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ACE Ceres-Merced Extension Project

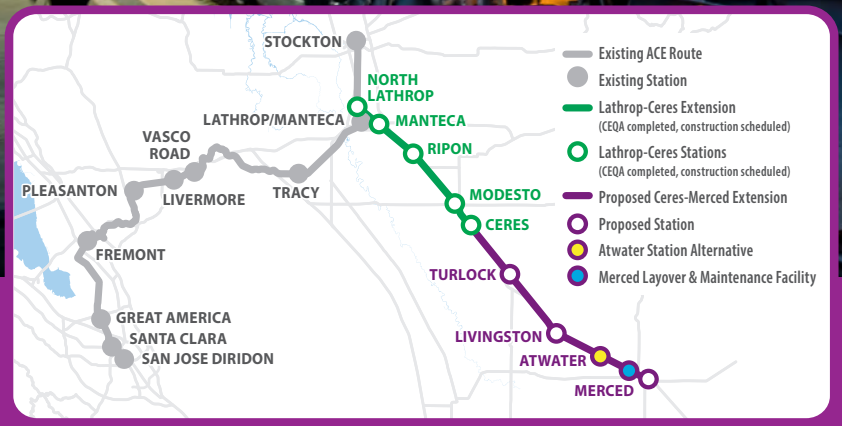
Draft Environmental Impact Report

SCH #2018012014







April 2021

DRAFT ENVIRONMENTAL IMPACT REPORT

SAN JOAQUIN REGIONAL RAIL COMMISSION

ACE CERES-MERCED EXTENSION PROJECT

STATE CLEARINGHOUSE #2018012014

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Acronyms and Abbreviations

µg/m^3	micrograms per cubic meter
AASHTO	American Association of State Highway and Transportation Officials
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACE	Altamont Corridor Express
ACE	Areas of Conservation Emphasis
ACM	asbestos containing material
ACM	asbestos-containing materials
ADA	Americans with Disabilities
AIA	airport influence area
ALS	advanced life support
ALUPC	airport land use compatibility plan
ARB	California Air Resources Board
AREMA	American Railroad Engineering and Maintenance-of-Way Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AVE	area of visual effect
B	ballast
BA	biological assessment
BAAQMD	Bay Area Air Quality Management District
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
BAT	best available technology economically achievable
Bay Area	San Francisco Bay Area
BCF	billion cubic feet
BCT	best conventional pollutant control technology
Bgs	below ground surface
BLM	Bureau of Land Management
BLS	basic life support
BM	building material
BMP	best management practices
BO	biological opinion
Board	SJRRC Board
BRWL	blue-rich white light lamps
Btu	British thermal units
BZP	border zone property
C&d	construction and demolition
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards

CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CAISO	California Independent System Operator
Cal Public Res. Code	California Public Resources Code
Cal. Code Regs.	California Code of Regulations
Cal. Gov. Code	California Government Code
Cal/EPA	California Environmental Protection Agency
CAL/OSHA	California Department of Occupational Safety and Health
Cal/OSHA	California Division of Occupational Safety and Health
Cal/OSHA	California's Division of Occupational Safety and Health
CALFIRE	California Department of Forestry and Fire Protection
California CAA	California Clean Air Act
CalOES	California Office of Emergency Services
CalSTA	California State Transportation Authority
Caltrans	California Department of Transportation
Carl Moyer Program	Carl Moyer Memorial Air Quality Standards Attainment Program
CBIA v. BAAQMD	California Building Industry Association vs. Bay Area Air Quality Management District
CCAs	Community Choice Aggregators
CCED	California Conservation Easement Database
CCR	California Code of Regulations
CCTA	Contra Costa Transportation Authority
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CGS	California Geological Survey
CH4	methane
CMP	congestion management program
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNG	compressed natural gas
CNPS	California Native Plant Society
CO Protocol	California Department of Transportation (Caltrans) Institute of Transportation Studies Transportation Project-Level Carbon Monoxide Protocol
CO	carbon monoxide
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COGs	councils of governments
CPUC	California Public Utilities Commission

CRHR	California Register of Historical Resources
CRMP	construction risk management plan
CUPA	Certified Unified Program Agencies
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CWA	Clean Water Act (CWA) of 1972
Db	decibel
dBA	A-weighting decibel
dBa	A-weighting decibel
DBH	diameter at breast height
Delta	Sacramento–San Joaquin Delta
DHS	Department of Homeland Security
DOGGR	California Division of Oil, Gas, & Geothermal Resources
DP	distributive power
DPM	diesel particulate matter
DPR	California Department of Pesticide Regulation
DTSC	California Department of Toxic Substances
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
EFH	essential fish habitat
EFs	California's Emergency Function Annexes
EFZ	earthquake fault zone
EIR	environmental impact report
EMS	emergency medical services
EMT	emergency medical technician
EO	California Executive Order
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESA	federal Endangered Species Act
ESFs	Emergency Support Functions
ESFs	Federal Emergency Support Function Annexes
ESPs	energy service providers
F	Fahrenheit
FAA	Federal Aviation Administration
FAST Act	Fixing America's Surface Transportation Act of 2015
FAST	Fixing America's Surface Transportation
FEMA	Federal Emergency Management Agency
FEMA	The Federal Emergency Management Agency
FHWG	Fisheries Hydroacoustic Working Group
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIP	freight investment plan
FIRM	Flood Insurance Rate Maps
Fish & G Code	California Fish and Game Code

FMMP	Farmland Mapping and Monitoring Program
FR	Federal Register
FRA	Federal Railroad Administration
FSZ	Farmland Security Zone
FTA	Federal Transit Administration
FUDS	formerly used defense sites
g/m3	micrograms per cubic meter
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts
GHG	greenhouse gas
GIS	geographic information system
GO	General Order
GPS	global positioning system
GSA	Groundwater Sustainability Agencies
GSPs	groundwater sustainability plans
GWh	gigawatt hours
GWP	global warming potential
HARP 2	Hotspots Analysis and Reporting Program Version 2
HCP	habitat conservation plan
Health & Saf. Code	California Health and Safety Code
HHFT	High-Hazard Flammable Trains
HI	hazard index
HRA	health risk assessment
HWP	hazardous waste property
I-	Interstate
ICCTA	Interstate Commerce Commission Termination Act
ICS	Incident Command System
IOUs	investor-owned utilities
IpaC	Information for Planning and Conservation
IPCC	Intergovernmental Panel on Climate Change
ITP	incidental take permit
KVP	key viewpoints
KWh	kilowatt hours
LAVTA	Livermore-Amador Valley Transportation Authority
LBP	lead-based paint
LBP	lead-based paint
Lbs	pounds
L_{dn}	the day-night sound level
LDT	light-duty truck
Leq	equivalent sound level
LID	low-impact development
Lmax	maximum A-weighted sound pressure levels
LOS	level of service
LRFD	Load and Resistance Factor Design
LRT	light rail transit

Lv, in VdB	vibration velocity level
MAA	Management Agency Agreement
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MBTA	Migratory Bird Treaty Act
MCAG	Merced County Association of Governments
MCE	Merced Regional Airport
MEI	maximum exposed individual
MID	Modesto Irrigation District
MOU	memorandum of understanding
MOW	Maintenance of way
Mph	miles per hour
MPO	metropolitan planning organizations
MRZ	mineral resource zone
MS4 Permit	NPDES General Permit for Municipal Separate Storm Sewer Systems
MS4	Municipal Separate Storm Sewer Systems
MTC	Metropolitan Transportation Commission
MTUCD	Manual on Uniform Traffic Control Devices
MW	megawatts
MWELO	model water efficient landscape ordinance
N/A	not applicable
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAH	Native American Heritage Commission
NCCP	natural community conservation plan
NCED	National Conservation Easement Database
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFCS	Natural Resources Conservation Service
NFHL	National Flood Hazard Layer
NFIP	The National Flood Insurance Program
NGOs	nongovernmental organizations
NHD	National Hydrography Dataset
NHFP	National Highway Freight Program
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NOA	Notice of Availability
NOP	Notice of Preparation

NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NSR	New Source Review
NSWD	non-stormwater discharge
OCP	organochlorine pesticides
OEHHA	Office of Environmental Health Hazard Assessment
OHP	Office of Historic Preservation
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbons
PB	lead
PCB	polychlorinated biphenyl
PCB	polychlorinated biphenyls
PCJPB	Peninsula Corridor Joint Powers Board
PG&E	Pacific Gas and Electric Company
PGA	peak ground acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PI	Plasticity Index
Plan	State Energy Plan
PM	particulate matter
PM_{10}	particulate matter smaller than 10 microns in diameter
$PM_{2.5}$	particulate matter smaller than 2.5 microns in diameter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act of 1969
Ppb	parts per billion
Ppb	parts per billion
Ppm	parts per million
PPV	peak particle velocity
Prior EIR	ACE Extension Lathrop to Ceres/Merced EIR
PTC	Positive Train Control
Public Res. Code	California Public Resources Code
RC	reinforced concrete
RCRA	Resources Conservation Recovery Act
Regional Water Boards	Regional Water Quality Control Boards
Richmond Railyard Study	Air Dispersion Modeling Assessment of Air Toxic Emissions from the BNSF Richmond Railyard
RMP	risk management plan
RMS	root-mean-square
ROG	reactive organic gases
ROW	right-of-way
RPS	Renewables Portfolio Standard
RTA	Rail Transit Agency
RTP	Regional Transportation Plan

RWD	Report of Waste Discharge
RWQCBs	Regional Water Quality Control Boards
S	soil
SAFE	USEPA Safer Affordable Fuel-Efficient
Santa Clara VTA	Santa Clara Valley Transportation Authority
SB	Senate Bill
SCS	Sustainable Communities Strategy
SED	Safety and Enforcement Division
SEL	sound exposure level
SEMS	California Standardized Emergency Management System
SERT	Special Emergency Response Team
SFBAAB	San Francisco Bay Area Air Basin
SFHA	special flood hazard areas
SGMA	California Department of Water Resources Sustainable Groundwater Management Act of 2014
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SJJPA	San Joaquin Joint Powers Authority
SJRRC	San Joaquin Regional Rail Commission
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLC	California State Lands Commission
SLIC	Spills, Leaks, Investigation, and Cleanup
SLR	sea level rise
SMARA	State Surface Mining and Reclamation Act
SO_2	sulfur dioxide
SO_2	sulfur dioxide
SOI	sphere of influence
SO_X	sulfur oxide
SPRR	Southern Pacific Railroad
SR	State Route
SR	State Route
SRA	shaded riverine aquatic cover
SSPP	System Safety Program Plan
StanCOG	Stanislaus County Council of Governments
State Water Board	State Water Resources Control Board
STB	Surface Transportation Board
SUDP	Specific Urban Development Plan
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminants
Tanner Act	Toxic Air Contaminant Identification and Control Act

TCE	temporary construction easement
TDS	total dissolved solids
TID	Turlock Irrigation District
TMDL	total maximum daily load
TOD	transit-oriented development
TPZs	timberland production zones
TSA	Transportation Security Administration
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
UPRR	Union Pacific Railroad
USA North	Underground Service Alert North
USACE	U.S. Army Corps of Engineers
USAR	urban search and rescue
USDA NRSC	U.S. Department of Agriculture Natural Resource Conservation Service
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VdB	vibration velocity
VegCAMP	Vegetation Classification and Mapping Program
VMT	vehicle miles traveled
Wat. Code	California Water Code
WDR	waste discharge requirement

Executive Summary

This executive summary presents the key findings of this environmental impact report (EIR) for the San Joaquin Regional Rail Commission's (SJRRC) Altamont Corridor Express (ACE) Ceres–Merced Extension Project (Project). SJRRC proposes to expand service to additional cities in Stanislaus and Merced Counties. This section summarizes the background, need for the Project, Project objectives, description, costs, environmental impacts and mitigation, alternatives, areas of controversy, and areas to be resolved associated with the Project.

The Proposed Project is the extension of ACE service from Ceres to Merced and includes the development of the following facilities.

- The Ceres to Merced Extension Alignment, which consists of upgrades to track, new track, and bridges within the Union Pacific Railroad (UPRR) Fresno Subdivision between Ceres and Merced.[1]
- New Turlock, Livingston, and Merced Stations, which are located along the Ceres to Merced Extension Alignment.
- The Merced Layover & Maintenance Facility, which is located in north Merced to support extension operations.

In addition, the SJRRC has identified the Atwater Station Alternative as an alternative to the Livingston Station. Only one station would be implemented in either Livingston or Atwater. This EIR analyzes both stations at an equal level of detail. The final decision as to whether to adopt the Proposed Project and/or an alternative will be made after completion of the final EIR for this Project.

ES.1 Project Background

SJRRC is the designated owner, operator, and policy-making body for the ACE service that presently connects the northern San Joaquin County, the Tri-Valley, and the Silicon Valley by providing weekday train service from Stockton to San Jose.

SJRRC manages and operates the ACE service, which provides commuter rail service between San Jose and Stockton. The existing 86-mile ACE service corridor passes through Santa Clara, Alameda, and San Joaquin Counties, with 10 stations along the route. At the western end of the ACE corridor, ACE operates on an approximately 4-mile segment of track between San Jose and Santa Clara, which is owned and operated by the Peninsula Corridor Joint Powers Board (PCJPB). North of the Santa Clara Station to Stockton, ACE operates on approximately 82 miles of track owned by UPRR. ACE operates on portions of UPRR's Coast, Niles, Oakland, and Fresno subdivisions.

As part of Senate Bill (SB) 132, passed in April 2017, SJRRC was awarded $400 million for the ACE service expansion to Ceres/Merced, including associated system improvements. SJRRC prepared the *ACE Extension Lathrop to Ceres/Merced EIR* (Prior EIR) in 2017–2018. The Prior EIR analyzed the Phase I extension of ACE service from Lathrop to Ceres at a project-level detail and the Phase II

[1] A *subdivision* is a portion of railroad or railway that operates under a single timetable (authority for train movement in the area).

extension from Ceres to Merced at a programmatic-level of detail. The Prior EIR was certified and Phase I of the Project was approved by the SJRRC Board of Commissioners on August 3, 2018. The extension from Lathrop to Ceres is currently in the final engineering design and permitting phase and is anticipated to start construction in fall of 2021.

