Alternative would have the lowest daily VMT in 2050 and the greatest reductions in daily per-capita VMT, followed by the HRA Focus Alternative, proposed Plan, and No Project Alternative, as reflected in Table 4-31. While VMT and GHG are not synonymous, daily VMT is the primary input into EMFAC, the mobile source emissions model to estimate GHG emissions.

The TRA Focus and HRA Focus Alternatives would result in the same number of less-than-significant and significant and unavoidable impacts as the proposed Plan. As shown in **Table 4-34**, the TRA Focus Alternative would result in comparatively less significant and unavoidable impact than either the proposed Plan or the HRA Focus Alternative (AQ-4 and LU-4).

Overall the TRA Alternative would have lower acreage of new developed land, lower acreage of development in agriculturally zoned land, lower development in TAC Risk Areas, lower acreage in Essential Connectivity Areas, lower mobile source MTCO2e emissions, lower total VMT, and lower VMT per capita. Because the level or degree of resulting significant and unavoidable impact would be lower under the TRA Focus Alternative, this alternative is environmentally superior to the other alternatives.

The following discussions provide additional information regarding the important relative differences between the proposed Plan and alternatives:

- **Aesthetics**: The TRA Focus and HRA Focus Alternatives would result in smaller land use growth, sea level rise adaptation, and transportation project footprints, compared to the proposed Plan and other alternatives. Overall, the TRA Focus and HRA Focus Alternatives would have the same impacts related to aesthetic resources as the proposed Plan but to a lesser degree. The No Project Alternative would also have similar types of impacts, but to a greater degree, because a greater area of undeveloped lands would be converted to developed uses.

- **Agricultural and Forestry Resources**: The TRA and HRA Focus Alternatives would result in fewer acres of Farmland converted to nonagricultural uses and fewer acres of forestland converted to other uses. The potential to result in changes to the existing environment that, because of their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forestland to non-forest use would be similar among the alternatives. A substantially greater amount of agricultural land and forestlands would be affected under the No Project Alternative compared to the proposed Plan.

- **Air Quality**: The TRA Focus and HRA Focus Alternatives would have lower mobile source emissions than the proposed Plan. The No Project Alternative would result in greater air emissions and would not include policies and the capital investments, defined by transportation strategies in the proposed Plan, that would make it consistent with the relevant control measures in the 2017 Clean Air Plan. Thus, the No Project Alternative would result in the greatest level of air quality impacts.

- **Biological Resources**: The TRA Focus and HRA Focus Alternatives would result in a lesser degree of impact on special-status species, critical habitat, and acreage of wetlands and ECAs compared to the proposed Plan. Overall, the No Project Alternative would have the greatest level of impact on biological resources compared to the proposed Plan.

- **Climate Change and Greenhouse Gases**: The TRA Focus and HRA Focus Alternatives would result in lower mobile source GHG emissions compared to the proposed Plan. In terms of GHG emissions per capita, the TRA Focus Alternative would result in similar reductions as the proposed Plan, and the HRA

Focus Alternative would result in a greater reduction than the proposed Plan. The No Project Alternative would not meet the SB 375 GHG emission reduction target of 19 percent below 2005 emissions by 2035 and would result in greater GHG emissions per capita than the proposed Plan.

- **Cultural Resources and Tribal Cultural Resources**: The TRA Focus and HRA Focus Alternatives would result in smaller land use growth, sea level rise adaptation, and transportation project footprints, compared to the proposed Plan. Overall, the TRA Focus and HRA Focus Alternatives would have the same cultural resources and tribal cultural resources impacts as the proposed Plan but to a lesser degree. The No Project Alternative would also have similar types of impacts, but they would be greater comparatively because a greater area of undeveloped uses would be converted to developed uses.

- **Geology, Seismicity, and Mineral Resources**: The alternatives would have geology, seismicity, and mineral resources impacts similar to those of the proposed Plan, but the TRA Focus and HRA Focus Alternatives would have impacts that would be comparatively less because they would result in fewer acres of land use growth footprint, sea level rise adaptation infrastructure, and transportation project footprint that overlap with Alquist-Priolo Zones, are located in areas in very high and high liquefaction potential zones, and are located in areas of landslides. The No Project Alternative would have greater geology, seismicity, and mineral resources impacts than the proposed Plan because its land use growth footprint is larger and greater areas of geologic hazard risk are located within its overall footprint.

- **Hazards and Wildfire**: Regarding hazards and wildfire impacts, the proposed Plan and all of the alternatives are comparable and would mostly have the same types of less-than-significant and significant and unavoidable impacts, and to a similar degree. Exceptions include potential exposure to NOA, which would be greatest under the proposed Plan, and exposure of people to loss, injury, or death and damage to property adjacent to wildlands or where residences are intermixed with wildlands (less than the project under Alternatives 1 and 2 and greater than the project under the No Project Alternative). The No Project Alternative would have greater hazards and wildfire impacts than the proposed Plan because its land use growth footprint is larger and greater areas of wildfire risk are located within its overall footprint, but it would result in less impeded evacuations during emergency conditions.

- **Hydrology and Water Quality**: The alternatives would have similar hydrology and water quality impacts, but the impacts would be greater under the No Project Alternative and generally less under the TRA Focus and HRA Focus Alternatives because the area of land use growth footprint and portion of land use growth footprint within the 100-Year flood zone are greater under the No Project Alternative and smaller under the TRA Focus and HRA Focus Alternatives. The No Project Alternative and TRA Focus Alternative would generally result in a greater potential flood risks because they would not have as many acres of sea level rise adaptation infrastructure as the proposed Plan.

- **Land Use**: The potential for division of an established community is generally attributed to the development of roadways or other impediments, which would be less under the No Project Alternative, TRA Focus Alternative, and HRA Focus Alternative than the proposed Plan. Displacement of residents, requiring construction of replacement housing elsewhere results in the potential for significant environmental impacts related to new development. Risk of displacement, and thus development of replacement housing, is lower under the TRA Focus Alternative compared to the proposed Plan because the housing growth pattern enables more low-income residents to continue living in current communities due to an increase in deed-

restricted affordable housing. Under the HRA Focus Alternative, strategies shift more development, including deed-restricted affordable housing, toward High-Resource Areas, indicating that less housing, including affordable housing, would be constructed in Equity Priority Communities This means that fewer residents in the existing low-income communities and communities of color are able to remain in place through 2050. Under the No Project Alternative there would be less replacement housing constructed because there would be less displacement compared to the proposed Plan and thereby less replacement housing developed.

- **Noise**: The Plan alternatives would result in types of impacts similar to those of the proposed Plan; however, increased noise levels would occur in different areas based on where development is located. Overall, the level of noise impacts under the Plan alternatives would be similar to that of the proposed Plan.

- **Public Services and Recreation:** The Plan alternatives and proposed Plan would have similar levels of impacts because jurisdictions would need to respond to changing population levels regardless of the land use growth footprint.

- **Public Utilities and Facilities**: The TRA Focus and HRA Focus Alternatives would involve compact development centered around the TRA and HRA growth geographies, respectively. This would reduce the area of growth compared to the proposed Plan and thus result in similar types of impacts but to a lesser degree. The land use growth footprint of the No Project Alternative, more spread out than that of the proposed Plan, would result in greater impacts related to water supply and utility infrastructure.

- **Transportation**: The TRA Focus and HRA Focus Alternatives would result in similar VMT per capita than the proposed Plan. The No Project Alternative would result in greater VMT per capita than the proposed Plan. Transportation impacts that address consistency with programs, plans, ordinances, policies, roadway design, and emergency access would be similar among the Plan alternatives.

Table 4-34: Summary Comparison of Impacts

Impacts	Proposed Plan	No Project Alternative	TRA Focus Alternative	HRA Focus Alternative
3.2 AESTHETICS AND VISUAL RESOURCES				
Impact AES-1: Have a substantial adverse effect on a scenic vista	SU	>	<	<
Impact AES-2: Substantially damage scenic resources, including but not limited to trees, rock outcropping, and historical buildings within a state scenic highway	SU	>	<	<
Impact AES-3: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings and in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality	SU	>	<	<
Impact AES-4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	>	<	<
3.3 AGRICULTURE AND FORESTRY RESOURCES				
Impact AGF-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use, or conflict with existing zoning for agricultural use, or a Williamson Act contract	SU	>	<	<

Impacts	Proposed Plan	No Project Alternative	TRA Focus Alternative	HRA Focus Alternative
Impact AGF-2: Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))	SU	>	<	<
Impact AGF-3: Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use	SU	=	=	=
3.4 AIR QUALITY				
Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan	LTS	>	=	=
Impact AQ-2: Result in a substantial net increase in construction-related emissions	SU	=	=	=
Impact AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard	SU	>	<	<
Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations	SU	>	<	=
Impact AQ-5: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people	LTS	=	=	=
3.5 BIOLOGICAL RESOURCES				
Impact BIO-1a: Have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NOAA Fisheries	SU	>	<	<
Impact BIO-1b: Have substantial adverse impacts on designated critical habitat for federally listed plant and wildlife species	LTS/M	>	<	<
Impact BIO-2: Have a substantial adverse effect on riparian habitat, State- or federally protected wetlands (including but not limited to marsh, vernal pool, coastal), or other sensitive natural communities identified in local or regional plans, policies, or regulations, or by CDFW or USFWS, through direct removal, filling, hydrological interruption, or other means.	LTS/M	<	<	<
Impact BIO-3: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites	SU	>	<	<
Impact BIO-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, or with provisions of an adopted Habitat Conservation Plan (HCP); Natural Community Conservation Plan (NCCP); or other approved local, regional, or State HCP	LTS	>	<	<
Impact BIO-5: Have the potential to substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species	SU	>	<	<
3.6 Climate Change, Greenhouse Gases, and Energy				
Impact GHG-1: Result in a net increase in greenhouse gas emissions, either directly or indirectly, compared to existing 2015 conditions that may have a significant impact on the environment	SU	>	<	<

Impacts	Proposed Plan	No Project Alternative	TRA Focus Alternative	HRA Focus Alternative
Impact GHG-2: Conflict with the Bay Area region's achievement of the GHG emissions reduction target of 19 percent below 2005 emissions by 2035 established by CARB pursuant to SB 375	LTS	>	=	<
Impact GHG-3: Conflict with an applicable state plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases	SU	>	=	<
Impact GHG-4: Conflict with an applicable local plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases	LTS	>	=	=
Impact EN-1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation	LTS	=	=	=
Impact EN-2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	LTS	>	=	=
3.7 Cultural Resources and Tribal Cultural Resources				
Impact CUL/TCR-1: Cause a substantial adverse change in the significance of a historical resource as defined in Guidelines Section 15064.5	SU	>	<	<
Impact CUL/TCR-2: Cause a substantial adverse change in the significance of a unique archaeological resource as defined in Guidelines Section 15064.5	SU	>	<	<
Impact CUL/TCR-3: Disturb any human remains, including those interred outside of formal cemeteries	LTS	>	<	<
Impact CUL/TCR-4: Cause a substantial adverse change in the significance of a TCR, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe	SU	>	<	<
3.8 Geology, Seismicity, and Mineral Resources				
Impact GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault	LTS	>	<	<
Impact GEO-2: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking	LTS	>	<	<
Impact GEO-3: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction, lateral spreading, and subsidence	LTS	<	<	<
Impact GEO-4: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides	LTS	>	<	<
Impact GEO-5: Result in substantial soil erosion or the loss of topsoil	LTS	>	<	<
Impact GEO-6: Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property	LTS	>	<	<
Impact GEO-7: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	SU	>	<	<
Impact MR-1: Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or a locally-important mineral resources recovery site delineated on a local land use plan	LTS	>	<	<

Impacts	Proposed Plan	No Project Alternative	TRA Focus Alternative	HRA Focus Alternative
3.9 Hazards and Wildfire				
Impact HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials	LTS	=	=	=
Impact HAZ-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment	LTS	<	=	=
Impact HAZ-3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school	LTS	=	=	=
Impact HAZ-4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment	SU	=	=	=
Impact HAZ-5: Result in a safety hazard for people residing or working in the planning area for projects located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport	LTS	=	=	=
Impact HAZ-6: Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan	SU	<	=	=
Impact HAZ-7: Exacerbate the risk of wildland fires, associated pollutant release, and potential for flooding and landslides due to projected land use patterns and infrastructure in or near State Responsibility Areas or land classified as very high hazard severity zones	SU	>	<	<
3.10 Hydrology and Water Quality				
Impact HYDRO-1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality	LTS	>	<	<
Impact HYDRO-2: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin	LTS	>	<	<
Impact HYDRO-3: Substantially alter existing drainage patterns, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion, siltation, or additional sources of polluted runoff	LTS	>	<	<
Impact HYDRO-4: Substantially alter existing drainage patterns, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in runoff that exceeds capacity of existing or planned stormwater drainage systems or results in flooding on- or off-site	LTS	>	<	<
Impact HYDRO-5: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows	LTS	>	<	<
Impact HYDRO-6: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation	LTS	>	>	=
3.11 Land Use, Population, and Housing				
Impact LU-1: Physically divide an established community	SU	<	<	<

Impacts	Proposed Plan	No Project Alternative	TRA Focus Alternative	HRA Focus Alternative
Impact LU-2: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect	SU	<	=	=
Impact LU-3: Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)	LTS	=	=	=
Impact LU-4: Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere	SU	<	<	>
3.12 Noise				
Impact NOISE-1: Generate a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies	SU	=	=	=
Impact NOISE-2: Generate a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies	SU	=	=	=
Impact NOISE-3: Generate excessive groundborne vibration or groundborne noise levels	SU	=	=	=
Impact NOISE-4: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels	SU	=	=	=
3.13 Public Services and Recreation				
Impact PSR-1: in substantial adverse physical impacts associated with the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, and other public facilities.	SU	=	=	=
Impact PSR-2: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated or include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment	SU	=	=	=
3.14 Public Utilities and Facilities				
Impact PUF-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities the construction or relocation of which could cause significant environmental effects	SU	>	<	<
Impact PUF-2: Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years	SU	>	<	<
Impact PUF-3: Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments	SU	=	=	=

Impacts	Proposed Plan	No Project Alternative	TRA Focus Alternative	HRA Focus Alternative
Impact PUF-4: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals, and comply with federal, state, and local management and reduction statutes and regulations related to solid waste	SU	=	=	=
3.15 Transportation				
Impact TRA-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities	LTS	=	=	=
Impact TRA-2: Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b)	SU	>	=	=
Impact TRA-3: Substantially increase hazards due to geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)	LTS	=	=	=
Impact TRA-4: Result in inadequate emergency access	LTS	=	=	=

Notes: LTS=less than significant
LTS/M=less than significant with mitigation incorporated
SU=significant and unavoidable
<=the alternative would result in less impact than the proposed Plan
>= the alternative would result in greater impact than the proposed Plan
= the alternative would result in a similar impact to the proposed Plan

4.7 ABILITY TO MEET PROJECT OBJECTIVES

The State CEQA Guidelines require an EIR to describe a range of reasonable alternatives to the project, or to the location of the project, that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen some of the significant effects of the project and that it shall evaluate the comparative merits of the alternatives (CEQA Guidelines Section 15126.6). The following discussion describes the objectives of the proposed Plan and provides a preliminary assessment of the extent to which each alternative will attain those objectives. The ultimate determination as to whether an alternative meets the project objectives will be made by the MTC/ABAG Board of Directors as part of its decision about the feasibility of the alternatives and based on the entirety of the record before it at the time of its decision. (See PRC Sections 21081.5, 21081[a] [3]; CEQA Guidelines Section 15126.6(f)(1).

The information presented in this section is based upon the Draft Plan Bay Area 2050 Performance Report, which evaluated the direction, magnitude and diversion of change of the proposed Plan and Plan alternatives. This report is available at www.planbayarea.org.

4.7.1 Objective 1: Address climate change by reducing carbon dioxide (CO_2) emissions pursuant to targets established by the California Air Resources Board (CARB); specifically, meet or exceed a 19-percent reduction in per-capita emissions from cars and light-duty trucks by 2035 relative to 2005 levels.

The Proposed Plan, TRA Focus Alternative, and HRA Focus Alternatives would exceed a 19 percent reduction in per-capita emissions from cars and light-duty trucks by 2035 relative to 2005 levels. The No Project Alternative would not exceed a 19 percent reduction in per-capita emissions from cars and light-duty trucks by 2035 relative to 2005 levels. Overall, the No Project Alternative does not meaningfully address objective 1.

NO PROJECT ALTERNATIVE

The No Project Alternative would fail to reduce CO_2 emissions pursuant to targets established by CARB: a 19-percent reduction in per-capita emissions from cars and light-duty trucks by 2035 relative to 2005 levels.

PROPOSED PLAN

The proposed Plan would reduce per capita emissions from cars and light-duty truck by 2035 by 22 percent relative to 2005 levels, which would meet the 19 percent reduction target.

TRA FOCUS ALTERNATIVE

The TRA Focus Alternative would reduce per capita emissions from cars and light-duty truck by 2035 by 22 percent relative to 2005 levels, which would meet the 19 percent reduction target.

HRA FOCUS ALTERNATIVE

The HRA Focus Alternative would reduce per capita emissions from cars and light-duty truck by 2035 by 23 percent relative to 2005 goals, which would meet the 19 percent reduction target.

4.7.2 Objective 2: House 100 percent of the region's projected growth by income level, and with no increase in in-commuters over the proposed Plan baseline year.

The No Project Alternative, Proposed Plan, TRA Focus Alternative, HRA Focus Alternatives would house 100 percent of the region's projected growth by income level.

NO PROJECT ALTERNATIVE

The No Project Alternative would accommodate 100 percent of the region's projected housing unit growth.

PROPOSED PLAN

The proposed Plan would accommodate 100 percent of the region's projected housing unit growth.

TRA FOCUS ALTERNATIVE

The TRA Focus Alternative would accommodate 100 percent of the region's projected housing unit growth.

HRA FOCUS ALTERNATIVE

The HRA Focus Alternative would accommodate 100 percent of the region's projected housing unit growth.

4.7.3 Objective 3: Ensure that all current and future Bay Area residents and workers have sufficient housing options they can afford by reducing how much residents spend on housing and transportation and by producing and preserving more affordable housing.

The combination of housing and transportations costs for Bay Area residents in 2015 was high: the average household spent 58 percent of their income on housing. Households with low incomes spent 113 percent of their income on housing and transportation costs. Without increased subsidies for affordable housing, housing cost burden remains high at 25 percent as a share of income for all households, and 44 percent for households with low incomes. Households in the Bay Area spent 25 percent of their income on transportation costs, while low income households spent 45 percent. In total households spent 33 percent of their income on housing, while low income households spent 68 percent of their incomes on housing. Further, 4 percent of the Bay Area's housing units were deed-restricted affordable. In historically exclusionary HRAs, 2 percent of housing units were deed-restricted affordable.

The proposed Plan, TRA Focus Alternative, and HRA Focus Alternative would ensure sufficient housing options for current and future Bay Area residents and workers through implementation of policies that plan for sufficient housing at all income levels, lower transportation costs for those that are most burdened, and universal basic income provisions. Overall, the No Project Alternative does not meaningfully address objective 3.

NO PROJECT ALTERNATIVE

Under the No Project Alternative, modeling results indicate that Bay Area households would spend 49 percent of their income on housing and transportation combined in 2050, while households with low incomes would spend 88 percent.

Without increased subsidies for affordable housing, housing cost burden remains high at 25 percent as a share of income for all households, and 44 percent for households with low incomes. Existing and anticipated funding sources for affordable housing production and preservation help increase the share of housing that would be deed-restricted affordable from 4 percent in 2015 to 13 percent in 2050. However, this level would be insufficient to meet the housing needs of Bay Area residents, especially households with low incomes.

Transportation affordability for all households would be 44 percent of total income. Households with low incomes would spend 44 percent of their income on transportation.

PROPOSED PLAN

The proposed Plan would reduce the burden of housing and transportation costs for all households from 58 percent in 2015 to 45 percent in 2050. Low income households would spent 57 percent of their incomes on housing and transportation, which would meaningfully decreases disparities that burden households with low incomes today.

Under the proposed Plan, the regional share of income spent on housing would decrease to 21 percent in 2050 from 33 percent in 2015. Low-income households would decrease spending on housing from 33 percent to 29 percent. Policies would allow for the share of deed-restricted affordable housing among all housing units to increase to 27 percent by 2050—sufficient to address the needs of all households with low incomes—the proposed Plan decreases the share of income spent on housing and transportation costs for households with low incomes to 57 percent in 2050. In historically exclusionary HRAs, the percent of deed-restricted affordable housing would increase from 2 percent to 24 percent.

Transit fare policy reform along with means-based discounts help lower transportation expenditures, especially for households with low incomes. All households are forecasted to experience higher expenses for auto trips due to the introduction of means-based per-mile tolls on select freeways and increased parking costs in growth geographies. Despite this, the share of income spent on transportation would be lowered for all households from 25 percent in 2015 to 24 percent in 2050. For households with low incomes, the percentage of income for transportation cost would decrease from 45 percent in 2015 to 28 percent in 2050.

TRA FOCUS ALTERNATIVE

Under the TRA Focus Alternative, the share of housing and transportation costs would be substantially similar to the proposed Plan, both for the Region (44 percent) and for low income households (57 percent). Affordable housing production as a share of new housing production would be higher than the proposed Plan with more development in TRAs, but this does not have a significant effect on housing costs for both low income and regional households (29 and 21 percent respectively). Deed-restricted affordable housing would increase to 28 percent for the region and 24 percent in HRAs.

Transportation costs remain fairly consistent as well, with a slight decrease in the region-wide average as the increased housing in TRAs drives vehicle ownership lower (23 percent) versus the proposed Plan (24 percent).