The ACE Ceres–Merced Extension Project, for which this EIR is being prepared, is Phase II of the Project that was analyzed in the Prior EIR. This EIR is being prepared by the SJRRC and will analyze the potential environmental impacts from expanding ACE service between Ceres and Merced at a project level of detail. Where appropriate, this EIR will incorporates analysis from the Prior EIR that is still current.

ES.2 Need for the Project

Since its inception, SJRRC has primarily operated ACE as a weekday commuter rail service between Stockton and San Jose. ACE service began in October 1998 with two westbound morning trains from Stockton to San Jose and two eastbound afternoon trains from San Jose to Stockton on weekdays. In November 2009, a third roundtrip for ACE passengers was added, providing a third westbound morning train and a third eastbound afternoon train on weekdays. A fourth weekday roundtrip train, providing an additional westbound morning train and eastbound afternoon train, was added in September 2012. ACE provided Saturday service under a pilot program, which began on September 7, 2019; however, this service was suspended on March 21, 2020 in response to the Novel Coronavirus (COVID-19) pandemic. ACE trains consist of one diesel locomotive and five to seven bi-level passenger coaches and operate at a top speed of 79 miles per hour (mph).

Due to the current circumstances associated with the COVID-19 pandemic, ACE service was reduced. During the COVID-19 pandemic, ACE has been operating two westbound trains in the morning from Stockton to San Jose and two eastbound trains in the afternoon from San Jose to Stockton. It is anticipated that ACE service will be restored to its pre-COVID-19 levels once the pandemic is over.

The need for the ACE Ceres–Merced Extension is driven by the following considerations.

- Transportation demand driven by the economic relationships between the Bay Area, and the Sacramento area and northern San Joaquin Valley counties.
- Roadway congestion along primary routes from the northern San Joaquin Valley to the Bay Area, and the Sacramento area and limited roadway expansion options.
- Air quality issues in the northern San Joaquin Valley, the Bay Area, and the Sacramento area, and the related imperative to reduce greenhouse gas (GHG) emissions in California and globally.

Each factor contributing to the need for the ACE Ceres–Merced Extension is discussed in detail in the following sections.

ES.2.1 Transportation Demand

ES.2.1.1 Existing Altamont Corridor Express Service Area

The analysis of transportation demand for the Project was completed using the best available data and forecasts from prior to the COVID-19 health emergency. The exact long-term impact of COVID-19 on transportation patterns and travel demand is not known and cannot be estimated without

engaging in speculation. California Environmental Quality Act (CEQA) guidelines specifically prohibit the use of speculation in CEQA analyses. While the specific scale and duration of COVID-19 effects on transportation patterns and travel demand are not known at this time, it is logical to consider that travel demand will return to the northern San Joaquin Valley and San Francisco Bay Area in time, although it is possible that the exact timing and rate of population and economic growth may be slower than estimated prior to the COVID-19 health emergency. If that occurs, it is still expected that travel demands between the northern San Joaquin Valley and the Bay Area will increase over time and thus there will be increase pressures on overcapacity roadways and demand for alternatives such as the Project. The forecasts for future year ridership may ultimately occur a few years later than estimated, but the demand is still expected to be realized in time.

Between 1990 and 2013, the number of people commuting from the northern San Joaquin Valley to the Bay Area more than doubled, growing from 32,000 to nearly 65,000 commuters (Bay Area Council Economic Institute 2016). Since then, the number of people commuting from the northern San Joaquin Valley to the Bay Area has grown to 86,445 in 2017 and 93,398 in 2018 (Bay Area Council Economic Institute 2017 and 2018). In 2015, approximately 1.33 million annual riders traveled on ACE. The annual ridership (calculated between July 2018 and June 2019), prior to the COVID-19 pandemic, was calculated to be 1.50 million riders (San Joaquin Regional Rail Commission 2020a).

Due to this great demand between northern San Joaquin Valley and the Bay Area, road congestion along the I-205 and I-580 corridors resulted in substantial travel delays prior to the COVID-19 health emergency (see discussion of COVID-19 health emergency on estimates of future demand above). ACE service provides a critical alternative to travel between northern San Joaquin Valley and the Bay Area.

The need for ACE passenger rail service stems from the social and economic ties that bind together the San Joaquin Valley and the Bay Area (specifically the Tri-Valley and the Silicon Valley/South Bay regions). To-date, the most characteristic ACE trips are journeys to and from employment areas in the Bay Area during peak commute times, from riders' places of residence in the San Joaquin Valley or the Tri-Valley to riders' places of work in the Tri-Valley or Silicon Valley/South Bay.

Table ES-1 summarizes the anticipated increases in population and employment growth in the counties within the existing ACE corridor. Population growth in Santa Clara, Alameda, and San Joaquin Counties was projected to grow at a generally steady rate from 2020 to 2030, with San Joaquin County experiencing the greatest population growth among the three counties. Employment growth within the three counties was anticipated to be the highest from 2020 to 2025, with San Joaquin County also experiencing the greatest employment growth among the three counties during this time. San Joaquin County will also continue to have the greatest discrepancy in the ratio of employment opportunities to population (jobs/person ratio) compared to Santa Clara and Alameda Counties. The jobs/person ratio for Santa Clara and Alameda Counties remains stable at 1:1.6 and 1:1.3 jobs/person respectively, from 2020 to 2035. San Joaquin County has a greater discrepancy in the jobs/person ratio than in the Bay Area counties, with 1:2.9 jobs/person in 2020 and 1:2.8 jobs/person in 2025 and 2030. Although San Joaquin County was projected to have the greatest employment growth of the three counties from 2020 to 2025 and from 2025 to 2030, this would not substantially reduce the discrepancy in the county's jobs/person ratio. The primary drivers of these imbalances are the relative robust economy in the Bay Area (Santa Clara and Alameda Counties) combined with dramatic increases in housing prices compared to historically lower employment opportunities and lower housing prices in San Joaquin County. These population and employment

projections support the general characteristics of current ACE trips and contribute to the need for future increased ACE service from San Joaquin County.

Table ES-1. Projected Population and Employment Growth in the Existing ACE Service Areas

Counties	2020	2025	2030	% Change 2020–2025	% Change 2025–2030
Population					
Santa Clara County	1,967,585	2,023,194	2,094,936	2.8	3.6
Alameda County	1,685,886	1,756,709	1,832,576	4.2	4.3
San Joaquin County	782,545	832,480	879,055	6.4	5.6
Employment					
Santa Clara County	1,200,520	1,268,920	1,337,320	5.7	5.4
Alameda County	1,269,560	1,339,260	1,408,960	5.5	5.2
San Joaquin County	274,100	293,100	312,100	6.9	6.5

Source: California Department of Finance 2020; California Employment Development Department 2019a, 2019b, 2019c.

Note: 2020, 2025, and 2030 employment figures are based upon a linear interpolation of 2016 and 2026 employment estimates from the California Employment Development Department (California Employment Development Department 2019a, 2019b, 2019c).

ES.2.1.2 Extended Altamont Corridor Express Service Area

SJRRC proposes to extend ACE service from Ceres to Turlock, Livingston or Atwater, and Merced. As described in the 2013 San Joaquin Council of Governments' *Interregional Multi-Modal Commute Trip Planning Study*, a large number of employed residents of San Joaquin, Stanislaus, and Merced Counties work outside the region or in a county other than their county of residence (San Joaquin Council of Governments 2013). Since the three-county region in the San Joaquin Valley has fewer jobs than workers, this imbalance leads to significant proportions of the workforce commuting out of the three-county region for work. Residents of the three-county region who work outside the county in which they reside travel mostly to the Bay Area (approximately 14 percent of all employed residents in the region) or commute within the three-county region but to a different county from their county of residence (approximately 9 percent of all employed residents in the region) (San Joaquin Council of Governments 2013). Given these travel characteristics, there is an existing and growing demand for transit services between the Bay Area and the San Joaquin Valley.

Table ES-2 summarizes the anticipated increases in population and employment in Stanislaus and Merced Counties, where the Project would be located. As shown, the anticipated populations in Stanislaus, and Merced Counties are significantly greater than the number of jobs offered in the respective counties for 2020, 2025, and 2030. This population and employment growth pattern are likely to increase the existing trend for commutes from the three-county region to the Bay Area and commutes within the three-county region.

These population and employment growth patterns contribute to the need for future increased ACE service from Stanislaus and Merced Counties.

Table ES-2. Projected Population and Employment Growth in the Extended ACE Service Areas

Counties	2020	2025	2030	% Change 2020–2025	% Change 2025–2030
Population					
Stanislaus County	562,303	584,055	606,900	3.9	3.9
Merced County	287,420	307,981	329,635	7.2	7.0
Employment					
Stanislaus County	213,460	220,240	231,540	3.2	5.1
Merced County	90,100	92,500	96,500	2.7	4.3

Source: California Department of Finance 2020; California Employment Development Department 2019d and 2019e.

Note: 2020, 2025, and 2030 employment figures are based upon a linear interpolation of 2016 and 2026 employment estimates from the California Employment Development Department (California Employment Development Department 2019d and 2019e).

This Project will allow ACE riders to travel from Merced to Sacramento. ACE service to Sacramento currently does not exist but is planned and has been environmentally cleared under CEQA as a part of the Valley Rail Sacramento Extension Project. As described in the Final EIR for the Valley Rail Sacramento Extension Project, there is a need to increase service between the San Joaquin Valley and Sacramento due to the region's unbalanced ratio of housing and jobs, which will continue to diverge, with even more people moving out of the Sacramento to find affordable housing in the San Joaquin Valley (San Joaquin Regional Rail Commission 2020b).

ES.2.2 Roadway Congestion

The predominant mode of personal travel where the existing and extended ACE corridor are located is the automobile. In addition, many of the roadway corridors are influenced by truck traffic between the Central Valley, Bay Area, and the Sacramento area, particularly Interstate (I-) 205 and I-580. Economic growth and the corresponding demand for transportation services in Santa Clara, Alameda, San Joaquin, Stanislaus, and Merced Counties have exceeded the region's ability to provide the needed roadway capacity. The existing and extended ACE corridor provides transportation services in the vicinity of the following freeway segments.

- State Route (SR) 99 and I-5 from Merced to Stockton and Sacramento
- SR 152 from I-5 near Los Banos to US 101 in Gilroy and then north to San Jose
- SR 140 from SR 99 in Merced to I-5 west of Gustine
- SR 132 from SR 99 in Modesto to I-5 and I-580
- SR 120 from SR 99 to I-5
- I-5 from Stockton to Lathrop and points south
- I-205 from Lathrop to the San Joaquin County line
- I-580 from San Joaquin County line to Pleasanton
- SR 84 from Livermore to Fremont

- I-680 from Pleasanton to San Jose
- I-880 from Fremont to San Jose

The rapid increase in travel demand between the San Joaquin Valley, the Tri-Valley, the Silicon Valley/South Bay, and the Sacramento area coupled with the growth in population in the surrounding areas, has placed increasing pressures on the highways serving the region. Santa Clara and Alameda are the first and second most congested counties within the nine-county Bay Area (California Department of Transportation 2020).

The congestion experienced on the freeway segments in the Bay Area carry over onto freeway segments in the San Joaquin Valley. As it connects with I-580 near the Alameda–San Joaquin County line, I-205 serves as a major interregional connector for moving people and goods between the northern San Joaquin Valley and the Bay Area. The commute pattern on I-205 is unidirectional, with San Joaquin Valley residents commuting to jobs in the Bay Area during the morning period and returning in the afternoon period. Congestion on I-205 correlates with this travel pattern, which stems from the growing jobs and housing imbalance within the San Joaquin Valley. In the future, this commute pattern from the San Joaquin Valley to the Bay Area is expected to continue and become even more pronounced. With this pattern, congestion and bottlenecking on I-205 is anticipated to worsen. In the northern San Joaquin Valley, congestion locations occur most frequently in urban areas where the annual average daily traffic tends to be higher, exit and entry ramps or interchanges are more frequent, and the risk of crashes is more prominent. Congestion on SR 99 primarily occurs near urban centers, such as Stockton, Modesto, and Merced (Fresno Council of Governments 2017).

Congestion on freeway corridors in the vicinity of ACE are anticipated to increase to the point at which travel peak periods would spread into midday and to later in the evening, even if planned roadway improvements take place. Bottlenecks would continue to constrain movement through the corridor. As shown in Table ES-1, job growth in the Bay Area was expected to increase between 5 and 6 percent between 2020 and 2025 and between 2025 and 2030. As shown in Tables ES-1 and ES-2, population growth and job growth are expected to increase in both the Bay Area and the San Joaquin Valley. The resultant new transportation demand will lead to high levels of congestion that will take a toll on economic development by constraining goods and people movement.

As one example, between 2013 and 2040, peak hour traffic was projected to increase as follows on routes of regional significance in the Tri-Valley and adjacent areas (DKS Associates 2017).

- I-680 south of SR 84 (Sunol Grade)—52 percent increase in peak hour traffic
- I-580 east of Tassajara Road—35 percent
- I-580 east of Vasco Road—59 percent
- I-680 overall in Tri-Valley
    - 2013—a.m. peak average speeds of 56 mph (northbound) to 57 mph (southbound) and p.m. peak average speeds of 45 mph (northbound) to 58 mph (southbound)
    - 2040—a.m. peak average speeds of 46 mph (northbound) to 52 mph (southbound) and p.m. peak average speeds of 40 mph (southbound) to 46 mph (northbound)
- I-580 overall in Tri-Valley
    - 2013—a.m. peak average speeds of 35 mph (westbound) to 62 mph (eastbound) and p.m. peak average speeds of 49 mph (eastbound) to 59 mph (westbound)

- 2040—a.m. peak average speeds of 26 mph (westbound) to 51 mph (eastbound) and p.m. peak average speeds of 35 mph (eastbound) to 48 mph (westbound)

Similar increases in congestion are expected for I-880, SR 84, I-205, and SR 99.