HRA FOCUS ALTERNATIVE

Housing and transportation costs as a share of all households and low-income households would be the same under the proposed Plan as the HRA Focus Alternative. As in the TRA Focus Alternative, regional average housing costs as a share of income are similar to the proposed Plan. Notably, the share of housing in HRAs that are permanently affordable (i.e. deed-restricted) in 2050 would be 26 percent, slightly higher than the 24 percent share in the proposed Plan. The expansion of means-based fare discounts for households with moderate incomes in this alternative helps lower the average fare per transit trip; however, this does not substantially affect the overall expenditure on transportation.

4.7.4 Objective 4: Support an expanded, well-functioning, safe, and multimodal transportation system that connects the Bay Area by improving access to destinations and by ensuring residents and workers have a transportation system they can rely on.

In 2015, 31 percent of Bay Area households were located within half-mile of frequent transit (i.e. rail, ferry and bus stops with two or more intersecting routes with frequencies less than or equal to 15 minutes). The share was higher for households with low incomes at 41 percent. On average, residents could access 18 percent of the region's jobs within a 30-minute drive and 3 percent within a 45-minute transit journey, including walking and waiting time. These metrics were more favorable for residents in Equity Priority Communities, at 19 percent and 5 percent respectively.

The No Project Alternative, while slightly improving access to transit and jobs by transit for all households, would substantially deteriorate the transportation system itself with increased congestion and transit crowding. The proposed Plan improves proximity to transit and accessibility to jobs by all modes for all households. Overall job accessibility outcomes are fairly similar between the proposed Plan and the Plan alternatives, but outcomes for freeway travel times and transit crowding improve slightly in the TRA Focus Alternative.

The proposed Plan, TRA Focus Alternative, and HRA Focus Alternative would support an expanded, well-functioning, safe, and multimodal transportation system that connects the Bay Area through implementation of policies that improve access to destinations and improve transportation system reliability. Overall, the No Project Alternative does not meaningfully address objective 4.

NO PROJECT ALTERNATIVE

In the No Project Alternative, the share of households within half-mile of frequent transit increases to 43 percent, and 50 percent for low-income households; however, without significant investment in expanding transit capacity, crowding increases substantially on some operators. In the absence of new transportation demand management strategies, freeway travel times nearly double in some corridors by 2050. Residents are able to reach 14 percent of the jobs in the region within a 30-minute drive – lower than the share in 2015, but an absolute increase since the number of jobs in the region increases. Accessible transit would be available to 4 percent of the Bay Area's jobs. These metrics were more favorable for residents in Equity Priority Communities, at 15 percent for access by automobile and 5 percent for transit.

PROPOSED PLAN

Under the proposed Plan, 49 percent of all households and 74 percent of households with low incomes live within a half-mile of frequent transit. This enables an increase in share of the region's jobs accessible by transit to 5 percent for all residents and 8 percent for residents of Equity Priority Communities. Transit crowding, although lower than the No Project Alternative, continues to remain a challenge despite investments in transit capacity expansion. Strategies to manage freeway demand, including freeway tolling, parking fees and improvements to transit help manage freeway travel times and in some cases lower them below 2015 levels. This helps improve access to the region's jobs within a 30-minute drive to 19 percent of all jobs, corresponding to a substantial increase in the number of jobs accessible.

TRA FOCUS ALTERNATIVE

Access to jobs by transit increases marginally in TRA Focus Alternative as more households are in closer proximity to high frequency transit than the proposed Plan. Any potential increase in commute times from removing express lanes in this alternative would be met by the increased access and use of transit, which also enabled a small decrease in travel times in many key freeway corridors. Investments to alleviate transit crowding in local transit lower the share of person hours spent in crowded transit for some operators, but crowding persists.

HRA FOCUS ALTERNATIVE

Generally, the ability of the HRA Focus Alternative to meet objective 4 would be similar to the proposed Plan. However, as compared to the proposed Plan, the increase in number of jobs in San Francisco County as well as investments to boost transit frequency in HRAs, which would have more housing growth, drives a slight increase in access to jobs by transit, while simultaneously also increasing auto travel times to San Francisco.

4.7.5 Objective 5: Support an inclusive region where people from all backgrounds, abilities, and ages can remain in place with full access to the region's assets and resources by creating more inclusive communities and reducing the risk that Bay Area residents are displaced

Region-wide, while 26 percent of households had low incomes in 2015, the share was lower in neighborhoods with the best access to well-resourced schools, jobs, and amenities – 24 percent in transit-rich HRAs, and 20 percent in all HRAs.

While the No Project does not make any meaningful progress in improving the distribution of low income households throughout the Bay Area, the proposed Plan creates more choices in housing locations for households with low incomes and enables more inclusive communities. Displacement is difficult to forecast and measure, given that simulation models cannot track the movement of individual households. Despite these modeling limitations, this "displacement risk" metric estimates the share of neighborhoods (census tracts) that are forecasted to experience a net loss of households with low incomes between 2015 and 2050. The net loss of such households indicates a risk of displacement, which could indeed be displacement or could instead reflect relocation by choice to other neighborhoods with more attractive housing or other opportunities. Differences in outcomes between the proposed Plan and the Plan alternatives under the Diverse Guiding Principle are driven by the change in housing growth patterns.

The proposed Plan, TRA Focus Alternative, and HRA Focus Alternative would support an inclusive region where people from all backgrounds, abilities, and ages can remain in place through implementation of policies that create inclusive communities and reduce displacement risk. Overall, the No Project Alternative does not meaningfully address objective 5.

NO PROJECT ALTERNATIVE

Because the No Project Alternative would not increase development of affordable housing development in the growth geographies, the shares of households with low incomes within transit-rich or HRAs in 2050 would remain similar to the shares in 2015. The share of neighborhoods with risk of

displacement between 2015 and 2050 would be 33 percent across the Plan Area, and would be substantially higher in Equity Priority Communities (45 percent), TRAs (51 percent), HRAs (48 percent).

PROPOSED PLAN

Under the proposed Plan, inclusionary zoning and subsidies for affordable housing in areas with better access to assets and opportunities would allow for the share of households with low incomes to increase to 36 percent in transit-rich HRAs, and 24 percent in all HRAs in 2050 (from 24 percent and 20 percent, respectively in 2015). This increase would be correlated with the decrease in the share in Equity Priority Communities from 43 percent in 2015 to 41 percent in 2050, as more households with low incomes choose to relocate to HRAs. At the Bay Area level, the share of neighborhoods with a displacement risk between 2015 and 2050 would be 48 percent, indicating that more neighborhoods may be at risk of displacement than the No Project Alternative; however, displacement risk in Equity Priority Communities would be lower, at 40%. However, the substantial drop in the metric in HRAs (17 percent) and TRAs (9 percent), when comparing the No Project Alternative (48 percent and 9 percent, respectively) to the proposed Plan, indicates that the increase would be mainly driven by households with low incomes relocating to these growth geographies – neighborhoods near frequent transit and/or in HRAs – where much of the new affordable housing would be developed under the proposed Plan strategies. Growth geographies also experience some displacement risk. However, analysis indicates that much of this displacement would be households with low incomes relocating between these neighborhoods, rather than being displaced to neighborhoods that lack quality transit or access to opportunity. Lastly, and importantly, the displacement risk metric does not fully capture the positive impact of protective policies at the local level, which could further reduce displacement risk and prevent homelessness. In addition, the proposed Plan also includes assistance for home ownership for roughly 10 percent of households with low incomes to promote wealth-building opportunities.

TRA FOCUS ALTERNATIVE

In this alternative, the share of households with low incomes in HRAs would be marginally higher (25 percent) relative to the share under the proposed Plan (24 percent). While the share of households with low incomes in TRAs would be slightly lower than the proposed Plan (37 percent versus 39 percent in proposed Plan), this would be primarily due to higher overall household growth in these areas, given the strategies' focus on growth near transit. Risk of displacement would be lower, both overall and in Equity Priority Communities, as this housing growth pattern enables more low-income residents to continue living in current communities, but with a greater share residing in deed-restricted affordable housing.

HRA FOCUS ALTERNATIVE

Under the HRA Focus Alternative, strategies would shift more development, including deed-restricted affordable housing, toward HRAs, making these traditionally-exclusive communities somewhat more inclusive than the proposed Plan. The share of households with low incomes in these neighborhoods increases to 27 percent by 2050, relative to 24 percent under the proposed Plan. However, the shift in housing development locations also indicates that less housing, including affordable housing, would be constructed in Equity Priority Communities, meaning that fewer residents in the existing low-income communities and communities of color are able to remain in place through 2050. Under this alternative, 44 percent of Equity Priority Communities have a risk of displacement, relative to 40 percent under the proposed Plan, despite a decrease in the risk of displacement throughout the Bay Area (42 percent under HRA Focus Alternative versus 48 percent under proposed Plan).

4.7.6 Objective 6: Conserve the region's natural resources, open space, clean water, and clean air with the intent of improving health of Bay Area residents and workers and improving the health of the environment locally and globally.

In 2015, 71 percent of the working population commuted using a car and 51 percent drove alone to work. High levels of auto-dependency make achieving state-mandated emissions targets difficult and hinder safety goals. Annual fatalities and injuries due to vehicle collisions occur at a rate of 6 and 26 per 100,000 residents in 2015. Approximately 118 acre of open space per resident are accessible in the Bay Area as of 2015.

The proposed Plan, TRA Focus Alternative, and HRA Focus Alternative would conserve the region's natural resources, open space, clean water, and clean air through implementation of policies that improve public health and improve local and global environmental outcomes. Overall, the No Project Alternative does not meaningfully address objective 6.

NO PROJECT

While the share of cars as a commute mode decreases from 71 percent in 2015 to 63 percent in 2050, greenhouse gas emissions would be increased by 1 percent and remain far from the state-mandated reduction target of 19 percent per capita by 2035 relative to 2005 levels. Under the No Project Alternative, automobile-related fatalities and injuries would increase marginally from 6.0 to 6.2 and 26.0 to 26.9 per 100,000 residents in 2050. The acreage of open space and urban park land per resident would also increase marginally between 2015 and 2050.

PROPOSED PLAN

Overall, the land use growth pattern under the proposed Plan would concentrate growth and limit effects on natural resources, open space, clean water, and clean air. Bay Area residents are forecasted to be healthier with better access to parks and improved air quality. Annual fatalities per one hundred thousand residents due to vehicle collisions (with other vehicles, pedestrians or bicycles) decrease from 6.0 in 2015 to 4.8 in 2050. Street design enhancements and additional education programs proposed in the proposed Plan strategies would be required to make further headway toward this important goal. Investments in resilience to natural hazards would protect nearly all households from two feet of inundation due to sea level rise and from major damage due to earthquake or wildfire events. The proposed Plan also plans for the Bay Area environment to be healthy and safe, with strategies that lower dependence on driving to 53 percent of commute trips in 2050 (36 percent for single-occupancy auto), reduce greenhouse gas emissions per capita by 22 percent by 2035, reduce carbon footprint of the building stock and primarily focus development within the existing urban footprint. Open space and urban park acreages would increase under the proposed Plan from 118 to 149, and 1.4 to 2.3 per thousand residents between 2015 and 2050.

TRA FOCUS ALTERNATIVE

Greenhouse gas emission reductions per capita in 2035 relative to 2005 are similar to the proposed Plan at 22 percent, meeting the state-mandated target of 19 percent for the region. Commute mode share of single occupancy auto drops marginally to 35 percent, relative to 36 percent in the proposed Plan. Metrics related to automobile-related fatalities and injuries, protection from sea level rise,

earthquake, and wildfire risk, and access to urban park and open space areas would be the same under the TRA Focus Alternative as the proposed Plan (see discussion above).

HRA FOCUS ALTERNATIVE

As in TRA Focus Alternative, outcomes are similar to the proposed Plan. Greenhouse gas emission reductions per capita in 2035 relative to 2005 are marginally higher than the proposed Plan at 23 percent, also meeting the state-mandated target of 19 percent for the region. As in TRA Focus Alternative, commute mode share of single occupancy auto drops marginally to 35 percent. Metrics related to automobile-related fatalities and injuries, protection from sea level rise, earthquake, and wildfire risk, and access to urban park and open space areas would be the same under the HRA Focus Alternative as the proposed Plan (see discussion above).

4.7.7 Objective 7: Support the creation of quality job opportunities for all and ample fiscal resources for communities by more evenly distributing jobs and housing in the Bay Area and by enabling the regional economy to thrive.

The existing jobs-housing imbalance in the Bay Area is evident in the 2015 metrics, with West and South Bay counties having a higher jobs-housing ratio than the region-wide ratio (1.5), and North Bay counties and Contra Costa County having a lower ratio. While the proposed Plan and TRA Focus Alternative are able to make progress on bringing jobs-housing ratios closer to the region-wide ratio, HRA Focus Alternative maintains a high jobs-housing ratio in San Francisco County.

Overall, robust economic output and job growth metrics indicate that the Bay Area economy would thrive under the proposed Plan and Plan alternatives, regardless of new revenue sources that are invested back into the transportation, housing, economy and environment. The regional jobs-housing ratio would be reduced to 1.3 under all alternatives, with significant variation between counties in each alternative.

The proposed Plan and TRA Focus Alternative would support the creation of quality job opportunities for all and ample fiscal resources for communities through implementation of policies that improve jobs-housing balance and support economic growth. Overall, the No Project Alternative and HRA Focus Alternative do not meaningfully address objective 7, in particular the issue of jobs-housing balance.

No Project Alternative: The No Project Alternative would bring the county-level jobs-housing ratio farther away from the regional ratio for four of the nine counties: Contra Costa (1.1 in 2015 and 0.7 in 2050), Marin (1.3 in 2015 and 0.9 in 2050), Napa (1.4 in 2015 and 1.5 in 2050), and San Francisco (1.8 in 2015 and 1.9 in 2050).

Proposed Plan: Under the proposed Plan, jobs and housing in the Bay Area are more evenly distributed than in 2015. The proposed Plan strategies that enable more housing in job-rich areas, such as allowances for increased densities in growth geographies and accelerated reuse of public land, were particularly successful in the West and South Bay, bringing the ratio closer to the regionwide average in San Francisco (1.9 in 2015 to 1.6 in 2050), San Mateo (1.5 in 2015 to 1.3 in 2050), and Santa Clara (1.8 in 2015 to 1.5 in 2050) counties in 2050. Meanwhile, encouraging job growth in housing-rich areas continues to be a challenge. Incentives to encourage employers to shift jobs to housing rich areas bring the ratio closer to the regionwide average in Napa (1.4 in 2015 to 1.6 in 2050),

and Solano (0.9 in 2015 to 1.1 in 2050) counties, while Contra Costa (1.1 in 2015 to 1.0 in 2050), and the other North Bay counties continue to have more housing than jobs.

TRA Focus Alternative: Under this alternative, the increased focus on housing in TRAs results in a slightly more dispersed job growth pattern than the proposed Plan and a slightly more even distribution of jobs and housing. The jobs-housing ratio decreases in San Francisco (1.9 to 1.4), San Mateo (1.5 to 1.2) and Alameda (1.6 to 1.4) counties, which have more TRAs. On the other hand, the jobs-housing ratio increases in Contra Costa (1.1 to 1.2) and Solano (0.9 to 1.3) counties, approaching the regionwide average of 1.3.

HRA Focus Alternative: While the proposed Plan and TRA Focus Alternative succeed in incentivizing job growth in some housing-rich counties and more evenly distributing jobs and housing across the region, the HRA Focus Alternative further concentrates jobs in San Francisco County. The new economic strategy to disallow office development in job-rich exclusionary cities, and their neighbors, has adverse effects for Silicon Valley while yielding additional job growth in (already jobs-rich) San Francisco. The jobs-housing ratio in San Francisco County continues to be high in 2050 at 1.9, well above the regionwide average (1.3). Meanwhile, jobs-housing ratios remain low in currently housing-rich counties such as Contra Costa (1.0) and Solano (1.1).

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5 OTHER CEQA-MANDATED SECTIONS

This chapter summarizes the significant irreversible environmental changes, significant and unavoidable impacts, growth-inducing impacts, cumulative impacts, and impacts found not to be significant associated with the proposed Plan. These subject areas are evaluated based on the analysis in Sections 3.2 through 3.15 of this EIR.

5.1 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Pursuant to Section 15126.2(d) of the CEQA Guidelines, an EIR must identify any significant irreversible environmental outcomes that could result from the implementation of a proposed project. These may include current or future uses of nonrenewable resources and secondary or growth-inducing impacts that commit future generations to similar uses. CEQA requires that irretrievable commitments of resources be evaluated to ensure that such current consumption is justified.

The entire Plan area includes approximately 4.4 million land acres. The regional growth forecast projects the region's employment to grow by 1.4 million to just over 5.4 million total jobs between 2015 and 2050. Population is forecasted to grow by 2.7 million people to 10.3 million. This population will comprise over 4.0 million households, for an increase of nearly 1.4 million households from 2015. Total population, employment, households, and associated housing units are identified in **Table 2-16**.

As part of the proposed Plan, specific geographic areas—known as growth geographies—are designated and prioritized to accommodate the regional growth forecast. The proposed Plan's core strategy remains "focused growth" in existing communities along the existing transportation network, as well as communities with well-resourced schools and easy access to jobs, parks, and other amenities. Though not entirely irreversible, the land use growth footprint and projected land use patterns that would result from implementation of the proposed Plan would be difficult to change once local governments have taken action to approve development consistent with the proposed Plan. The development pattern reflected in the proposed Plan represents a commitment of these areas to urban uses for the foreseeable future, if implemented. As noted in the Chapter 2, "Project Description," the region's cities and counties retain local land use authority and local jurisdictions would continue to determine where future development occurs.

For the purposes of this analysis, consideration of the proposed Plan in the context of resource commitment that would occur absent the proposed Plan is relevant. The proposed Plan uses the growth geographies and land use strategies to influence the forecasted development pattern by affecting the location, use, intensity, and density of forecasted development. Many of the land use strategies are intended to achieve the proposed Plan's focused growth strategy to comply with Senate Bill (SB) 375's greenhouse gas (GHG) emissions reduction mandate and SB 375's mandate to ensure that a mix of housing types are available to households of all income types across the region. As compared to existing conditions—as well as those future conditions under many of the existing general plans of Bay Area jurisdictions— implementation of the proposed Plan would result in a more densely and intensely developed land use pattern, with more growth concentrated on less land (see the discussion of the No Project Alternative in Chapter 4, "Alternatives"). The result would be improved utilization of already developed land and better utilization of new land to be converted at the urban edge or in undeveloped areas of the Plan area.

While use of nonrenewable energy and fuel; conversion of agriculture, open space, and habitat; release of pollutants emissions into the atmosphere; and climate change effects are in and of themselves generally irreversible resource commitments, the fact that the proposed Plan changes (slows) the rate of use of these resources is a beneficial outcome. Overall, implementation of the proposed Plan would commit existing and future generations to a more efficient use of nonrenewable resources than under presently planned conditions.

Irretrievable commitments of non-renewable resources associated with the projected change in land use, and with the sea level rise adaptation infrastructure and transportation projects in the proposed Plan, would include those described below. The following issues are addressed in various sections of Chapter 3, as noted:

- consumption of significant amounts of nonrenewable energy for construction, maintenance, and operation of new development, sea level rise adaptation infrastructure, or transportation projects (addressed in Section 3.6, “Climate Change, Greenhouse Gases, and Energy”);
- use of building materials, fossil fuels, and other resources for construction, maintenance, and operation of new development, sea level rise adaptation infrastructure, or transportation improvements (addressed in Section 3.6, “Climate Change, Greenhouse Gases, and Energy”);
- conversion of some resource lands, such as agricultural land, habitat areas, and other undeveloped lands into developed land, sea level rise adaptation infrastructure, or transportation uses (addressed in several sections, including Section 3.3, “Agriculture and Forestry Resources,” Section 3.6, “Climate Change, Greenhouse Gases, and Energy,” and Section 3.5, “Biological Resources”);
- degradation of ambient air quality through the increase of harmful particulate matter caused by a cumulative increase in vehicle exhaust (addressed in Section 3.4, “Air Quality”); and
- emission of GHGs that would contribute to global climate change (addressed in Section 3.6, “Climate Change, Greenhouse Gases, and Energy”).

5.2 SIGNIFICANT AND UNAVOIDABLE IMPACTS

Significant and unavoidable impacts are those that cannot be mitigated to a less-than-significant level. Chapter 3 of this EIR identifies significant and unavoidable impacts of the proposed Plan. As stated in Chapter 3, many impacts identified as significant could be reduced to a less-than-significant level, but only with adoption of mitigation measures that are outside the control of MTC and ABAG. These measures would be adopted by local jurisdictions as they approve proposed development. Because MTC and ABAG cannot require local implementing agencies to adopt most of the mitigation measures, and it is ultimately the responsibility of the local lead agency to determine and adopt mitigation, some impacts have been identified as significant and unavoidable for purposes of this program-level review. Projects taking advantage of CEQA Streamlining provisions of SB 375 (PRC Sections 21155.1, 21155.2, and 21159.28) must apply the mitigation measures described in this EIR, where applicable, to address site-specific conditions. The following are the impacts identified as significant and unavoidable, listed by technical section and impact number.