Opportunities to improve highway capacity are constrained by a number of factors, including funding availability, the need for extensive and costly right-of-way acquisitions, and potential environmental impacts, such as displacement of residences and businesses, and impacts on natural resources and redesign of local roadways beyond the interchanges. For these reasons, substantial capacity improvements to I-880, I-680, SR 84, I-580, I-205, SR 120, I-5, and SR 99 cannot be relied upon to fully address long-term travel demands in the corridor. In this environment, ACE provides an essential and viable transportation alternative to costly highway capacity expansion. By reducing trip times and increasing transit ridership, the ACE Ceres–Merced Extension Project would help to ease congestion on the Bay Area and San Joaquin Valley freeways.

This Project will allow ACE riders to travel from Merced to Sacramento. The benefits associated with relieving traffic congestion for travelers in the San Joaquin Valley to the Sacramento area has been identified previously in the Final EIR for the Valley Rail Sacramento Extension Project (San Joaquin Regional Rail Commission 2020b). The ACE Ceres–Merced Extension Project would contribute to the overall benefit of relieving traffic congestion along I-5 and SR-99.

ES.2.3 Air Quality and Greenhouse Gas Emissions

High rates of automobile ownership and increasing vehicle miles traveled (VMT) have contributed to air quality problems throughout California. Pollutants of concern include nitrogen oxides and reactive organic gases, which are precursors of ozone (also referred to as *smog*); sulfur dioxides; carbon monoxide; and particulate matter. GHGs (including carbon dioxide, nitrous oxide, methane, and other gases) are now a focus of environmental planning in California because of their role in global climate change. Motor vehicles are substantial contributors to the production of all of these pollutants.

The existing ACE corridor and the proposed extension of ACE service to Merced includes portions of two air basins: the San Francisco Bay Area Air Basin (SFBAAB), for which air quality conditions are regulated by the Bay Area Air Quality Management District (BAAQMD), and the San Joaquin Valley Air Basin (SJVAB), for which air quality conditions are regulated by the San Joaquin Valley Air Pollution Control District (SJVAPCD). While the air quality has improved in recent years, largely in response to technological improvements in motor vehicles and fuels, both air basins face substantial challenges to meet air quality standards.

The SFBAAB is designated a marginal nonattainment area for the 8-hour federal standard for ozone, a moderate nonattainment area for the federal PM2.5 (particulate matter smaller than 2.5 microns in diameter) standard, and a maintenance area for the federal carbon monoxide standard. With respect to the California standards, the SFBAAB is currently a serious nonattainment area for the 1-hour ozone standard and a nonattainment area for the 8-hour ozone, PM2.5, and PM10 (particulate matter smaller than 10 microns in diameter) standards.

The San Joaquin Valley has more challenging air quality issues than the SFBAAB. The SJVAB is designated an extreme nonattainment area for the 8-hour federal standard for ozone and a nonattainment area for the federal PM2.5 standard. With respect to California standards, the SJVAB

is currently a severe nonattainment area for the 1-hour ozone standard and a nonattainment area for the 8-hour ozone, PM2.5, and PM10 standards.

Section 3.3, *Air Quality*, provides a summary of data collected at the air quality monitoring stations nearest to the ACE corridor and a discussion of the total number of days that state and federal ambient air quality standards were exceeded.

Because transportation is the major contributor to ozone precursors, increasing auto travel threatens the area's improvement in air quality. Growing traffic generation and congestion will add to the potential problems because of increased emissions due to increased number of vehicles operating and also due to this increased traffic being subjected to increased frequency of stop-and-go traffic. Shifting commuters and other travelers to higher occupancy modes is highly desirable as a means to partially offset the effects on air quality produced by the growth in auto travel. Expanded ACE service offers the greatest potential for increased high-occupancy travel from the San Joaquin Valley to the Bay Area and the Sacramento area, including in areas with the most severe air quality problems in the corridor. Compared to the conditions without the Project, by 2040, the ACE Ceres-Merced Extension would result in reduction in emissions of up to 0.2 tons per year of ozone precursors and 9.6 tons per year of PM10 in the BAAQMD and up to 6.9 tons per year of PM10 in the SJVAPCD as a result of extended ACE service (see Section 3.3, *Air Quality*). The ACE Ceres-Merced Extension would also result in reductions to air pollutants in the Sacramento area.

The transportation sector is the largest source of GHG emissions in California and in most communities along the existing and extended ACE corridor (California Air Resources Board 2018). The Stanislaus Council of Governments and the Merced County Association of Governments have both adopted Regional Transportation Plans (RTP)/ Sustainable Community Strategies (SCS) to reduce GHG emissions. California has ambitious goals to reduce GHG emissions throughout the state, including Assembly Bill (AB) 32 and Senate Bill (SB) 32, which outline the state's GHG reduction goals of achieving 1990 emissions levels by 2020 and a level 40 percent below 1990 emissions levels by 2030 (see Section 3.8, *Greenhouse Gas Emission*). By reducing vehicle travel on regional roadways, the ACE Ceres–Merced Extension would also help communities along the existing ACE corridor; along the extended ACE corridor Merced to Ceres, Ceres to Lathrop, and Lathrop to Sacramento; and California as a whole to meet their goals for GHG reductions. Compared to the conditions without the Project, operations of the ACE Ceres–Merced Extension would result in a reduction of approximately 4,082 metric tons of carbon dioxide equivalent of GHG emissions by 2040 (see Section 3.8, *Greenhouse Gas Emissions*).

ES.3 Project Objectives

The primary objectives of the ACE Ceres–Merced Extension Project is to enhance commuter rail and intercity service and transit connections in the San Joaquin Valley; reduce traffic congestion, improve regional air quality, and reduce GHG emissions; and to promote local and regional land use and transportation sustainability goals. Each of these objectives is discussed in detail in this section.

- **Enhance commuter rail and intercity service and transit connections in the San Joaquin Valley.** Project improvements would support enhanced commuter rail and intercity passenger rail and transit access and connectivity, as well as provide additional surface passenger transportation capacity in the San Joaquin Valley. The ACE Ceres–Merced Extension Project would extend the reach of the existing commuter and intercity rail transportation network of

the San Joaquin Valley. The Project would provide additional service to areas currently lacking access to passenger rail transportation as well as supplementing rail service to other areas. The Project would support transit-oriented development near proposed station locations. The Project would also provide an opportunity to connect with the future California High-Speed Rail System, which would integrate ACE service into a unified northern California rail network. These commuter and intercity rail connections are expected to stimulate additional ACE ridership.

- **Reduce traffic congestion, improve regional air quality, and reduce greenhouse gas emissions.** An expanded and improved ACE system would provide a transportation alternative to automobile use, which would alleviate traffic congestion on corridor highway segments (along SR 99, I-205, I-580, I-680, I-5, and I-880) and result in air quality benefits and a reduction in GHG emissions. In addition, by maximizing connections with other transit services within the San Joaquin Valley, the Project would contribute to indirect benefits related to alleviating congestion and improving regional air quality. Reductions in air pollutant emissions represent long-term health benefits for ACE riders, and for residents and employees along the ACE corridor. In addition, reduction of GHG emissions would help California to meet its goals under Assembly Bill 32, the 2006 Global Warming Solutions Act (as amended by Senate Bill 32), as well as other state GHG emission reduction goals.
- **Promote local and regional land use and transportation sustainability goals.** Metropolitan areas are implementing strategies to encourage more efficient use of land resources, improve mobility, and provide alternative transportation facilities and services in order to lower GHG emissions and to maintain air quality standards. One statewide strategy adopted in the California State Implementation Plan is the development of multi-use transportation corridors, including the addition of more transit and the expansion of rail modal options. This Project would further improve regional air quality and reduce GHG emissions, beyond reducing VMT from automobiles, by supporting regional land use and transportation planning goals under the Sustainable Communities and Climate Protection Act of 2008 (also known as SB 375) and other local, regional, and state sustainability initiatives. ACE is evaluating potential new ACE stations between Ceres and Merced. The new transit stations could act as a catalyst for smart growth in communities by revitalizing city core areas and addressing traffic congestion issues in the cities of the northern San Joaquin Valley.

ES.4 Project Description

SJRRC is proposing to expand ACE service to Ceres and to Merced. Figure ES-1 depicts the location of the Project. The analysis in this EIR would allow subsequent implementation of individual facilities, and prioritization and phasing of facilities. Infrastructure improvements and passenger service can be increased in a phased approach over time. Thus, the development of physical improvements and implementation of ACE service could be phased in over time, as follows.

- Initial improvements: Construction of stations, parking, and key track/infrastructure improvements and commencement of initial service (one or more trains).
- Interim improvements: Construction of additional track improvements, such as the additional new mainline track, at specific areas of train congestion, and possibly additional parking improvements necessary because of increased ridership, which would allow further expansion of service beyond the initial service or expansion.

- Full build: Completion of all proposed improvements and implementation of the full service plans.

ES.4.1 Overview of the Project

ES.4.1.1 Proposed Project

The Proposed Project is the extension of ACE service from Ceres to Merced, and includes the following facilities.

- The Ceres to Merced Extension Alignment, which consists of upgrades to track, new track, and bridges within the UPRR Fresno Subdivision between Ceres and Merced (see Figure ES-1).
- New Turlock, Livingston, and Merced Stations, which are located along the Ceres to Merced Extension Alignment (see Figures ES-2, ES-3, and ES-4).
- The Merced Layover & Maintenance Facility, which is located in north Merced to support extension operations (see Figure ES-5).

Detailed descriptions of the Proposed Project are presented in Chapter 2, *Project Description*.

ES.4.1.2 Alternatives Analyzed

This EIR analyzes one alternative to the proposed Livingston Station (the Atwater Station Alternative), one alternative to the Merced Station (the Merced Station Alternative), and one alternative to the Merced Layover & Maintenance Facility (the Merced Layover Facility Alternative).

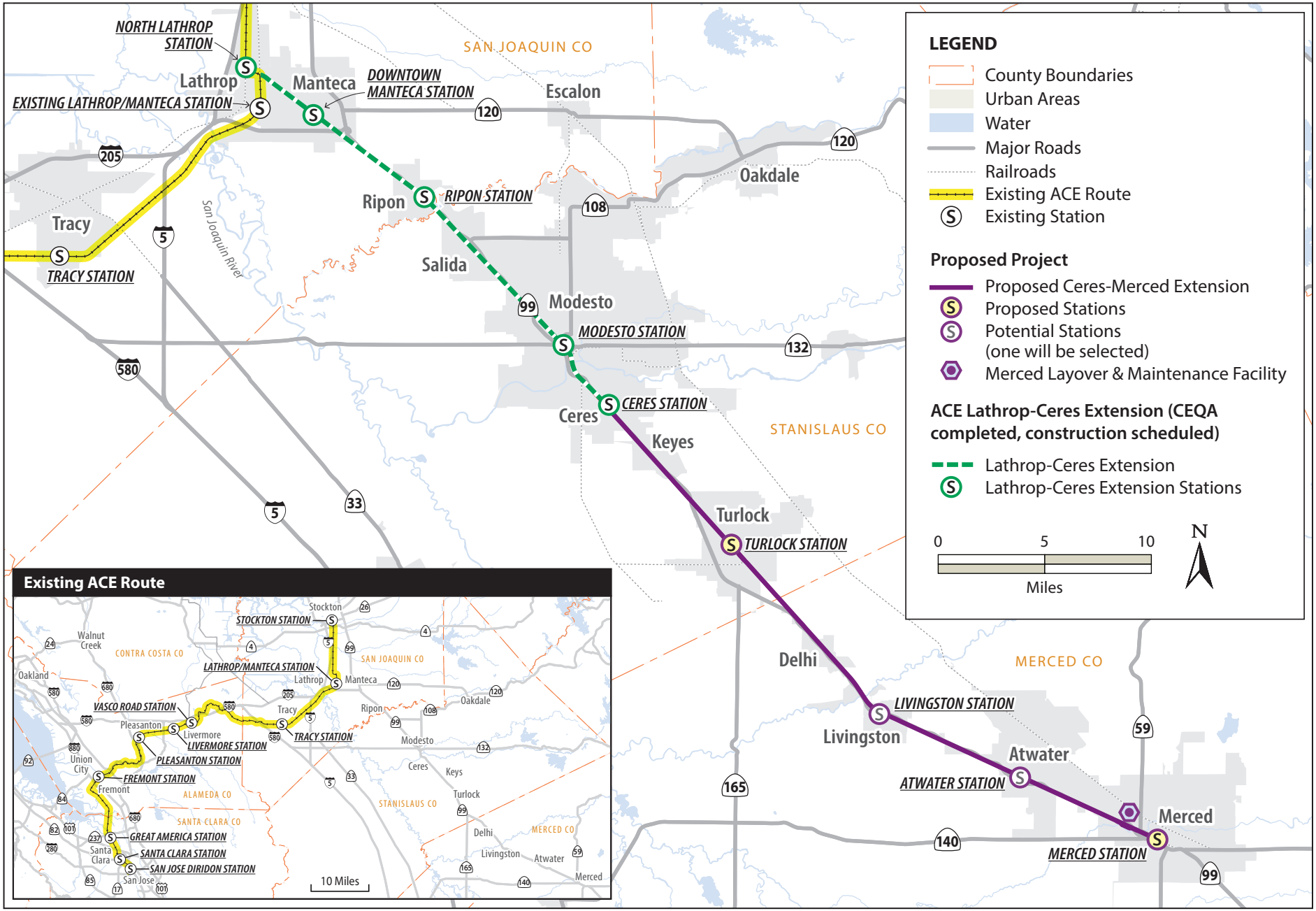
- The Atwater Station Alternative (see Figure ES-6) is analyzed at an equal level of detail as the Proposed Project and a detailed description of this alternative is presented in Chapter 2, *Project Description*.
- The Merced Station Alternative and the Merced Layover Facility Alternative are analyzed at a lesser level of detail in Chapter 5, *Alternatives.*

A summary of why the SJRRC is proposing the facilities identified as a part of the Proposed Project and not the alternatives is included below.