5.2.1 Aesthetics and Visual Resources

- Impact AES-1: Have a substantial adverse effect on a scenic vista
- Impact AES-2: Substantially damage scenic resources, including but not limited to trees, rock outcropping, and historical buildings within a state scenic highway
- Impact AES-3: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings and in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality
- Impact AES-4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area

5.2.2 Agriculture and Forestry Resources

- Impact AGF-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use, or conflict with existing zoning for agricultural use, or a Williamson Act contract
- Impact AGF-2: Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)
- Impact AGF-3: Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use

5.2.3 Air Quality

- Impact AQ-2: Implementation of the proposed Plan could result in a substantial net increase in construction-related emissions
- Impact AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard
- Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations

5.2.4 Biological Resources

- Impact BIO-1a: Have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NOAA Fisheries

- Impact BIO-3: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites
- Impact BIO-5: Have the potential to substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species

5.2.5 Climate Change, Greenhouse Gases, and Energy

- Impact GHG-1: Result in a net increase in greenhouse gas emissions, either directly or indirectly, compared to existing 2015 conditions that may have a significant impact on the environment
- Impact GHG-3: Conflict with an applicable state plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases

5.2.6 Cultural Resources and Tribal Cultural Resources

- Impact CUL/TCR-1: Cause a substantial adverse change in the significance of a historical resource as defined in Guidelines Section 15064.5
- Impact CUL/TCR-2: Cause a substantial adverse change in the significance of a unique archaeological resource as defined in Guidelines Section 15064.5
- Impact CUL/TCR-4: Cause a substantial adverse change in the significance of a TCR, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe

5.2.7 Geology, Seismicity, and Mineral Resources

- Impact GEO-7: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

5.2.8 Hazards and Wildfire

- Impact HAZ-4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment
- Impact HAZ-6: Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan
- Impact HAZ-7: Exacerbate the risk of wildland fires, associated pollutant release, and potential for flooding and landslides due to projected land use patterns and infrastructure in or near State Responsibility Areas or land classified as very high hazard severity zones

5.2.9 Land Use, Population, and Housing

- Impact LU-1: Physically divide an established community
- Impact LU-2: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect
- Impact LU-4: Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere

5.2.10 Noise

- Impact NOISE-1: Generate a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
- Impact NOISE-2: Generate a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
- Impact NOISE-3: Generate excessive groundborne vibration or groundborne noise levels
- Impact NOISE-4: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels

5.2.11 Public Services and Recreation

- Impact PSR-1: Result in substantial adverse physical impacts associated with the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, and other public facilities
- Impact PSR-2: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated or include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment

5.2.12 Public Utilities and Facilities

- Impact PUF-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities the construction or relocation of which could cause significant environmental effects
- Impact PUF-2: Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years

- Impact PUF-3: Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments
- Impact PUF-4: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals, and comply with federal, state, and local management and reduction statutes and regulations related to solid waste

5.2.13 Transportation

- Impact TRA-2: Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b) pertaining to vehicle miles traveled

5.3 GROWTH-INDUCING IMPACTS

5.3.1 Growth-Inducing Impacts

CEQA Guidelines Section 15126.2(e) requires an EIR to evaluate the potential growth-inducing impacts of a proposed project. Specifically, an EIR must discuss the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Growth can be induced in a number of ways, including the elimination of obstacles to growth, or by encouraging and/or facilitating other activities that could induce growth. Examples of projects likely to have growth-inducing impacts include extensions or expansions of infrastructure systems beyond what is needed to serve project-specific demand, and development of new residential or commercial uses in areas that are currently only sparsely developed or are undeveloped.

The CEQA Guidelines are clear that while an analysis of growth-inducing effects is required, it should not be assumed that induced growth is detrimental or beneficial to the environment. The analysis below examines these issues relative to the adoption and implementation of the proposed Plan.

PROJECT OVERVIEW

The proposed project is a long-range regional plan for the nine-county San Francisco Bay Area (Bay Area or region) that outlines 35 integrated strategies across four key issues—housing, the economy, transportation, and the environment—to make the Bay Area more equitable for all residents and more resilient in the face of unexpected challenges. The proposed Plan serves as the third RTP/SCS for the Bay Area and is a major update to Plan Bay Area 2040. The proposed Plan's strategies chart a course to make the Bay Area more affordable, connected, diverse, healthy, and vibrant for all residents, while also achieving regional greenhouse gas emissions reduction targets established by the California Air Resources Board pursuant to the SB375.

The proposed Plan includes housing and economic strategies to accommodate forecasted regional growth, transportation strategies to invest expected transportation revenues, and environmental strategies to protect the region from future sea level rise inundation. It also seeks to meet or exceed

State and federal planning requirements, including State-mandated targets for GHG emissions reductions.

The Bay Area consists of nine counties and 101 cities, covering an area of approximately 4.4 million acres. In 2015 the region had 4.0 million jobs, 2.8 million households, and 7.6 million people. The proposed Plan would accommodate projected growth for an additional 1.4 million jobs, 1.4 million households, and 2.7 million people by 2050. The proposed Plan would not increase growth beyond what would otherwise be projected to occur in the Bay Area; rather, it provides a strategy to accommodate that growth in a manner that is more efficient in terms of the provision of transportation options, minimization of GHG emission, and development of various land uses.

ANALYSIS OF GROWTH-INDUCEMENT

This analysis examines the following potential growth-inducing impacts related to implementation of the proposed Plan:

- foster population growth and construction of housing;
- eliminate obstacles to population growth;
- foster economic growth;
- affect service levels, facility capacity, or infrastructure demand; and
- encourage or facilitate other activities that could significantly affect the environment.

FOSTER POPULATION GROWTH AND CONSTRUCTION OF HOUSING

The proposed Plan would accommodate the Bay Area's forecasted population through the identified housing and transportation strategies. Overall, the region would move toward its adopted vision of a more affordable, connected, diverse, healthy, and vibrant Bay Area for all, while also achieving the SB 375 State-mandated target for GHG emissions reductions. This is generally accomplished by some of the strategies' ability to shape the region's forecasted land use development pattern and focus new housing in transit-rich areas and high-resource areas. The proposed Plan is intended to help shape growth patterns in the region, leading to better efficiency, a more sustainable approach, and more compact and mixed patterns of land use that are better served by transit and other mode choice options.

Overall, the proposed Plan accommodates growth that is already forecasted to occur throughout the region, in a manner that is more efficient and effective from a regional perspective, consistent with SB 375. The proposed Plan includes economic strategies as well, leveraging a set of geographies identified for intensified job site development and policies aimed at creating a more equitable economy. The proposed Plan does not change local land use policies; individual jurisdictions retain local land use authority. However, the proposed Plan reflects differences from local adopted land use plans in some areas, and may reflect greater density/intensity of growth than included in current adopted local general plans. Where this occurs, implementation would require the local jurisdiction to consider and resolve those differences through appropriate amendments to local planning documents and required environmental review.

While development consistent with the proposed Plan would result in additional commerce, industry, recreation, public services, and infrastructure throughout the region, this economic activity is consistent with the housing and jobs growth forecasts. The number of housing units reflects a plan for no net growth in the in-commute into the region, consistent with State law and MTC's and ABAG's legal settlement with the Building Industry Association. See MTC/ABAG's webpage, http://www.planbayarea.org, for more information. Therefore, because forecasted growth would be

accommodated and managed, the proposed Plan is not growth-inducing overall; rather, it reflects the regulatory mandate to house the forecasted population. While there may be differences with general plans at the local level, implementation of the proposed Plan would require amendments to those local plans thus avoiding impacts related to unplanned growth and/or plan inconsistencies in smaller geographies.

Eliminate Obstacles to Population Growth

Impediments to growth may be physical, regulatory, or fiscal. A physical obstacle to growth typically involves the lack of public infrastructure or insufficient infrastructure capacity. The extension of public service infrastructure (e.g., roadways, water and sewer lines) into areas that are not currently provided with these services may be considered growth inducing. Similarly, the elimination of a regulatory obstacle, such as a service boundary or growth management policy, or a change in land use designation, can also result in new growth in a manner that might be considered growth inducing. In addition, resolution of infrastructure funding constraints or the identification of new sources of funding can facilitate growth by funding the construction of new infrastructure.

The proposed Plan would result in substantial investments and improvements to the regional infrastructure in support of projected development. Transportation projects would create more efficient and effective circulation systems throughout the region. For the proposed Plan, the transportation network is designed to support the land use strategy in a way that moves the region closer to the attainment of the identified goals and objectives described above: a more efficient and equitable pattern that accommodates the forecasted growth.

The proposed Plan includes a mix of land uses balanced to minimize vehicle miles traveled (VMT) and maximize the ability for residents to conduct everyday activities within their neighborhood without the need to travel by car. In other words, the roadway investments of the proposed Plan are located and sized to achieve more sustainable forecasted growth. The proposed Plan's transportation strategies detail how the region intends to invest the region's $593 billion in committed and forecasted transportation revenues over the next 30 years. The strategies were selected to move the region toward its adopted vision of a more affordable, connected, diverse, healthy, and vibrant Bay Area for all and to exceed the State-mandated target under the SB 375 process for GHG emissions reductions. This is generally accomplished by the strategies' ability to increase travel mode choices and accessibility while reducing travel times and costs. Projects that would widen or expand roadways could be considered growth-inducing on a local scale; however, this would support the housing, employment, and population forecasts for the region.

The proposed Plan also includes investment to protect the region from two feet of future permanent sea level rise inundation, reduce climate emissions, and maintain and expand the region's parks and open space system. The sea level rise adaptation infrastructure is located in areas where sea level rise threatens existing and locally planned development. This would generally protect existing developed areas from sea level rise hazards and would not create new areas of potential development.

In summary, the roadway investments of the proposed Plan are located and sized to achieve more sustainable forecasted growth. While obstacles to growth would be removed by providing more capacity in some instances, this growth is forecasted. In addition, sea level rise infrastructure has been planned to protect existing shoreline communities affected by sea level rise.

Foster Economic Growth

As discussed above, the proposed Plan was developed to integrate forecasted population increases, employment opportunities, and housing needs within the Plan area. Therefore, the proposed Plan is

designed to accommodate growth that would occur with or without its adoption; it is not designed, nor is it anticipated to, drive further population growth beyond the levels forecasted. The proposed Plan supports the successful economic growth and prosperity of the region as required by law. Federal regulations governing the preparation of regional transportation plans require that they "support the economic vitality of the metropolitan area" (23 CFR Section 450.306). Population growth resulting from that economic vitality is not driven by the proposed Plan; thus, it is not a growth-inducing consequence of the proposed Plan.

Affect Service Levels, Facility Capacity, or Infrastructure Demand

While development that may occur consistent with the proposed Plan could result in increases in demand for public services and infrastructure in excess of the existing conditions, local agencies retain the authority to ensure the provision of appropriately timed and sized services and utilities to serve new urban development concurrent with growth. These impacts are addressed in Section 3.13, "Public Services and Recreation," and Section 3.14, "Public Utilities and Facilities," of this Draft EIR.

Encourage or facilitate other activities that could significantly affect the environment

This EIR analyzes at a programmatic level the potential for implementation of the proposed Plan's land use development pattern, sea level rise adaptation infrastructure, and transportation projects to significantly affect the environment. These analyses are provided primarily in chapter 3.0 of this Draft EIR. While MTC and ABAG have planning authority to develop the policies and strategies in this Plan, decisions regarding project construction occur through other lead agencies. The mitigation measures identified in this Draft EIR would be implemented at the project level by those lead agencies, thus reducing the potential for significant effects to the maximum feasible level as determined by the approving agency. As noted above, the growth accommodated through the proposed Plan is projected to occur based on identified demographic and economic forces. The proposed Plan ensures that outcomes are more efficient and effective for the region overall.

Summary

In summary, the proposed Plan includes 35 integrated strategies to enable the Bay Area to accommodate future growth and make the region more equitable and resilient in the face of unexpected challenges, such as sea level rise. This growth is not under the authority or control of MTC or ABAG. As dictated by existing State law, it will occur in a manner substantially consistent with local general plans and other applicable requirements.

The proposed Plan accounts for growth likely to occur through 2050 and makes assumptions about location and design that promote regional environmental benefits. While the effects of growth inducement can be considered an adverse impact under CEQA, the proposed Plan accommodates projected growth and implements State mandates to integrate land use and transportation decision-making in a way that achieves improved environmental and social outcomes. As discussed above, the proposed Plan would be growth-accommodating, not growth-inducing, and it reflects the regulatory mandate to house the forecasted population. At the regional and statewide level, the proposed Plan's policies help prevent sprawl and make growth in existing centers more equitable and more efficient. Under the proposed Plan, GHG emissions and other environmental impacts would be lessened relative to what may otherwise occur absent the regional strategies embodied in the proposed Plan.

5.4 CUMULATIVE IMPACTS

The CEQA Guidelines define cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (Section 15355). Section 15130 of the CEQA Guidelines requires that an EIR evaluate potential environmental impacts that are individually limited but cumulatively considerable. These impacts can result from the proposed project alone or together with other projects. The CEQA Guidelines state: "The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects" (Section 15355). A cumulative impact of concern under CEQA occurs when the net result of combined individual impacts compounds or increases other overall environmental impacts (CEQA Guidelines Section 15355). In other words, cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. CEQA does not require an analysis of incremental effects that are not cumulatively considerable, nor is there a requirement to discuss impacts that do not result in part from the project evaluated in the EIR.

5.4.1 Methodology

The proposed Plan is a cumulative plan by design. The Plan area encompasses 4.4 million acres and includes nine counties and 101 cities. It integrates transportation investments with land use strategies for an entire region of the state that shares, or is connected by, common economic, social, and environmental characteristics. Therefore, the environmental analysis of the proposed Plan presented throughout this Draft EIR is a cumulative analysis compliant with the requirements of CEQA and the CEQA Guidelines. Furthermore, this Draft EIR contains detailed analysis of regional (cumulative) impacts, which are differentiated from localized impacts that may occur at the county, TPA, and/or priority development area level. Nevertheless, the following discussion examines impacts associated with implementation of the proposed Plan, plus implementation of projected development for jurisdictions adjoining the Bay Area, to assess the potential for cumulative impacts from growth extending beyond the region.

CEQA allows the cumulative impact analysis to use either a list of past, present, and probable future projects, including projects outside the control of the lead agency, or a summary of projections in an adopted planning document, or a thoughtful combination of the two approaches. The cumulative analysis presented below uses a projections-based approach. Land use and growth projections for the region, which are the subject of analysis throughout this Draft EIR, are combined with the growth projections for the adjoining counties. Adjoining counties are listed as follows:

- Lake County: Lake County is located generally to the north of the Plan area, north of Napa County, and northeast of Sonoma County. It is sparsely populated, with the majority of development surrounding Clear Lake. According to the Lake County General Plan, the county is rooted in agriculture, resort development, and rural mountain communities (Lake County 2008).
- Mendocino County: Mendocino County is located to the north of the Plan area, north of Sonoma County, and west of Lake County. It has a history of timber and agricultural production. This county is facing increased development pressures from its more urban neighboring counties and changes in the timber and agricultural industries (Mendocino County 2009).

- Merced County: Merced County is located in the heart of California's San Joaquin Valley, a very productive agricultural region. The county, which extends from the Coast Range to the foothills of the Sierra Nevada, is bordered by Santa Clara County to the west (Merced County 2011). It is generally southeast of the Plan area.

- Sacramento County: Sacramento County is located east of the Plan area, bordering Solano County to the east and Contra Costa to the north. This county has a large population (nearly 1.5 million people), centered around seven incorporated cities (Sacramento County 2016).

- San Benito County: San Benito County is located south of the Plan area, bordering Santa Clara County to the south. San Benito County is generally rural and contains substantial amounts of agricultural land (San Benito County 2015).

- San Joaquin County: San Joaquin County is located in the Central Valley of California, east of the Plan area. It borders Contra Costa and Alameda Counties to the east. San Joaquin County is primarily in agricultural production and contains a large population centered primarily around its seven cities (San Joaquin County 2016).

- Santa Cruz County: Santa Cruz County is located south of the Plan area, bordering the western edge of Santa Clara County and south of San Mateo County. Because of its climate and variety of landscape types, the county contains a diverse economic base that includes tourism, agriculture, and manufacturing. It has a relatively small population centered around the city of Santa Cruz (Santa Cruz County 1994).

- Stanislaus County: Stanislaus County is located east of the Plan area, bordering the eastern edge of Santa Clara County. This county is located in the San Joaquin Valley. Stanislaus County is primarily in agricultural production but is facing rapid population growth that began in the 1990s (Stanislaus County 2015).

- Yolo County: Yolo County was one of the original 27 counties created when California became a state in 1850. The county is located in the rich agricultural regions of California's Central Valley and the Sacramento River Delta. It is directly west of Sacramento, the state capital, and northeast of the Bay Area counties of Solano and Napa (County of Yolo 2009:IN-2).

The area that includes the Bay Area and the above-referenced adjoining counties is referred to in this analysis as the "cumulative impact analysis area." As shown in **Table 5-1**, the population for the cumulative impact analysis area is projected to grow from under 12 million people to nearly 15 million by 2050.

As shown in **Table 5-1**, approximately 68 percent of the existing population in the cumulative impact analysis area is located in the Plan area. By 2050, this proportion is expected to increase slightly (70 percent of the population). Thus, under both current and forecasted future conditions, the Bay Area represents a substantial portion of the growth in the cumulative analysis impact area. This is considered in the discussion below.

Table 5-1 Population Projections of Cumulative Impact Analysis Area, 2015– 2050

Jurisdiction	Acreage	Population	
		2020	2050
Lake County	851,000	63,800	66,200
Mendocino County	2,045,000	87,500	85,600
Merced County	1,266,000	284,800	372,500
Sacramento County	636,000	1,562,200	1,901,500
San Benito County	889,000	62,800	73,600
San Joaquin County	913,000	776,100	968,700
Santa Cruz County	286,000	270,100	289,100
Stanislaus County	970,000	556,000	668,200
Yolo County	653,000	79,100	88,200
Bay Area	4,400,000	7,930,000	10,330,000
Total	12,909,000	11,672,400	14,843,600

Sources: DOC 2016; California Department of Finance 2020, 2021; MTC 2020

CUMULATIVE EFFECTS OF THE PROPOSED PLAN

The following analysis examines the cumulative effects of the proposed Plan within the cumulative analysis impact area. The potential cumulative effects of the proposed Plan are summarized qualitatively below for each of the topics analyzed in Chapter 3 of this Draft EIR.

Aesthetics and Visual Resources

Aesthetics and visual resources impacts associated with implementation of the proposed Plan are analyzed in Section 3.2 of this Draft EIR. The analysis examines impacts of the proposed Plan on aesthetics and visual resources throughout the Bay Area. Some impacts on scenic viewsheds would be expected, but these viewsheds are within the Bay Area and not visible to areas surrounding the Plan area. Generally, effects on scenic resources occur at the interface between development and the scenic resources and tend to be localized. Consequently, the proposed Plan would not be expected to combine with development in adjacent areas to produce a considerable contribution to cumulative impacts. The potential for cumulative impacts related to aesthetics and visual resources would not be cumulatively considerable, and the impact would be less than significant (LTS).

Impact CUM-1: The incremental contribution to cumulative aesthetics and visual resources impacts from implementation of the proposed Plan would not be cumulatively considerable. This impact would be less than significant (LTS).

Mitigation Measure

None required.

Agriculture and Forestry Resources

Implementation of the proposed Plan has the potential to result in conversion of land uses, including the conversion of agricultural lands and forestland to urban uses, as discussed in Section 3.3 of this Draft EIR. Similarly, development pursuant to other local and regional planning efforts within the cumulative impact analysis area could also have impacts on agriculturally designated land and forestry resources. As a result, cumulative impacts would be potentially significant. Further,

implementation of the proposed Plan and other cumulative development could also indirectly result in additional conversion of agriculture land and forestland to other uses. Because of the potential direct and indirect impacts that could occur as a result of the proposed Plan, implementation of the proposed Plan would contribute considerably to this impact and the impact would be significant (S).

Impact CUM-2: The incremental contribution to cumulative agricultural and forestry resources impacts from implementation of the proposed Plan would be cumulatively considerable. This impact would be significant (S).

Mitigation Measure

CUM-2: Implement Mitigation Measures in Section 3.3.

Implementing these mitigation measures would reduce the significant impact of conversion of agricultural land and forestland to other uses because it would require avoidance or compensation for converted lands. However, conservation easements do not offset loss of agricultural land and forestland converted to other uses. While implementing these mitigation measures would protect other agricultural land and forestland in the future, it would not avoid conversion or restore new land to equivalent value to that lost. For these reasons, the residual impacts on conversion of agricultural land and forestland would be significant and unavoidable (SU). Additionally, the cumulative impact on agriculture and forestry resources would be significant and unavoidable (SU).

Air Quality

As noted in Section 3.4, the nine-county MTC region encompasses all or parts of three air basins (the San Francisco Bay Area Air Basin in its entirety, portions of the North Coast Air Basin, and portions of the Sacramento Valley Air Basin), and it falls within the jurisdiction of the three related air districts (Bay Area Air Quality Management District, North Sonoma County Air Pollution Control District, and Yolo-Solano Air Quality Management District). Outside of the MTC region, three additional air basins are located in the other nine additional counties in the cumulative impact analysis area:

- Lake County Air Basin,
- San Joaquin Valley Air Basin, and
- North Central Coast Air Basin.

Additionally, portions of the cumulative impact analysis area (outside of the Plan area) fall within the jurisdiction of the following five additional air districts:

- Lake County Air Quality Management District – Lake County;
- Mendocino County Air Quality Management District – Mendocino County;
- Monterey Bay Unified Air Pollution Control District – San Benito County;
- Sacramento Metropolitan Air Quality Management District – Sacramento County; and
- San Joaquin Valley Air Pollution Control District – Merced, San Joaquin, and Stanislaus Counties.

The State has identified air basin–specific pollutants that have exceeded applicable federal and State pollutant standards. As noted in Section 3.4, any area that exceeds applicable standards for a particular pollutant is typically referred to as a "nonattainment" area for that pollutant. In addition, the air districts identified above have prepared area-specific air quality plans to improve air quality conditions within their jurisdiction to meet federal and State pollutant standards for those pollutants that currently exceed standards. Although each jurisdiction is primarily responsible for regulating its own emissions, pollutant transport, which is a result of a variety of topographical and atmospheric conditions that cause pollution generated in one location to move to another location (including a neighboring air

basin), can result in one area's emissions affecting another's ability to achieve applicable pollutant standards.

Because the air basins identified above are currently designated as nonattainment areas for one or more pollutants for which federal and/or State standards exist, a significant cumulative impact exists. Additionally, the proposed Plan could result in substantial increases in pollutant emission levels (PM_{10} and $PM_{2.5}$) during construction and operational activities associated with future growth and development patterns. However, the proposed Plan is intended to reduce the overall emissions load through a transportation and land use strategy that maximizes access to transit and other alternative transportation approaches, lowering potential VMT per capita. While an improvement over what would be expected absent the Plan, given existing air pollution conditions in surrounding areas, implementation of the proposed Plan would be cumulatively considerable and significant (S).