Livingston Station versus Atwater Station Alternative

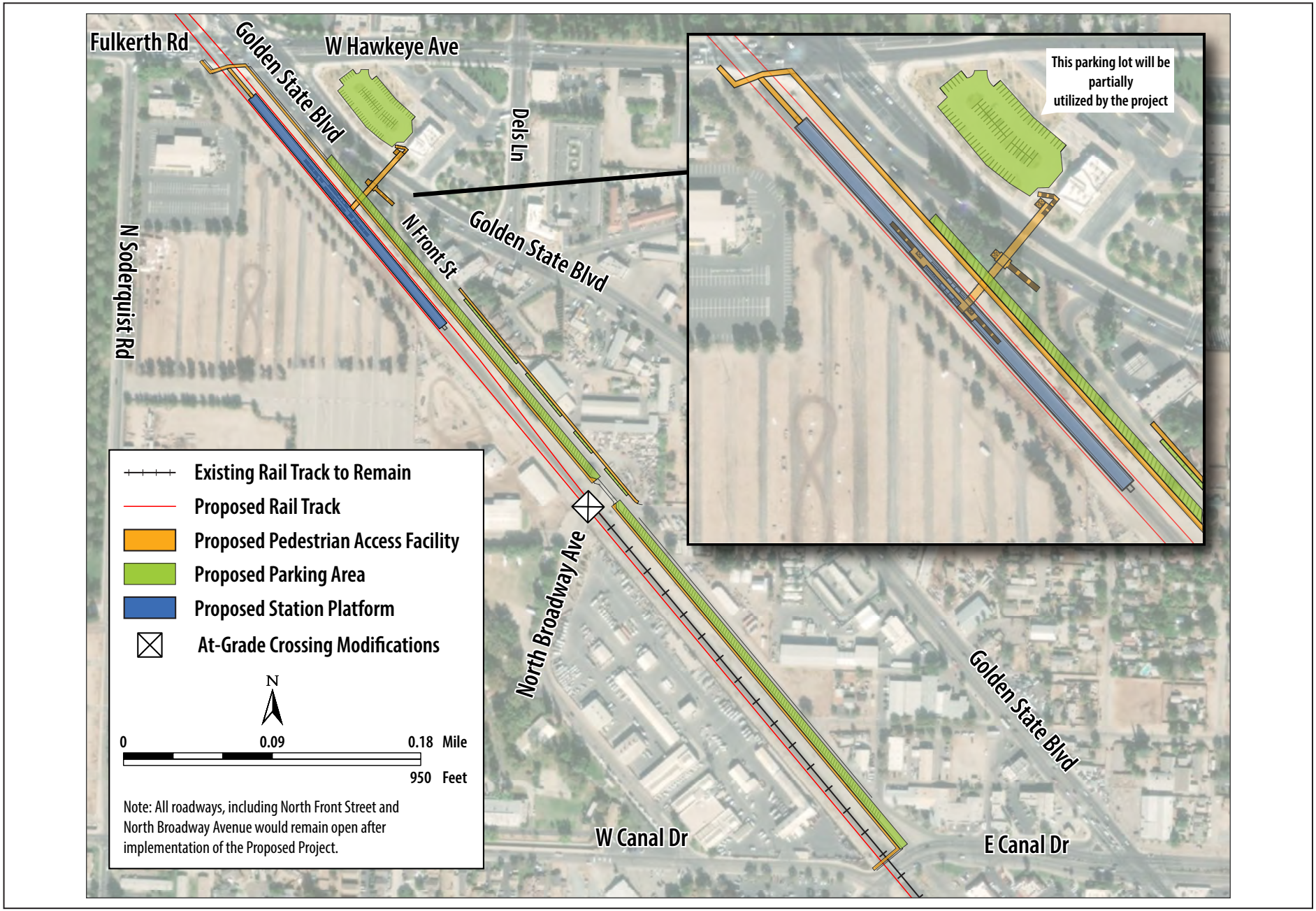
As shown in the environmental resource sections in Chapter 3, there are no substantial differences in environmental impacts between the proposed Livingston Station and the Atwater Station Alternative. SJRRC has included the Livingston Station and not the Atwater Station Alternative as part of the Proposed Project due to the reasons identified below and summarized in Table ES-3.

- *Spacing between stations.* The Livingston Station would be 14 miles from the Merced Station and 11 miles from the Turlock Station, which allows better freight operations than the Atwater Station Alternative. The Atwater Station Alternative is located only 7 miles from the Merced Station, which could create more freight bottlenecks.
- *Parking accessibility.* With the Livingston Station, ACE riders would be able to access the station platform from one contiguous lot and would not need to cross a roadway to access the station. The Atwater Station Alternative would require two parking lots, with one adjacent to the station and another across the street.



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Figure ES-1
Project Location
ACE Ceres-Merced Extension Project



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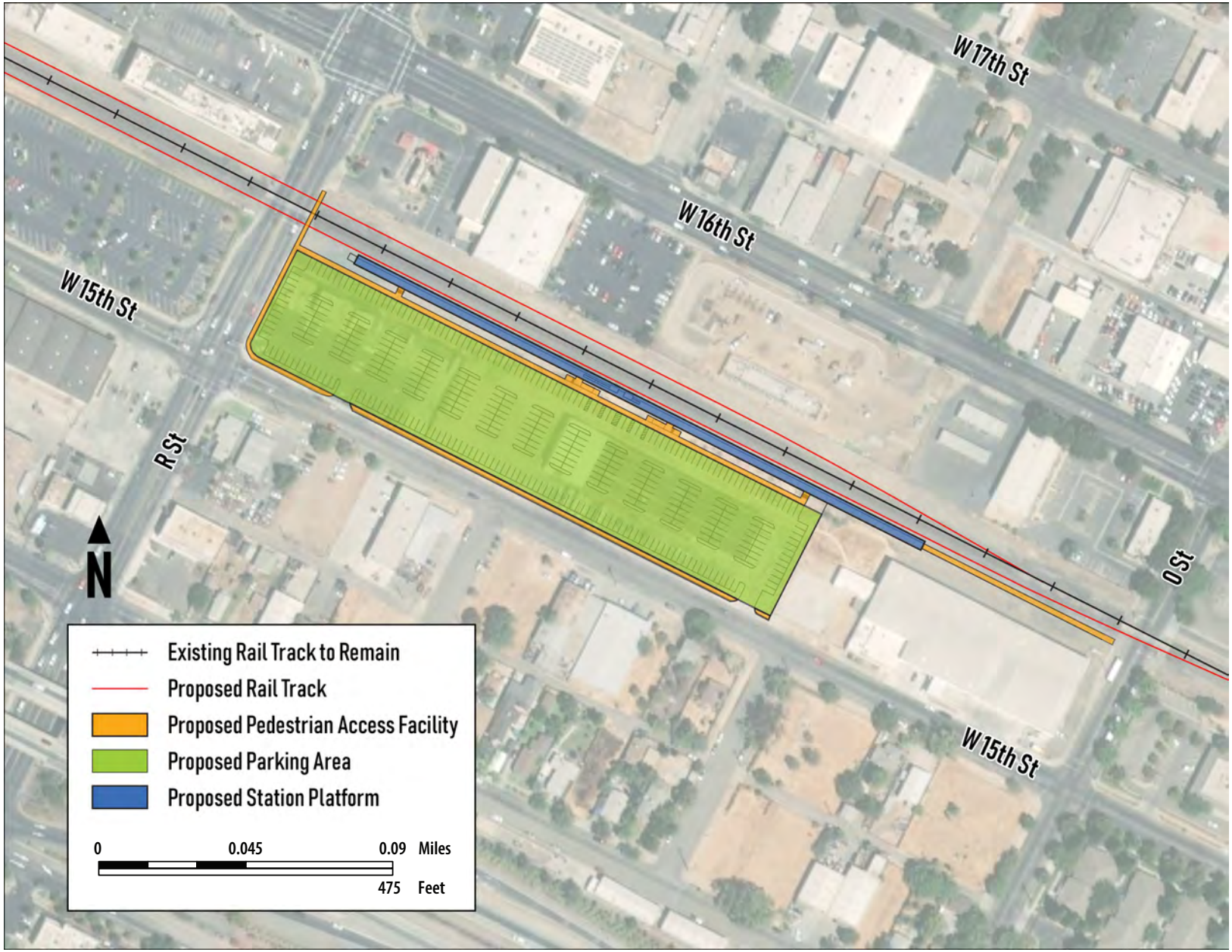
Figure ES-2
Turlock Station
ACE Ceres-Merced Extension Project



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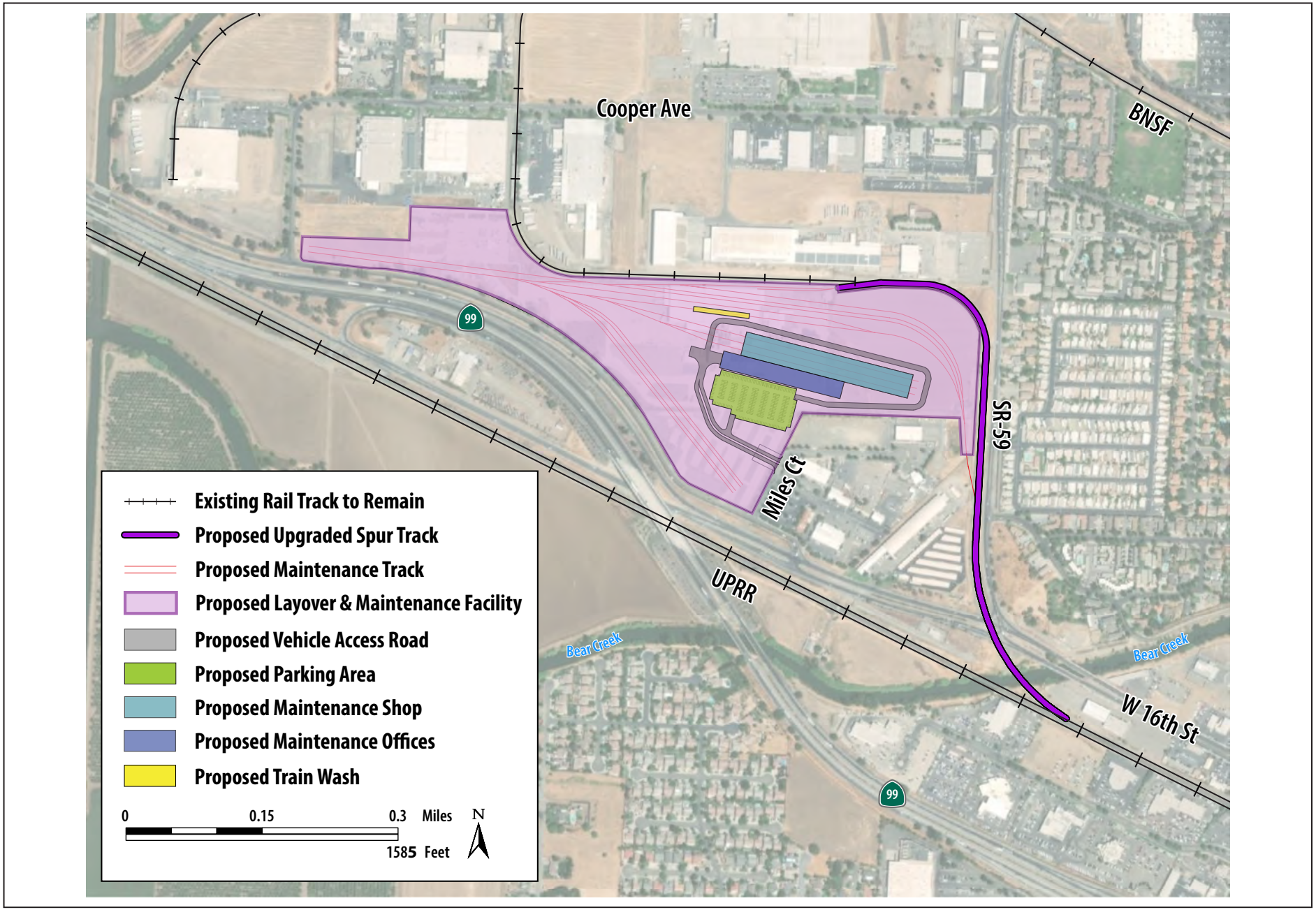
Figure ES-3
Livingston Station
ACE Ceres-Merced Extension Project



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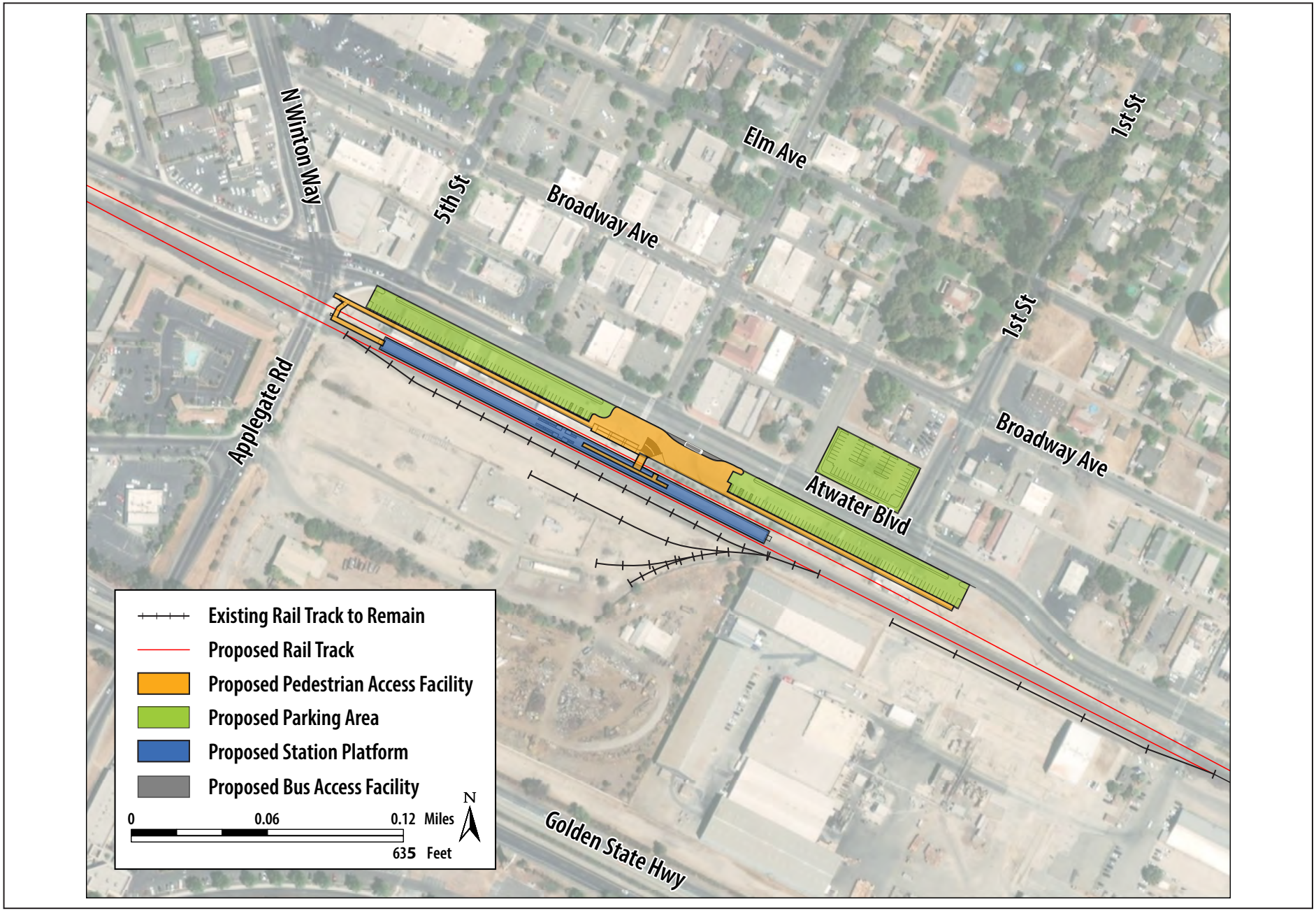
Figure ES-4
Merced Station
ACE Ceres-Merced Extension Project



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Figure ES-5
Merced Layover & Maintenance Facility
ACE Ceres-Merced Extension Project



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Figure ES-6
Atwater Station Alternative
ACE Ceres-Merced Extension Project

- *Number of Parcels.* The Livingston Station would require the acquisition of one parcel and one area that is Caltrans excess right-of-way (ROW). The Atwater Station Alternative would require the acquisition of ten parcels (see Tables 2-11 and 2-12 in Chapter 2).
- *Demolition and Business Impacts.* The Livingston Station would require the demolition of only one existing building and the potential relocation of any associated active business operations. The Atwater Station Alternative would require the demolition of four existing buildings and the potential relocation of any associated active business operations.
- *Cost.* The cost associated with the Livingston Station, as shown in Table ES-3, is expected to be $6.4 million less than the Atwater Station Alternative.

Table ES-3. Comparison of Proposed Livingston Station and Atwater Station Alternative

Criteria	Proposed Livingston Station	Atwater Station Alternative
Station Spacing	Merced to Livingston = 14 miles Livingston to Turlock = 11 miles	Merced to Atwater = 7 miles Atwater to Turlock = 18 miles
Parking Accessibility	One contiguous lot adjacent to station, no need to cross a roadway.	Approximately one third of parking spaces are located across Atwater Boulevard from the station, requiring passengers to cross Atwater Boulevard to access the station.
Number of Parcels	One parcel that would need to be acquired and one area that is Caltrans excess ROW.	Ten parcels that would need to be acquired.
Demolition and Business Impacts	Demolition of one building and potential relocation of any associated active business operations.	Demolition of four buildings and potential relocation of any associated active business operations.
Cost	$21,126,387	$27,558,046

Merced Station versus Merced Station Alternative

The Merced Station Alternative analyzed in this EIR is located in the currently adopted location of the future California High-Speed Rail (HSR) station in Merced; however, this location is not preferred by the City of Merced. SJRRC is proposing to locate the ACE Merced Station in the location preferred by the City of the Merced. The City of Merced prefers a more northerly location for both the ACE station and the HSR station for the following reasons (City of Merced pers. comm.):

- It would have greater transit-oriented development potential.
- It would extend the revitalization of downtown Merced to the northwest providing a catalyst for further economic development.
- It would be adjacent to the City's existing transit center.
- It would avoid relocation of the City's central Fire Department and Station.
- It would avoid disruption to historic buildings in the downtown.
- It would avoid disruption to the City's recent investments in G Street, which is the primary emergency route to Dignity Health.,

- It would not require the roadway crossing relocations that are needed for the more southerly HSR station location.

Merced Layover & Maintenance Facility versus Merced Layover Facility Alternative

The Merced Layover Facility Alternative analyzed in this EIR was previously identified in the Prior EIR. As explained in Chapter 5, *Alternatives,* the Merced Layover & Maintenance Facility is proposed by the SJRRC instead of the location considered in the Prior EIR because it is more consistent with land use planning (located in an industrial park instead of on farmland) and would have lower impacts on prime farmland, biological resources, and visual aesthetics.

ES.4.2 Operation and Maintenance

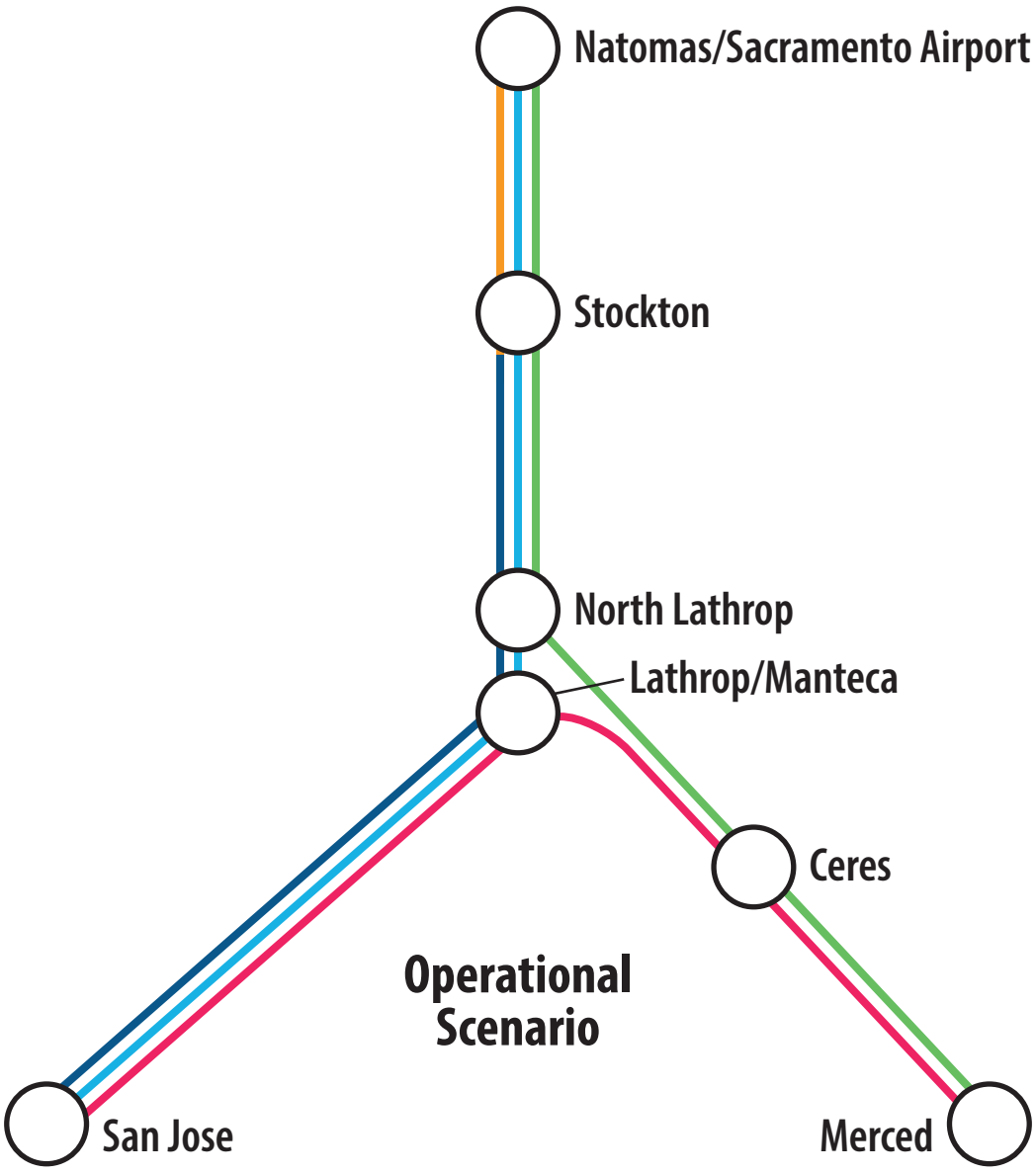
ES.4.2.1 Conceptual Service Plan

Upon implementation of full operations for the Project, ACE train service associated with the Project would consist of the following service configuration (see Figure ES-7), which would be limited to weekdays:

- In the morning, three northbound trains would run from Merced Station to the Natomas/ Sacramento Airport Station (included within the approved Valley Rail Sacramento Extension Project). Passengers boarding in Merced and Stanislaus Counties and Southern San Joaquin County would either stay on the train in the direction of Sacramento or transfer onto the three westbound trains in the direction of San Jose at the North Lathrop Station (timed transfers). One westbound train would run from Merced Station to San Jose Diridon Station directly.
- In the evening, three southbound trains would run from Natomas/Sacramento Airport Station to Merced Station. ACE passengers returning from the Bay Area would transfer at the North Lathrop Station (timed transfers) onto the three Sacramento to Merced trains. One eastbound/southbound train would run from San Jose Diridon Station to Merced Station directly.

In addition, with operation of the Project fully implemented plus the operation of the approved Valley Rail Sacramento Extension Project and the Extension from Ceres to Lathrop, the entire ACE service would include (see Figure ES-7) the following trains.

- One train in the morning and one train in the evening between the Merced Station and San Jose Diridon Station.
- Two trains in the morning and two trains in the evening between the Stockton Station and San Jose Diridon Station.
- One train in the morning and one train in the evening between Natomas/ Sacramento Airport Station and San Jose Diridon Station.
- Three trains in the morning and three train in the evening between the Merced Station and Natomas/Sacramento Airport Station.
- One train in the morning and one train in the evening between the Natomas/ Sacramento Airport Station and Stockton Station.



Legend

- Merced–San Jose (1 round trip; leaving Merced in the AM & returning in the PM)
- Natomas/Sacramento Airport–Stockton (1 round trip; leaving Natomas/Sacramento Airport in the AM & returning in the PM)
- Merced–Natomas/Sacramento Airport (3 round trips; leaving Merced in the AM & returning in the PM)
- Stockton–San Jose (2 round trips; leaving Stockton in the AM & returning in the PM)
- Natomas/Sacramento Airport–San Jose (1 round trip; leaving Natomas/Sacramento Airport in the AM & returning in the PM)

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ACE ALTAMONT CORRIDOR EXPRESS

Figure ES-7
Conceptual Service Plan
ACE Ceres-Merced Extension Project

ES.4.2.2 Shuttle Service

ACE currently provides shuttle services at the Great America and Pleasanton Stations. In 2030, the No Project Conditions is anticipated to require 164 daily shuttle trips provided by the existing routes at the Great America Station. To support the increased ridership system wide with the Project, an additional 3 daily shuttle trips provided by the existing routes are required at the Great America Station, beyond the 2030 No Project Conditions. In 2040, the No Project Conditions is anticipated to require 197 daily shuttle trips provided by the existing routes at the Great America Station. To support the increased ridership system-wide with operation of the Project, an additional 11 daily shuttle trips provided by the existing routes are required at the Great America Station, beyond the 2040 No Project Conditions.

At the Pleasanton Station, in 2030, the No Project Conditions is anticipated to require 23 daily shuttle trips provided by the existing routes at the Pleasanton Station. To support the increased ridership system-wide with operation of the Project, one additional daily shuttle trip provided by the existing route is required at the Pleasanton Station, beyond the 2030 No Project Conditions. In 2040, the No Project Conditions is anticipated to require 26 daily shuttle trips provided by the existing routes at the Pleasanton Station. No additional daily shuttles at the Pleasanton Station would be required in 2040.

In addition, the Prior EIR identified a bus service that would consist of four buses in the morning that would shuttle passengers from Merced to Ceres and four buses in the evening that would meet passengers disembarking eastbound San Jose to Stockton trains and provide bus services to Merced. With the Project, these bus trips would be discontinued.

ES.4.2.3 Ridership

Implementation of the Project is anticipated to result in increased ridership by 2030. Table ES-4 summarizes the projected annual ridership for the entire ACE system without the Project, the forested annual ridership for the entire ACE system with the Project, and the net new annual ridership due to this Project. Ridership for the Project is presented in more detail in Appendix D, *ACE Ceres–Merced Extension Ridership, Revenue, and Benefits Report*.

Table ES-4. System Ridership with Operations of the Project

		Proposed Project (with Livingston Station)[b]		Atwater Station Alternative[b]	
Year	No Project Conditions[a]	Forecasted Annual Riders	Net New Annual Riders	Forecasted Annual Riders	Net New Annual Riders
2030[c]	3,735,500	4,176,800	441,300	4,180,900	445,400
2040[c]	4,797,100	5,364,100	567,000	5,367,500	570,400

Source: Appendix D, *ACE Extension Ridership, Revenue, and Benefits Report*.

Notes:

[a] The No Project conditions include ACE service, with the addition of the approved Sacramento Extension and Ceres Extension. Service includes the following: two direct trains between Stockton and San Jose; one direct train between Ceres and San Jose with connecting bus service between Ceres and Merced; one direct train between Natomas and San Jose; one direct train between Natomas and Stockton; three trains between Ceres and Natomas via the Natomas Extension with connecting bus service between Ceres and Merced, these three trains also connect at North Lathrop to other inbound ACE trains with service to San Jose; and four buses between Ceres and

Merced, connecting to the trains at Ceres.