Impact CUM-3: The incremental contribution to cumulative air quality impacts, from implementation of the proposed Plan would be cumulatively considerable. This impact would be significant (S).

Mitigation Measure

CUM-3: Implement Mitigation Measures in Section 3.4.

As noted in Section 3.4, mitigation measures are available that could reduce an individual project's contribution (under the proposed Plan) to areawide emissions. However, the ability and requirement to implement such measures would ultimately be the responsibility of a lead agency to determine on a case-by-case basis, and implementation cannot be guaranteed by MTC or ABAG. As a result, the cumulative impact on air quality would be significant and unavoidable (SU).

Biological Resources

The effect of implementation of the proposed Plan on regional biological resources is analyzed in Section 3.5 of this Draft EIR. Biological resources impacts include e direct and indirect effects on sensitive/special-status species or their habitat; substantial adverse effects on riparian, wetland, or other sensitive natural communities; interference with wildlife movement/corridors and nursery sites; or conflicts with plans or policies protecting biological resources. As noted in Section 3.5, implementation of the land use development pattern under the proposed Plan could result in regional impacts on special-status species. Similarly, development pursuant to other local and regional planning efforts within the cumulative impact analysis area could also have impacts on special-status species and habitat. As a result, cumulative impacts would be potentially significant. Further, implementation of the proposed Plan and other cumulative development could also result in disruption of movement corridors and nursery sites. Because of the potential direct and indirect impacts, including loss of individual species and habitat that may occur as a result of the proposed Plan, implementation of the proposed Plan would contribute considerably to this impact, and this impact would be significant (S).

CUM-4: The incremental contribution to cumulative biological resources impacts from implementation of the proposed Plan would be cumulatively considerable. This impact would be significant (S).

Mitigation Measure

CUM-4: Implement Mitigation Measures in Section 3.5.

These mitigation measures set requirements for surveys and actions to be taken if biological resources may be adversely affected. If the implementing agency and/or project sponsor adopts

these mitigation measures, it would reduce the contribution of the proposed Plan to cumulative impacts on biological resources. However, the mitigation measures may not be sufficient to reduce impacts to a less-than-significant level in all cases. Additionally, MTC and ABAG cannot require implementing agencies to adopt these mitigation measures. It is ultimately the responsibility of the implementing agency to determine and adopt mitigation. Therefore, the cumulative impact on biological resources would be significant and unavoidable (SU).

Climate Change, Greenhouse Gases, and Energy

Section 3.6 in this Draft EIR addresses climate change, GHGs, and energy. Climate change is an inherently cumulative issue. MTC and ABAG have developed a land use and transportation strategy that meets SB 375 goals and places the Bay Area on a downward trajectory in GHG emissions, but the California Air Resources Board has stated that meeting SB 375 goals alone will not meet statewide goals under California's 2017 Climate Change Scoping Plan. The proposed Plan does not have additional land use strategies to feasibly bridge the gap between the proposed Plan GHG emissions and 2030 (and beyond) targets. This is not unique to MTC; all metropolitan planning organizations (MPOs) in California are faced with this same challenge. In the absence of State and local jurisdictional action (e.g., new State regulations, city and county GHG reduction plans targeted to 2030 and beyond), it is not possible to demonstrate that the proposed Plan would not impede the State's ability to achieve its SB 32 GHG reduction targets. Thus, implementation of the proposed Plan would contribute considerably to this impact and would be significant (S).

Impact CUM-5: *The incremental contribution to cumulative climate change and GHG impacts from implementation of the proposed Plan would be cumulatively considerable. This impact would be significant (S).*

Mitigation Measure

CUM-5: Implement Mitigation Measures in Section 3.6.

Implementing these mitigation measures would reduce the potentially significant impact related to a conflict with State GHG reduction goals linked to transportation because it would require climate action planning, which would help to reduce GHG emissions from the land use projects that would be constructed under the Plan, as well as reduce GHG emissions from existing uses. Mitigation, via climate action plans for individual jurisdictions, or other programs, including retrofitting existing buildings, installing renewable energy facilities that replace reliance on fossil-fuel power in the region, altering the vehicle fleet (toward more non-fossil fuel-powered vehicles), and implementing other measures would be required to meet the goals needed for the State to attain the 2030 and 2050 targets. However, there is no assurance that the measures would reduce impacts to a less-than-significant level. Additionally, the ability and requirement to implement such measures would ultimately be the responsibility of the local jurisdiction, and implementation cannot be guaranteed by MTC or ABAG, resulting in a cumulatively considerable contribution by the proposed Plan. Therefore, the cumulative impact on climate change and GHGs would be significant and unavoidable (SU).

Cultural Resources and Tribal Cultural Resources

The effect of implementation of the proposed Plan on cultural resources and tribal cultural resources (TCRs) is analyzed in Section 3.7 of this Draft EIR. While some cultural resources may have regional significance, the resources themselves are site specific, and impacts on them are project specific. For example, impacts on a subsurface archaeological find at one project site are generally not made worse by impacts from another project on a cultural resource at another site. Rather, the resources and the effects on them are generally independent. Therefore, the proposed Plan would not be expected to

combine with impacts on cultural resources in areas surrounding the Bay Area to create more considerable impacts. The potential for cumulative impacts related to cultural resources is not cumulatively considerable, and the impact would be less than significant (LTS).

However, with regard to TCRs, the aerial extent of ancestral territories for affected tribes may be extensive. Sacred Lands searches would be conducted through the Native American Heritage Commission during the CEQA process, and local jurisdictions in the region must initiate consultation with the Native American tribes as part of their compliance with Assembly Bill 52. The purpose of that consultation is to determine whether there is a potential for TCRs that could be affected by a proposed project and to engage the tribes in addressing the impacts on a project level. Ongoing consultation with tribes has identified, and would continue to identify, additional TCRs throughout the region. However, on a regional level, the loss of these resources may not be mitigated to acceptable levels through data recovery and collection, because their value may also lie in tribal cultural mores and religious beliefs. Therefore, cumulative disturbance of TCRs from Plan implementation within the historic boundaries of tribes in the Bay Area and surrounding counties, in particular disturbance of TCRS associated with the cultural and physical remains of native peoples whose descendants are living today, could contribute considerably to this impact and would be a significant impact (S).

CUM-6: The incremental contribution to cumulative tribal cultural resources impacts would be cumulatively considerable and would be significant (S).

Mitigation Measure

CUM-6: Implement Mitigation Measure CUL/TCR-4.

Implementation of Mitigation Measure CUL/TCR-4 would reduce impacts associated with TCRs because it would require the performance of professionally accepted and legally compliant procedures related to the identification of TCRs associated with subsequent projects. However, the ability and requirement to implement such measures would ultimately be the responsibility of a lead agency to determine on a case-by-case basis, and implementation cannot be guaranteed by MTC or ABAG. As a result, this cumulative impact on cultural resources and TCRs would be significant and unavoidable (SU).

Geology, Seismicity, and Mineral Resources

Impacts on geology, seismicity, and mineral resources related to implementation of the proposed Plan are analyzed in Section 3.8 of this Draft EIR. Geology, seismicity, and mineral resources impacts may result from increased exposure to seismic hazards, increased erosion and/or loss of topsoil, the presence of unstable/expansive soils, alternative waste disposal or septic systems, and the loss of known mineral resources or paleontological resources. These effects occur independently of one another, related to site-specific and project-specific characteristics and conditions. In addition, existing regulations specify mandatory actions that must occur during project development, which would adequately address the potential for effects from construction or operation of projects related to geology, seismicity, and paleontological and mineral resources as noted throughout the impact discussion in Section 3.8 of this Draft EIR.

The potential for cumulative impacts related to geology, seismicity, and paleontological and mineral resources is not cumulatively considerable, and the impact would be less than significant (LTS).

CUM-7: The incremental contribution to cumulative geology, seismicity, and mineral resources impacts from implementation of the proposed Plan would not be cumulatively considerable. This impact would be less than significant (LTS).

Mitigation Measure

None required.

Hazards and Wildfire

Impacts associated with hazards and wildfire related to implementation of the proposed Plan are analyzed in Section 3.9 of this Draft EIR. Hazards and hazardous materials impacts may be related to the transport, use, or disposal of hazardous materials (including by rail); reasonably foreseeable upset or accidental conditions involving the release of hazardous materials; emission of hazardous materials within ¼-mile of a school; location on a known hazardous materials site; and airport-related hazards. Most of these effects occur independently of one another, related to site-specific and project-specific characteristics and conditions. In addition, the proposed Plan would not generate a substantial increase in hazardous materials transport by rail. Furthermore, existing regulations specify mandatory actions that must occur during project development, including transport, use, and disposal of hazardous materials, which would adequately address issues pertaining to hazards and hazardous materials as noted throughout the impact discussion in Section 3.9 of this Draft EIR. The potential for cumulative impacts related to hazards and hazardous materials is not cumulatively considerable, and the impact would be less than significant (LTS).

Hazards related to implementation of an adopted emergency response plan or emergency evacuation plan would be potentially significant because increased population and employment in areas in the Bay Area would increase congestion on evacuation routes and could slow evacuation. The potential for cumulative impacts related to evacuation would be cumulatively considerable, and the impact would be significant (S). Features of the Plan that would reduce the potential to exacerbate the risk of wildfire include maintaining the urban growth boundaries, directing growth away from areas with the highest fire hazard severity potential, and supporting vegetation management on conservation lands. The proposed Plan is designed to accommodate anticipated population growth in a manner that reduces potential contributions to climate change, encourages concentrated growth in developed areas and land management in open space, and includes structural hardening efforts where existing structures are vulnerable to fire. Nonetheless, because development could occur near land classified as very high hazard severity zones and could indirectly result in extension or expansion of infrastructure through these areas, there is potential for the proposed Plan to exacerbate the risk of wildland fires. The Plan could indirectly result in extension or expansion of infrastructure through these areas and adversely affect emergency evacuation procedures. This impact would be potentially significant. Because the risk and effects of wildland fires are regional in nature, the potential direct and indirect impacts that could occur as a result of the proposed Plan would contribute considerably to this impact and would be significant (S).

CUM-8: The incremental contribution to cumulative hazards and wildfire impacts from implementation of the proposed Plan would be cumulatively considerable. This impact would be significant (S).

Mitigation Measure

CUM-8: Implement Mitigation Measures in Section 3.9.

As noted in Section 3.9, mitigation measures are available that could reduce an individual project's contribution (under the proposed Plan) to inadequate emergency access and wildland fire risk. However, the ability and requirement to implement such measures would ultimately be the responsibility of a lead agency to determine on a case-by-case basis, and implementation cannot be guaranteed by MTC or ABAG. As a result, this cumulative impact on hazards and wildfire would be significant and unavoidable (SU).