[b] The scenario for the Proposed Project with the Livingston Station or the Atwater Station Alterative consists of converting the Ceres–Merced bus connection under the No Project conditions to rail.

[c] For the 2040 scenario, ACE service is the same as the ACE service used in 2030 scenario.

ES.4.2.4 Energy Consumption

The primary sources of energy used to operate ACE trains and at maintenance and station facilities are diesel fuel and electricity. Existing diesel fuel consumption is approximately 455,000 gallons per year (based on 2017 figures). Operations at the existing stations and maintenance facility required approximately 2,353,000 kilowatt hours (kWh) of electricity in 2016.

With operation of the Project, ACE diesel trains would require approximately 124,953 additional gallons of fuel per year. By 2025 when an initial service between Ceres and Merced is expected to commence, all ACE trains are expected to use renewable diesel. Electrical use at new stations and facilities with operation of the Project would require approximately additional 1,026,516 kWh of electricity per year. Section 3.6, *Energy*, provides a detailed analysis of energy demand associated with operation of the Project.

ES.4.2.5 Maintenance Activities

Track Maintenance

SJRRC does not own the tracks on which ACE operates; instead, SJRRC has entered into trackage rights agreements with host railroads (both PCJPB and UPRR) to operate on portions of their respective tracks. Maintenance-of-way (MOW) is the responsibility of the host railroad. In general, MOW is the ongoing maintenance of track (e.g., tie replacement, switch greasing, ballast recontouring), track structures, bridges, drainage features, signal apparatus and other signal infrastructure. Maintenance activities are both ongoing responses to daily issues and planned preventive maintenance. Maintenance of bridges would include routine removal of woody debris, sediment, and other materials that accumulate near the piers of the bridges. Host railroads would have other maintenance activities that are required, specific to the features located in the corridor.

PCJPB maintenance activities also include tree pruning and removal in areas where trees would pose a maintenance or safety concern. UPRR maintenance activities include annual vegetation trimming and herbicide application. With operation of ACE from Ceres to Merced, PCJPB and UPRR would continue to conduct maintenance activities associated with the rail corridor in accordance with their current practices.

Station Maintenance

ACE stations, served solely by ACE, are maintained by SJRRC even though the land may be owned by the local jurisdiction. The Fremont, Great America, Santa Clara, and San Jose Diridon Stations are maintained by other transit entities. SJRRC's Facility Department is responsible for maintenance and cleanup of stations from Pleasanton to Stockton. Maintenance crews are located at the ACE Rail Maintenance Facility in Stockton and are dispatched as needed from Stockton to the various stations. Typical maintenance activities include trash pickup, landscaping, painting, minor concrete work, and light bulb replacement. Contractors are hired for more extensive maintenance activities, such as major concrete work, platform extension, and paving. Certain stations have specific

agreements with the local jurisdictions regarding maintenance activities that would be the responsibility of the local jurisdiction.

SJRRC would own and maintain the station platforms at all new stations. Maintenance of parking at new stations would vary depending on the nature of ownership of the underlying land and future agreements between SJRRC and local jurisdictions.

Fleet Maintenance

SJRRC's existing fleet maintenance activities for ACE are conducted at the ACE Rail Maintenance Facility located at 1020 East Alpine Avenue in Stockton, approximately 1.5 miles north of the Stockton Station. Regular train maintenance consists of daily inspections of equipment (as required by the Federal Railroad Administration), cleaning, and servicing activities such as fueling, filling of sand boxes, emptying of toilet tanks, and replenishing of fluids, supplies, and consumables (including trail crew supplies). Train washing can occur up to several times per week, or as required for any special event trains. Preventive and periodic maintenance, including light and heavy repairs of passenger coaches and locomotives, are conducted as needed. With operation of ACE from Ceres to Merced, heavy maintenance activities would continue at the ACE Rail Maintenance Facility. The Merced Layover & Maintenance Facility would support train layovers, storage, light maintenance, and daily servicing. For heavy maintenance and repairs, trains would be cycled back to the ACE Rail Maintenance Facility.

ES.4.3 Construction Schedule and Durations

SJRRC proposes to initiate service along the Ceres to Merced Extension by 2025. Table ES-5 identifies the duration for construction of each proposed or alternative facility. The construction durations presented are not sequential; construction could occur simultaneously at several locations. The durations noted below are for actual construction activity. These facilities would require permitting, contractor selection, and final design prior to construction and, thus, the total duration could be longer than the construction durations noted in the table.

Table ES-5. Construction Durations

Proposed and Alternative Facilities	Construction Duration (months)
Ceres to Merced Extension Alignment	36
Merced Layover & Maintenance Facility	24
Turlock Station	14
Livingston Station	12
Merced Station	10
Atwater Station Alternative	12

ES.4.4 Right-of-Way and Easement Needs

Approximately 13 parcels outside the UPRR ROW could be affected by the Proposed Project. With the Atwater Station Alternative, approximately 22 parcels outside the UPRR ROW could be affected.

Portions of these public and private parcels may be acquired or require easements for track ROW or rail support facilities.

ES.4.5 Costs and Revenues

ES.4.5.1 Capital Costs

With the Livingston Station, capital costs associated with the Project could cost approximately $481 million for infrastructure improvements, depending on coordination with the host railroad (UPRR). With the Atwater Station Alternative, capital costs associated with the Project could cost approximately $488 million for infrastructure improvements, depending on coordination with the host railroad (UPRR). The extension of service to Merced does not necessarily require the full build of the Project in order to extend service. Train service could be initially expanded or extended with station, parking and key track/infrastructure improvements, be expanded over time with additional improvements, and then be expanded fully with the full build suite of improvements.

As shown in Table ES-6, capital costs associated with the construction of the Project differ slightly, depending on whether the Livingston Station or Atwater Station Alternative is implemented. Capital costs associated with the Project are presented in more detail in Appendix E, *ACE Ceres–Merced Extension Opinion of Probable Cost Report.*

Table ES-6. Construction Cost Estimates for the Project (2021 dollars)

Proposed or Alternative Facility	Construction Cost
Ceres to Merced Extension Alignment	$346,410,846
Merced Maintenance & Layover Facility	$73,495,973
Turlock Station	$26,023,143
Livingston Station	$21,126,387
Atwater Station Alternative	$27,558,046
Merced Station	$14,434,294
Proposed Project (i.e., with Livingston Station)	**$481,490,463**
Project with Atwater Station Alternative	**$487,922,302**

Source: Appendix E, *ACE Ceres–Merced Extension Opinion of Probable Cost Report*

ES.4.5.2 Operating and Maintenance Costs and Revenues

As shown in Table ES-7, existing annual operations and maintenance costs are estimated at approximately $24.5 million (this estimate is in 2021 dollars). Under the No Project Conditions, annual operations and maintenance costs are estimated at approximately $43.1 million in 2021 dollars. With operation of service between Ceres and Merced, annual operations and maintenance costs are estimated at approximately $50.2 million in 2021 dollars.

Table ES-7. Summary of Annual Projected Operations & Maintenance Cost (2021 dollars in millions)

	Existing Cost	No Project Conditions Cost[a]	Project Cost
Total	$24.5	$43.1	$50.2

a. The No Project Conditions include ACE service, with the addition of the approved Sacramento Extension and Ceres Extension. Service includes the following: two direct trains between Stockton and San Jose; one direct train between Ceres and San Jose with connecting bus service between Ceres and Merced; one direct train between Natomas and San Jose; one direct train between Natomas and Stockton; three trains between Ceres and Natomas via the Natomas Extension with connecting bus service between Ceres and Merced, these three trains also connect at North Lathrop to other inbound ACE trains with service to San Jose; and four buses between Ceres and Merced, connecting to the trains at Ceres.

As shown in Table ES-8, anticipated revenue associated with the No Project Conditions in 2030 and 2040 would be approximately $24.5 million and $31.6 million, respectively. Anticipated revenue associated with operation of the Project would be approximately $27.0 million in 2030 and approximately $34.8 million in 2040. Operations and maintenance costs and revenues are presented in more detail in Appendix F, *ACE Ceres–Merced Extension Operating and Maintenance Cost Technical Memorandum.*

Table ES-8. ACE System Revenue

	Annual Fare Revenue				
Ridership Scenarios	**2016 [a]**	**2030 [b]**	**% Increase from 2016**	**2040 [b]**	**% Increase from 2016**
No Project Conditions	$8,135,417	$24,511,200	201%	$31,632,200	289%
Operation of Proposed Project (with Livingston Station)	--	$27,033,900	232%	$34,872,300	329%
Operation of Project (with Atwater Station Alternative)	--	$27,041,500	232%	$34,872,800	329%

a. The annual fare revenue was identified in Table 2-11 from the Prior EIR (San Joaquin Regional Rail Commission 2018).

b. The 2030 and 2040 annual fare revenues for the No Project Conditions and the Project are identified in Appendix D, *ACE Ceres–Merced Extension Ridership, Revenue, and Benefits Report*.

ES.5 Summary of Environmental Impacts and Mitigation

The potential impacts of the Project are presented in Chapter 3, *Environmental Impact Analysis*, and cumulative impacts are presented in Chapter 4, *Other CEQA-Required Analysis*, and are summarized in Table ES-9.[2] Table ES-9 is included at the end of this Executive Summary. Mitigation measures were also identified, where available and feasible, for significant impacts identified in this EIR. These mitigation measures are also listed in Table ES-9. Please note that in Tables ES-8, the term "significant" refers to the level of impact and the term "considerable" refers to the Project's contribution to a cumulative impact.

[2] The cumulative impacts analysis takes into account the Proposed Project in consideration with the cumulative projects and projections.

This EIR analyzes the construction impacts, operational impacts, and cumulative impacts for each separate subject area. The following summary describes the key conclusions in this EIR. This list is not a comprehensive list of impact conclusions; for a comprehensive review, please refer to Table ES-9, Chapter 3, and Chapter 4.

- Summary of construction-period impacts
- *Aesthetics:* The Project would temporarily change aesthetic conditions adjacent to nearby viewers, including residential areas. Mitigation measures requiring the installation of visual barriers, limiting construction activities near residential uses to daytime hours, minimizing fugitive light from construction activities, and implementing fugitive dust measures per San Joaquin Valley Air Pollution Control District regulations would minimize the duration and extent of these temporary impacts and impacts would be less than significant after mitigation.
- *Agricultural Resources:* The majority of the Project is located within or adjacent to the existing UPRR ROW, which passes through urbanized or otherwise disturbed areas with limited agricultural resources. Portions of the Project are located in areas identified for current agricultural uses, which would result in the conversions of farmlands to nonagricultural uses. The Project would impact Important Farmlands; however, the Project would not impact lands under Williamson Act contract or other agricultural lands protection mechanism. Mitigation measures would be required to restore farmlands used temporarily during construction, compensatory mitigation for permanent impacts, relocation of irrigation facilities, and coordination with utility providers. Nonetheless, the conversion of Important Farmland to non-agricultural uses due to the Project would be a significant and unavoidable impact.
- *Air Quality*: Construction of the Project would result in the emission of criteria pollutants due to the use of heavy-duty construction equipment, worker vehicle trips, truck hauling trips, and locomotive trips. In addition, fugitive emissions would result from site grading and asphalt paving. Mitigation measures requiring implementation of advanced emission controls for off-road equipment and locomotives, as well as mitigation requiring placing the emergency generator at least 1,000 feet from sensitive receptors would reduce impacts regarding criteria pollutants and toxic air contaminants to less-than-significant levels.
- *Biological Resources*: The majority of the Project would be located within or adjacent to the existing UPRR ROW, which passes through urbanized or otherwise disturbed areas with limited potential to support biological resources. Portions of the Project are located in small pockets of area that support natural land cover and with suitable habitat characteristics. Construction of the Project in these natural land cover areas would affect special-status plant, wildlife, and fish species; wetlands and other aquatic resources; sensitive natural communities; migration corridors; and trees. Implementation of mitigation measures would reduce impacts on these biological resources to a less-than-significant level.
- *Cultural Resources and Tribal Cultural Resources*: Construction of the Project would have a less-than-significant impact on built environment historical resources. Construction impacts on archaeological resources, human remains, and tribal cultural resources would be reduced to a less-than-significant level with mitigation requiring cultural resources awareness training, monitoring, establishing protocols in the event of discovery, archaeological testing, implementation of avoidance and protection measures, compliance with regulations regarding Native American remains, and implementation of procedures in case of inadvertent tribal cultural resources discoveries.

- *Energy:* Construction of the Project would require substantial energy input, primarily in the form of fuel for construction equipment and construction worker trips. However, the energy expenditure associated with construction would be temporary and limited to the duration of the construction period. Energy use benefits achieved through operations would substantially offset the short-term construction energy consumption.
- *Geology and Soils*: Construction of the Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving geologic hazards and these impacts would be less than significant. Construction impacts on paleontological resources would be reduced to less-than-significant levels with mitigation requiring protocols in the event resources are encountered.
- *Greenhouse Gas Emissions*: Construction of the Project would result in GHG emissions. However, these construction-period emissions are one-time and short-term emissions, which would be more than offset by the substantial net operational GHG reduction associated with the Project due to the reduction of automobile emissions with increased ACE ridership.
- *Hazardous Materials*: Portions of the Project are located on or in close proximity to areas with hazardous materials contamination due to prior land use activities. Project mitigation measures would control potential exposure of workers and the public to contamination where encountered, and would also minimize potential spills of hazardous materials during construction.
- *Hydrology and Water Quality*: Construction of the Project could result in temporary degradation of water quality, particularly involved with construction for new bridges; discharge of dewatering effluent; or improper management of soils, fill, and hazardous materials. Construction impacts on hydrology and water quality would be reduced to less-than-significant levels with identified construction controls and mitigation measures identified to avoid work adjacent to or within surface waters, limit dewatering discharge, and properly handle construction materials.
- *Land Use and Planning:* Construction of the Project would have a less than significant impact in regard to impeding access to local businesses and community services and facilities in construction areas and interfering with the routine activities and interactions that contribute to established communities.
- *Noise and Vibration:* Construction of the Project would require construction activities in the daytime, and possibly nighttime. Although mitigation in the form of implementing best practices to minimize construction noise would reduce impacts in many locations, this mitigation might not always reduce impacts during nighttime construction to a less-than-significant level. Construction period noise impacts would remain significant and unavoidable. For construction-period vibration impacts, best practices to minimize construction vibration would minimize impacts to a less-than-significant level.
- *Population and Housing*: Construction of the Project would not result in substantial changes in population. In addition, construction of the Project would not displace existing housing units or residential uses.
- *Public Services*: Temporary interference to emergency response during construction of the Project would be reduced to less-than-significant levels with mitigation that requires coordination with local roadway agencies and emergency service providers.

- *Recreation*: Temporary disruption to recreation resulting from construction of the Project would be reduced to less-than-significant levels with mitigation measures minimizing construction-period visual and noise impacts; mitigation requiring coordination with Merced County and California Department of Parks and Recreation; and with compliance with San Joaquin Valley Air Pollution Control District regulations requiring fugitive dust controls on users of nearby recreational resources.
- *Safety and Security:* Temporary interference with an adopted emergency response plan or emergency evacuation plan during construction of the Project would be reduced to less-than-significant levels through mitigation that requires coordination with local roadway agencies and emergency service providers.
- *Transportation*: Construction of the Project could result in temporary disruptions to freight service and emergency access during construction. Mitigation would include coordination with local roadway agencies and freight rail service operators to minimize disruption. In addition, mitigation would include a construction road traffic control plan to minimize impacts to emergency access. Impacts would be reduced to less-than-significant levels with mitigation.
- *Utilities and Service Systems*: The Project would require relocation of certain utilities during construction activities. As mitigation, SJRRC would coordinate with all utility owners to conduct relocation activities in a way that minimizes potential disruption and impacts would be reduced to less-than-significant levels.
- Summary of operational impacts
- *Aesthetics*: The Project would change local visual character through addition of the new stations and track alignments within and outside the existing UPRR ROW. These visual changes from the Project are a result of the introduction of new features such as parking lots, pedestrian bridges, utility lines, railroad bridges, and vegetation removal that would alter the existing visual landscape. In addition, new stations and the Merced Layover & Maintenance Facility would introduce new sources of light or glare that could adversely affect views. Implementation of measures requiring the application of and replacement of landscaping, aesthetic design and surface treatments to bridges and fences, undergrounding new utilities, and minimum light standards would reduce impacts to less than significant levels.
- *Agricultural Resources:* Project operations would have limited impacts on agricultural resources, except on confined animal facilities as related to operational passenger rail noise. Expected noise levels at nearby confined animal facilities due to Project operations would be less than threshold levels and impacts would be less than significant.
- *Air Quality*: Project operations would create air quality impacts through extended ACE rail service and increased shuttle/bus bridge activity. However, Project operations would also improve existing passenger rail opportunities, which would reduce single-occupancy VMT in the transportation network. Overall, the Project would not generate emissions in excess of BAAQMD or SJVAPCD's thresholds. Moreover, several pollutants would be reduced relative to the No Project Conditions. This would be a regional air quality benefit in BAAQMD for all criteria pollutants and SJVAPCD for carbon monoxide and particulate matter, and a less-than-significant impact in SJVAPCD for reactive organic gases and nitrogen oxides for Project operations.
- *Biological Resources*: The Project would have limited impacts on biological resources except on nesting birds, bats, and other special-status species during vegetation trimming or clearing for

maintenance. These impacts would be less than significant with mitigation to control the timing of maintenance activities.

- *Cultural Resources and Tribal Cultural Resources*: The Project would have no significant impacts on cultural resources and tribal cultural resources during operations.
- *Energy:* Project operations would result in a net energy savings due to the reduction of automobile VMT and consequently reduce energy consumption per passenger mile. Energy use benefits achieved through Project operations would substantially offset the short-term construction energy and would be a beneficial impact.
- *Geology and Soils*: Project operations would not expose people or structures to significant impacts related to geologic hazards or affect paleontological resources.
- *Greenhouse Gas Emissions*: Project operations would result in a net GHG reduction from changes in regional traffic and diverted private automobile trips to public transit. Net emission reductions will decline as a function of time because the vehicles that will be removed from the road will be progressively cleaner due to engine improvements and vehicle modernization. GHG benefits achieved through operation of the Project would offset construction emissions and would be a beneficial impact.
- *Hazardous Material*s: Portions of the Project are located on or in close proximity to areas with hazardous materials contamination due to prior land use activities. Project mitigation measures would control potential exposure of workers and the public to contamination where encountered during maintenance activities and impacts would be reduced to less-than-significant levels.
- *Hydrology and Water Quality*: Portions of the Project would be located within a mapped 100-year flood hazard zone, but mitigation requiring detailed hydraulic evaluations and modifications to designs within drainage courses and flood zone areas would reduce impacts to a less-than-significant level. Increases in impervious spaces and alterations to drainage patterns would occur with implementation of the Project, but runoff impacts would be controlled through compliance with stormwater regulation requirements and mitigation requiring detailed hydraulic evaluations and modifications to designs for stormwater controls to prevent flooding would reduce impacts to a less-than-significant level.
- *Land Use and Planning:* The Project would establish new stations in areas supported by the general plans of the municipalities in which new stations would be located. The majority of the Project would be located within the existing UPRR ROW where no land use designation is identified and where local cities and counties do not have jurisdiction. Several Project facilities, specifically new stations and the Merced Layover & Maintenance Facility, are located wholly or partially outside the existing UPRR ROW where land use designations are identified by the local jurisdiction. Construction of the Merced Layover & Maintenance Facility could conflict with local land use plans and policies for the purposes of avoiding or mitigating an environmental effect. However, the Merced Layover & Maintenance Facility would not preclude the development of other allowable uses or significantly change the land use pattern envisioned for these area. Implementation of mitigation measures to protect agricultural and biological resources would reduce impacts on these resources and inconsistencies of the Project with policies to preserve agricultural or biological resources would be less than significant.

- *Noise and Vibration*: The Project would have less-than-significant impacts on noise during operation. Operational vibration impacts would be less than significant after implementation of mitigation requiring special trackwork on a portion of the Ceres to Merced Extension Alignment.
- *Population and Housing*: New stations established along the Project corridor are supported by the general plans of the municipalities in which new stations would be located. As such, the population growth that may result in the station vicinity is already planned for and the Project would have less-than-significant impacts on population and housing during operations.
- *Public Services*: The Project would have less-than-significant impacts on public services during operation.
- *Recreation:* The Project would have a less than significant impact on recreational resources during operations.
- *Safety and Security:* The Project would have less than significant impacts on increasing hazards to workers, passenger, or adjacent human and environmental receptors along the Project corridor during operation.
- *Transportation*: Overall, the Project would have a beneficial impact on transportation from the reduction of VMT. The Project would have less than significant impacts on transportation during operation of the Project.
- *Utilities and Service Systems*: The Project would have less-than-significant impacts on utilities and service systems during operation.
- Summary of cumulative impacts
- *Aesthetics*: The Project's contributions to cumulative impacts related to aesthetics can be reduced to less than considerable levels with Project mitigation measures.
- *Agricultural Resources:* The Project's contributions to cumulative impacts related to permanent impacts on Important Farmland would be considered considerable even with Project mitigation.
- *Air Quality*: The Project would improve air quality in some respects; where the Project would increase criteria pollutant emissions or toxic air contaminants, these emissions would not contribute adversely to cumulative air quality impacts (after implementation of Project mitigation).
- *Biological Resources*: The Project's contributions to cumulative impacts related to biological resources can be reduced to less than considerable levels with Project mitigation measures.
- *Cultural Resources and Tribal Cultural Resources*: The Project's contributions to cumulative impacts related to cultural resources and tribal cultural resources can be reduced to less than considerable levels with Project mitigation measures.
- *Energy:* The Project would not contribute considerably to any cumulative impacts related to energy resources.
- *Geology and Soils*: The Project's contributions to cumulative impacts related to geology and soils can be reduced to less than considerable levels with Project mitigation measures.
- *Greenhouse Gas Emissions*: The Project would reduce GHG emissions and thus would not contribute to cumulative impacts related to GHG emissions.

- *Hazards and Hazardous Materials:* The Project's contributions to cumulative impacts related to hazardous materials can be reduced to less than considerable levels with Project mitigation measures.
- *Hydrology and Water Quality*: The Project's contributions to cumulative impacts related to hydrology and water quality can be reduced to less than considerable levels with Project mitigation measures.
- *Land Use and Planning:* The Project's contributions to cumulative impacts related to land use and planning can be reduced to less than considerable levels with Project mitigation measures (apart from the separately disclosed considerable contribution to agricultural land conversion under Impact C-AG-1).
- *Noise and Vibration*: Because the Project could result in a significant and unavoidable noise impact during construction (even after implementation of Project mitigation) and because there could be other cumulative projects simultaneously under construction, the Project would result in a cumulatively considerable contribution to noise impacts during construction. The Project's contributions to cumulative impacts related to operational noise impacts would be less than considerable. The Project's contributions to cumulative impacts related to vibration impacts (during both construction and operations of the Project) can be reduced to less than considerable levels with Project mitigation measures.
- *Population and Housing*: The Project would not contribute considerably to any cumulative impacts related to population and housing.
- *Public Services*: The Project would not contribute considerably to any cumulative impacts related to public services.
- *Recreation*: The Project's contributions to cumulative impacts related to recreation can be reduced to less than considerable levels with Project mitigation measures.
- *Safety and Security*: The Project's contributions to cumulative impacts related to safety and security can be reduced to less than considerable levels with Project mitigation measures.
- *Transportation*: The Project's contributions to cumulative impacts related to transportation can be reduced to less than considerable levels with Project mitigation measures.
- *Utilities and Service Systems*: The Project would not contribute considerably to any cumulative impacts related to utilities and service systems.

ES.6 Alternatives Screening Process and Other Alternatives Considered and Dismissed

SJRRC considered a wide range of alternatives before selecting the alternatives to be analyzed in this EIR. SJRRC conducted meetings with local agencies, communities, stakeholders, organizations, working groups, and resource agencies (Chapter 6, *Public Agency Involvement*) to formulate the initial set of alternatives. Alternatives were also identified through input from the public, agencies, and stakeholders during scoping. Appendix A, *ACE Ceres–Merced Extension Scoping Memorandum,* provides the scoping memorandum summarizing the written and oral comments received during the scoping process.

Alternatives were screened based on the following criteria.

- **Tier 1**—does the alternative meet most of the Proposed Project's basic objectives?
- **Tier 2**—is the alternative technically, logistically, and financially feasible?
- **Tier 3**—would the alternative avoid or substantially lessen one or more significant impacts of the Proposed Project?

Alternatives determined not to meet most of the Proposed Project's basic objectives, to Proposed Project Extension, were dismissed from further analysis in this EIR. All of the alternatives considered, but dismissed from analysis, are discussed in Chapter 5, *Alternatives*, along with the rationale for their dismissal.

The Atwater Station Alternative, which was analyzed in an equal level of detail as the Proposed Project in this EIR (Chapter 2, 3, and 4) were determined to meet the Proposed Project's basic objectives and to be feasible. Its environmental impacts are disclosed in Chapter 3 and Chapter 4. In addition, the No Project Alternative and two additional alternatives (Merced Layover Facility Alternative and Merced Station Alternative) are analyzed at a lesser level of detail in Chapter 5.

ES.7 Comparison of Alternatives and the Environmentally Superior Alternative

The State CEQA Guidelines require a comparison of alternatives analyzed in an EIR and identification of an "environmentally superior alternative." CEQA Guidelines Section 15126.6(e)(2) require an EIR to identify an "environmentally superior alternative" from among the alternatives considered to the Proposed Project. The guidelines also state that if the environmentally superior alternative is the No Project Alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives. As such, from a technical CEQA perspective, an EIR cannot identify a Proposed Project as the "environmental superior alternative" even if the Proposed Project has better environmental performance than all the alternatives. As discussed below, except for the Atwater Station Alternative, the Proposed Project would be environmentally superior to any other alternative.

The environmental impacts of the Atwater Station Alternative are presented in Chapter 3 and 4 and these chapters describe the slight but insubstantial differences in impacts between the Atwater Station Alternative and the proposed Livingston Station. Chapter 5 presents an analysis of the environmental impacts of the No Project Alternative, Merced Station Alternative, and the Merced Layover Facility Alternative at a lesser level of detail. Chapter 5 also provides a tabular comparison of the key environmental impact differences between the alternatives.

The Proposed Project as well as any of the alternatives considered would provide benefits, such as reducing VMT and reducing regional air pollutants and GHG emissions that would not be realized under the No Project Alternative. While the No Project Alternative would avoid the construction impacts of the Proposed Project and any of the build alternatives, it is not considered the "environmentally superior alternative" because it would not provide the long-term environmental benefits of expanded passenger rail service.

The "environmentally superior alternative" among the alternatives to the Proposed Project is a combination of different alternative facilities and is summarized in Table 5-10 of Chapter 5. The

"environmentally superior alternative" among the alternatives would consist of the following Project facilities:

- The rail alignment as described for the Proposed Project but extended 0.6 mile southward to the Merced Station Alternative
- Implementation of the Turlock Station
- Implementation of the Atwater Station Alternative
- Implementation of the Merced Station Alternative
- Implementation of the Merced Layover Facility Alternative.

As described in Chapter 3, there are no substantial differences in environmental impacts between the Atwater Station Alternative and the proposed Livingston Station. There are, however, some environmental tradeoffs between the "environmentally superior alternative" and the Proposed Project in relation to the impacts of the Merced Layover Facility Alternative versus the proposed Merced Layover & Maintenance Facility and the impacts of the Merced Station Alternative versus the proposed Merced Station. These environmental tradeoffs are summarized in Table 5-11 in Chapter 5.