Hydrology and Water Quality

Hydrology and water quality impacts associated with implementation of the proposed Plan are analyzed in Section 3.10 of this Draft EIR. These impacts may be related to violation of water quality standards; interference with groundwater recharge; increased erosion; increased nonpoint source pollution; increased runoff; effects on flood zones; and exposure of people to a significant risk of loss, injury, or death involving flooding (including flooding as a result of the failure of a levee or dam), seiche, tsunami, or mudflow. These effects, like those related to geology, seismicity, and mineral resources above, occur independently of one another, related to site-specific and project-specific characteristics and conditions. In addition, existing regulations specify mandatory actions that must occur during project development, which would adequately address the potential for construction or operation of projects to affect water resources as noted throughout the impact discussion in Section 3.10. Thus, the potential for cumulative impacts related to water resources is not cumulatively considerable, and the impact would be less than significant (LTS).

CUM-9: The incremental contribution to cumulative hydrology and water resources impacts from implementation of the proposed Plan would not be cumulatively considerable. This impact would be less than significant (LTS).

Mitigation Measure

None required.

Land Use, Population, and Housing

Land use, population, and housing impacts associated with implementation of the proposed Plan are analyzed in Section 3.11 of this Draft EIR. As noted in Section 3.11, the additional population, housing, and job growth forecasted for the planning period is not a result of the proposed Plan; rather, the growth is forecast to occur with or without the proposed Plan. The proposed Plan provides a strategy to accommodate growth in such a way as to achieve a more balanced jobs/housing ratio and to optimize transportation investments that support those land uses. The land use growth footprint assumes a number of residential units adequate to meet the forecasted demand, taking into account localized displacement of some households within the region. Thus, implementation of the proposed Plan would not result in displacement at the regional scale, and localized displacement would not be expected to exert development pressure on areas surrounding the Bay Area. Because the proposed Plan would not exert development pressure on adjacent counties through displacement of land uses, indirect effects that would otherwise be expected (effects tied to development) would not occur. This would be a less-than-significant cumulative effect (LTS).

CUM-10: The incremental contribution to cumulative land use, population, and housing impacts from implementation of the proposed Plan would not be cumulatively considerable. This impact would be less than significant (LTS).

Noise

Impacts associated with noise related to implementation of the proposed Plan are analyzed in Section 3.12 of this Draft EIR. Noise impacts are based on factors related to site-specific and project-specific characteristics and conditions, including distance to noise sources, barriers between land uses and noise sources, and other factors. Impacts related to construction, traffic, and transit would be significant. Cumulative noise increases from traffic within the Plan area are addressed in Section 3.12. No other cumulative sources of noise (in relation to cumulative development) are expected.

The proposed Plan is not expected to substantially increase interregional travel, because the proposed Plan accommodates projected growth. Therefore, proposed Plan-related contributions to traffic noise outside the region are expected to be minimal, and the proposed Plan's contribution to cumulative traffic noise would be less than significant (LTS).

CUM-11: The incremental contribution to cumulative noise impacts from implementation of the proposed Plan would not be cumulatively considerable. This impact would be less than significant (LTS).

Mitigation Measure

None required.

Public Services and Recreation

Impacts on public services and recreation related to implementation of the proposed Plan are analyzed in Section 3.13 of this Draft EIR. This assessment includes an analysis of the need for new facilities or modification to facilities, the construction of which causes significant environmental impacts, to maintain acceptable service ratios, response times, or other performance objectives for schools, emergency services, police protection, fire protection, and other public facilities or for regional parks or other recreational facilities.

Law enforcement, fire protection, and emergency services are provided by local governments or fire protection districts for areas within their jurisdiction, although mutual-aid agreements between agencies help spread and share resources. The California Highway Patrol has specific jurisdiction over all California State routes (including all freeways and expressways), U.S. highways, interstate highways, and all public roads in unincorporated parts of a county. The U.S. Forest Service and California Department of Forestry and Fire Protection provide fire protection services within many rural areas.

Public schools are provided by school districts to areas within their jurisdictions. While districts may have cross-jurisdictional boundaries, school services are still provided at the local, rather than regional, level. Libraries are also generally provided by local governments for areas within their jurisdiction, and services are not provided on a regional basis, although there are often regional cooperation programs. Social services are generally provided by counties and not provided on a regional basis.

Neighborhood and city/county parks and recreational services are provided by local governments for areas within their jurisdiction. The Bay Area also includes numerous regional, State, and federal parks, open space, and recreational areas.

The effects of the proposed Plan as it relates to most public services and local parks and recreation facilities would not be cumulatively considerable, because of the localized (and inherently noncumulative) nature of these services. As a result, cumulative impacts related to these services would be less than significant (LTS).

Impact CUM-12: The incremental contribution to cumulative public services and recreation impacts from implementation of the proposed Plan would not be cumulatively considerable. This impact would be less than significant (LTS).

Mitigation Measure

None required.

Public Utilities and Facilities

Impacts on public utilities and services related to implementation of the proposed Plan are analyzed in Section 3.14 of this Draft EIR. The analysis includes an examination of potential impacts related to the availability and capacity of water supply, stormwater, wastewater, solid waste, natural gas, propane, electricity, and telecommunications infrastructure. The utilities identified below are generally provided or delivered on a local level but may originate from sources outside of the local jurisdiction and/or as part of a regional distribution system. The proposed Plan's contribution to cumulative impacts associated with the provision of utilities is discussed below.

Water Supply and Infrastructure

Water supply and associated infrastructure have both local and regional aspects. The rivers that provide virtually all the surface water supplies in the Bay Area originate outside the region and travel through the region and beyond, providing water supply to jurisdictions inside and outside of the Bay Area along the way.

An increase in demand and water consumption in one region has the potential to affect supplies throughout California, because the surface water supply systems are interconnected. Development of future water supply and associated infrastructure regionally and beyond depends on several factors, such as surface water and groundwater availability, groundwater recharge, land use density, and land use type. Future urban growth (population, housing, and employees) anticipated with implementation of the Plan would result in an increase in water supply needs and demand. Future growth elsewhere in the cumulative impact analysis area could also lead to potential future water shortages and depletion of existing water supplies. As a result, the proposed Plan's contribution with respect to water supply and water infrastructure would be cumulatively considerable, and this impact would be potentially significant (PS).

Wastewater and Infrastructure

Wastewater service (sewer treatment) is a localized concern because the wastewater treatment facilities and services are usually provided and regulated by local governments or special districts for areas within their jurisdiction. For this reason, wastewater systems and associated infrastructure within the Bay Area would not be substantially affected by development outside of the region or substantially affect other counties in the cumulative impact analysis area. Therefore, the proposed Plan's contribution with respect to wastewater and wastewater infrastructure would not be cumulatively considerable, and impacts would be less than significant (LTS).

Stormwater and Infrastructure

Stormwater drainage systems in the Bay Area are generally provided by local governments for areas within their jurisdictions or for county/city areas combined and are not typically provided on a regional or extraregional basis. Stormwater drainage solutions typically depend on site-specific and project-specific characteristics and implementation. For this reason, stormwater drainage systems within the Plan area would not be significantly affected by development outside of the region, nor would development under the proposed Plan significantly affect stormwater drainage systems in the cumulative impact analysis area. Therefore, the proposed Plan's contribution with respect to stormwater and stormwater infrastructure would not be cumulatively considerable, and impacts would be less than significant (LTS).

Solid Waste

Solid waste management is generally provided by privately operated landfills (with the exception of one landfill operated by the Sonoma County Public Works Department) under the oversight of each county's

local enforcement agency and not on a regional basis. There are 57 transfer stations in the Bay Area that receive solid waste and transfer it into containers or vehicles before it is finally disposed of in a landfill or transformation facility, and solid waste generated in one county can be transported to another county or outside the region. Implementation of the proposed Plan, in conjunction with other development projected to occur in the cumulative impact analysis area, has the potential to exceed available local solid waste capacity. Because of the potential solid waste generated through Plan implementation, the proposed Plan's contribution would be cumulatively considerable. Impacts would be significant (S).

CUM-13: The incremental contribution to cumulative public utilities and facilities impacts from implementation of the proposed Plan would be cumulatively considerable. This impact would be significant (S).

Mitigation Measure

CUM-13: Implement Mitigation Measures in Section 3.14.

The mitigation measures identified in Section 3.14 would ensure that adequate public utilities would be available to serve the project at applicable service levels. If the implementing agency and/or project sponsor adopts these mitigation measures, it would reduce the cumulative contribution of the proposed Plan to less than considerable, and residual impacts on public utilities and facilities would be less than significant (LTS). However, the ability and requirement to implement such measures would ultimately be the responsibility of the local jurisdiction, and implementation cannot be guaranteed by MTC or ABAG, resulting in a cumulatively considerable contribution by the proposed Plan. Therefore, the cumulative impact on public utilities and facilities would be significant and unavoidable (SU).

Transportation

Impacts on transportation related to implementation of the proposed Plan are analyzed in Section 3.15 of this Draft EIR. As discussed in Section 3.15, implementation of the proposed Plan would reduce per capita VMT compared to the 2015 baseline but would increase total VMT because of the projected population increase. If implemented, the proposed Plan's comprehensive suite of land use, transportation, and environmental strategies would help the region make progress in reducing per capita VMT and would not directly interfere with statewide VMT reduction policies intended to meet the State's statutory GHG emission targets. However, because there is a gap between SB 375 targets and GHG reductions needed to achieve statewide GHG reduction goals, and because the ability to bridge this gap relies on implementation of travel demand management and other strategies that can be employed only at the local jurisdictional level, MTC and ABAG cannot conclude that the reductions would be sufficient to meet the State's climate goals. The inability to meet this goal is not limited to MTC or the proposed Plan; rather, it affects all MPOs and the entire state. Thus, the proposed Plan would contribute considerably to this impact and would be significant (S). The less-than-significant impacts related to conflicts with a program, plan, ordinance, or policy addressing the circulation system; increased hazards related to geometric design features or incompatible uses; and emergency access would be localized. Consequently, the proposed Plan would not be expected to combine with development in adjacent areas to produce a considerable contribution to cumulative impacts. The potential for cumulative impacts related to conflicts with existing programs and plans, increased hazards, and emergency access would not be cumulatively considerable, and these impacts would be less than significant (LTS).

Impact CUM-14: *The incremental contribution to transportation impacts from implementation of the proposed Plan would be cumulatively considerable. This impact would be significant (S).*

Mitigation Measure

CUM-14: Implement Mitigation Measures in Section 3.6.

These mitigation measures would reduce the significant impact of meeting State GHG reduction goals linked to transportation because they would involve implementing additional State policy actions and funding to close the VMT gap between what the MPOs could achieve through implementation of their SCSs, and reductions needed to meet State goals. However, there is no assurance that implementation of the mitigation measures would be enough to achieve the regional reductions needed to attain the State's goals. Additionally, the ability and requirement to implement such measures would ultimately be the responsibility of the local jurisdiction, and implementation cannot be guaranteed by MTC or ABAG, resulting in a cumulatively considerable contribution by the proposed Plan. Therefore, the cumulative impact on transportation would be significant and unavoidable (SU).

5.5 IMPACTS FOUND NOT TO BE SIGNIFICANT

This EIR focuses on potentially significant impacts. CEQA requires that an EIR provide a brief statement indicating why various possible significant impacts were determined to not be significant and were not discussed in detail. For the issue areas addressed in Chapter 3, all potential impacts are identified. See Sections 3.2 through 3.15 for discussions related to impacts found not to be significant.

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