The Proposed Project is environmentally superior to the "environmentally superior alternative" for the following reasons:

- The Merced Station would have greater potential for transit-oriented development than the Merced Station Alternative and thus would be more consistent with City of Merced's long-term planning direction than the Merced Station Alternative. The Merced Station Alternative would require more trackwork than the proposed Merced Station and thus would result in more construction air quality and GHG emissions than the proposed Merced Station. The Merced Station Alternative would have slightly higher train criteria pollutant and GHG emissions than the proposed Merced Station because the Merced Station Alternative is located slightly south of the proposed Merced Station and thus trains would have a longer distance to travel. However, the Merced Station Alternative would have less of a noise impact during construction than the proposed Merced Station because it is further away from sensitive receptors.
- The Merced Layover & Maintenance Facility would have lower impacts on agricultural farmland because it would affect much lower quality of farmland and a lesser quantity of farmland than the Merced Layover Facility Alternative. The Merced Layover & Maintenance Facility would be more consistent with land use planning and have lower aesthetic impacts since it would be located within an existing industrial park compared to the Merced Layover Facility Alternative, which would be in an agricultural area. The Merced Layover & Maintenance Facility would have a lower impact on biological resources than the Merced Layover Facility Alternative. However, the Merced Layover Facility Alternative would have less of a construction noise impact during than the proposed Merced Layover & Maintenance Facility because it would be located further away from sensitive receptors.

Taking all these factors into consideration, the Proposed Project would be environmentally superior for all relevant environmental factors that differ between the Proposed Project and the "environmentally superior alternative" with the exception of construction noise. Since construction noise would be a temporary effect, whereas the Proposed Project's environmental benefits would be primarily related to permanent long-term effects such as conservation of prime farmland, land use

consistency, potential for transit-oriented development, as well as biological resources, the Proposed Project would be environmentally superior to the "environmentally superior alternative."

ES.8 Issues of Controversy and Issues to be Resolved

There are some areas of controversy for the Proposed Project including, but not limited to, the following issues.

- **Consideration of Alternatives**—While the EIR considers a wide range of alternatives for the Project, some may desire that other alternatives should be evaluated in detail. Chapter 5 discusses all alternatives considered and why some alternatives were not carried forward for detailed evaluations.

The following issues remain to be resolved:

- **Consideration of Comments on this Draft EIR**—SJRRC will consider and respond to substantive comments on this draft EIR in the final EIR scheduled for completion later in 2021.
- **Certification of the EIR and Project Adoption**—SJRRC will need to consider the final EIR, once prepared, and decide whether to certify the document. If certified, then the SJRRC Board would need to decide whether to approve the Proposed Project as is or to adopt an alternative.
- **Selection of the Livingston Station versus the Atwater Station Alternative**—SJRRC will select either the Livingston Station or the Atwater Station Alternative after considering the comments on the Draft EIR and after the final EIR is certified.
- **Design of the Project**—The final design of the Project would be completed following the environmental review process.
- **Regulatory Permitting**—Permits from a wide range of local, state, and federal agencies would need to be obtained in order to implement the Project.
- **National Environmental Policy Act (NEPA) Compliance**—If federal funding is obtained, then compliance with NEPA will be necessary. At this time, no federal funding has been identified and NEPA compliance is not required at this time.
- **Funding**—ACE has obtained funding commitments through SB 1 for approximately $400 million to support the extension of ACE services to Ceres and Merced. It will need to be determined how to best use this funding to expand and extend ACE service as soon as possible and how to best leverage any other funding that may be necessary achieve the longer-term project goals.
- **High-Speed Rail Merced Station**—While not necessary for the completion of this Project, which can be implemented independent of the HSR project, the California High Speed Rail Authority would need to confirm and environmentally clear the HSR Merced Station that is preferred by the City of Merced. The proposed ACE Merced Station is located at the preferred location of the City of Merced.

Table ES-9. Summary of Impacts and Required Mitigation Measures

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
3.1 Aesthetics			
Impact AES-1. Construction of the Proposed Project could substantially degrade the existing visual character or quality of the site and its surroundings, including scenic vistas and scenic highways, and could create a new source of substantial light or glare that would adversely affect day or nighttime views.	Potentially significant impact	AES-1.1: Install visual barriers between construction work areas and sensitive receptors AES-1.2: Limit construction near residences to daylight hours AES-1.3: Minimize fugitive light from portable sources used for construction	Less than significant impact
Impact AES-2. Proposed Project operations could conflict with applicable zoning and other regulations governing scenic quality in an urbanized area, including scenic vistas.	Potentially significant impact	AES-2.1: Landscape parking facilities AES-2.2: Apply aesthetic design treatments to pedestrian bridges over tracks and bridges with visibility to residents and recreationists AES-2.3: Underground new utilities AES-2.4: Apply aesthetic surface treatments to fencing and pedestrian bridge safety barriers AES-2.5: Replace disturbed vegetation along landscaped freeways	Less than significant impact
Impact AES-3. Proposed Project operations would not substantially degrade the existing visual character or quality of public views the site and its surroundings in a non-urbanized area, including scenic vistas.	Less than significant impact	None required	--

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Impact AES-4. Proposed Project operations could substantially damage scenic resources within a state scenic highway.	Potentially significant impact	AES-2.1: Landscape parking facilities AES-2.3: Underground new utilities AES-2.4: Apply aesthetic surface treatments to fencing and pedestrian bridge safety barriers	Less than significant impact
Impact AES-5. Proposed Project operations could create a new source of substantial light or glare that would adversely affect day or nighttime views.	Potentially significant impact	AES-2.1: Landscape parking facilities AES-2.2: Apply aesthetic design treatments to pedestrian bridges over tracks and bridges with visibility to residents and recreationists AES-5.1: Apply minimum lighting standards	Less than significant impact
Impact C-AES-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative impact on aesthetics.	Significant cumulative impact	AES-1.1: Install visual barriers between construction work areas and sensitive receptors AES-1.2: Limit construction near residences to daylight hours AES-1.3: Minimize fugitive light from portable sources used for construction AES-2.1: Landscape parking facilities AES-2.2: Apply aesthetic design treatments to pedestrian bridges over tracks and bridges with visibility to residents and recreationists AES-2.3: Underground new utilities AES-2.4: Apply aesthetic surface treatments to fencing and pedestrian bridge safety barriers AES-2.5: Replace disturbed vegetation along landscaped freeways AES-5.1: Apply minimum lighting standards	Less than considerable contribution
3.2 Agricultural Resources			
Impact AG-1. Construction and operation of the Proposed Project could convert Important Farmlands to nonagricultural use.	Potentially significant impact	AG-1.1: Avoid Important Farmlands and Restore Important Farmlands used for temporary staging areas AG-1.2: Conserve Important Farmlands (Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance)	Significant and unavoidable impact
Impact AG-2. Construction and operation of the Proposed Project would not conflict with a	Less than significant impact	None required	--

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Williamson Act contract or other agricultural lands protection mechanism.			
Impact AG-3. Construction and operation of the Proposed Project would not result in conversion of farmland through noise and vibration impacts on confined farm animals.	Less than significant impact	None required	--
Impact AG-4. Construction of the Proposed Project would not create unviable remnant or severed parcels of Important Farmland.	Less than significant impact	None required	--
Impact AG-5. Construction and operation of the Proposed Project could involve other changes in the existing environment that, due to their location or nature, could result in conversion of farmland to nonagricultural use.	Potentially significant impact	AG-5.1: Relocate irrigation facilities AG-5.2: Coordinate with utility providers	Less than significant impact
Impact C-AG-1. Construction and Operations of the Project could contribute considerably to a significant cumulative impact on agricultural resources.	Significant cumulative impact	AG-1.1: Avoid Important Farmlands and Restore Important Farmlands used for temporary staging areas AG-1.2: Conserve Important Farmlands (Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance) AG-5.1: Relocate irrigation facilities AG-5.2: Coordinate with utility providers	Considerable contribution
3.3 Air Quality			
Impact AQ-1. Construction of the Proposed Project could conflict with or obstruct implementation of the applicable air quality plan. Operation of the Proposed	Potentially significant impact	AQ-2.1: Implement advanced emissions controls for off-road equipment	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Project would not conflict with or obstruct implementation of the applicable air quality plan.			
Impact AQ-2a. Construction of the Proposed Project could result in a cumulatively considerable net increase of a criteria pollutant for which the Project region is designated a nonattainment area under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).	Potentially significant impact	AQ-2.1: Implement advanced emissions controls for off-road equipment AQ-2.2: Implement advanced emissions controls for locomotives used for construction	Less than significant impact
Impact AQ-2b. Operations of the Proposed Project would not result in a cumulatively considerable net increase of a criteria pollutant for which the Project region is designated a nonattainment area under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).	Less than significant impact (beneficial) (BAAQMD: all pollutants and SJVAPCD: CO, PM2.5, PM10, and SOx) Less than significant impact (SJVAPCD: ROG, NOx)	None required	--
Impact AQ-3a. Operation of the Proposed Project would not expose sensitive receptors to substantial carbon monoxide concentrations from increased passenger rail traffic.	Less than significant impact	None required	--

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Impact AQ-3b. Construction of the Proposed Project could expose sensitive receptors to substantial diesel particulate matter or localized particulate matter concentrations.	Potentially significant impact	AQ-2.1: Implement advanced emissions controls for off-road equipment AQ-2.2: Implement advanced emissions controls for locomotives used for construction	Less than significant impact
Impact AQ-3c. Operations of the Proposed Project would not expose sensitive receptors to health risks from increased exposure to diesel particulate matter and PM2.5 concentrations.	Less than significant impact	None required	--
Impact AQ-3d. Operations of the Proposed Project would not expose sensitive receptors adjacent to ACE stations and maintenance facilities to health risks from increased exposure to diesel particulate matter.	Potentially significant impact	AQ-3.1: Locate emergency generator for the Merced Layover & Maintenance Facility more than 1,000 feet from residences	Less than significant impact
Impact AQ-3e. Operations of the Proposed Project would not expose sensitive receptors adjacent to shuttle routes to health risks from increased exposure to diesel particulate matter and PM2.5 concentrations from expanded shuttle service.	Less than significant impact	None required	--
Impact AQ-3f. Construction and operations of the Proposed Project would not expose sensitive receptors to health risks from increased exposure to diesel particulate matter and	Less than significant impact	None required	--

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
PM2.5 concentrations from multiple emission sources.			
Impact AQ-3g. Construction and operations of the Proposed Project would not expose sensitive receptors to cumulative health risks from increased exposure to diesel particulate matter and PM2.5 concentrations.	Less than significant impact	None required	--
Impact AQ-3h. Construction of the Proposed Project would not expose sensitive receptors to increased risk of contracting Valley Fever or exposure to asbestos-containing material.	Less than significant impact	None required	--
Impact AQ-4. Construction and operations of the Proposed Project would not create objectionable odors affecting a substantial number of people.	Less than significant impact	None required	--
Impact C-AQ-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative impact on air quality.	Less than considerable contribution (beneficial)	AQ-2.1: Implement advanced emissions controls for off-road equipment AQ-2.2: Implement advanced emissions controls for locomotives used for construction	--

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
3.4 Biological Resources			
Impact BIO-1. Construction of the Proposed Project could remove or degrade special-status plants and their habitat.	Potentially significant impact	BIO-1.1: Conduct preconstruction surveys for special-status plant species BIO-1.2: Prepare a salvage, relocation, or propagation and monitoring plan for special-status plant species BIO-1.3: Document affected special-status plant species BIO-1.4: Prevent introduction or spread of invasive plant species HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters	Less than significant impact
Impact BIO-2. Construction of the Proposed Project could injure or kill special-status wildlife species and remove or degrade their habitat.	Potentially significant impact	BIO-2.1: Conduct a worker environmental training program for construction personnel BIO-2.2: Avoid vernal pool–endemic species BIO-2.3: Avoid valley elderberry longhorn beetle BIO-2.4: Avoid California tiger salamander and western spadefoot toad BIO-2.5: Avoid western pond turtle and giant garter snake BIO-2.6: Avoid coast horned lizard and Northern California legless lizard BIO-2.7: Avoid nesting birds BIO-2.8: Avoid Swainson's hawk BIO-2.9: Compensate for Swainson's hawk foraging habitat loss BIO-2.10: Avoid burrowing owl BIO-2.11: Compensate for burrowing owl habitat loss BIO-2.12: Avoid song sparrow (Modesto population), tricolored blackbird, and yellow-headed blackbird BIO-2.13: Avoid roosting bats BIO-2.14: Avoid San Joaquin kit fox and American badger BIO-2.15: Compensate for San Joaquin kit fox and American badger habitat loss BIO-2.16: Avoid direct impacts on Western Monarch Butterfly Host Plants & Provide Compensatory Mitigation for Impacts on Monarch Butterfly Habitat	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Impact BIO-3. Construction of the Proposed Project could injure or kill special-status fish and remove or degrade their habitat.	Potentially significant impact	BIO-2.1: Conduct a worker environmental training program for construction personnel BIO-3.1: Implement noise reduction measures for pile driving BIO-3.2: Develop and implement a hydroacoustic monitoring plan to minimize noise effects on fish BIO-3.3: Implement seasonal restrictions for in-water work BIO-4.1: Avoid and protect wetlands during construction BIO-4.2: Compensate for impacts on jurisdictional wetlands and non-wetland waters of the United States (aquatic resources) prior to improvements impacts during construction BIO-5.1: Avoid and protect sensitive natural communities, including riparian habitat, during construction BIO-5.2: Compensate for loss of sensitive natural communities (including riparian habitat) HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters	Less than significant impact
Impact BIO-4. Construction of the Proposed Project could remove or degrade state or federally regulated wetlands and other aquatic resources.	Potentially significant impact	BIO-4.1: Avoid and protect wetlands during construction BIO-4.2: Compensate for impacts on jurisdictional wetlands and non-wetland waters of the United States (aquatic resources) due to proposed impacts during construction	Less than significant impact
Impact BIO-5. Construction of the Proposed Project could remove or degrade sensitive natural communities, including riparian habitat, identified in local or regional plans, policies, and regulations or by CDFW or USFWS.	Potentially significant impact	BIO-4.1: Avoid and protect wetlands during construction BIO-4.2: Compensate for impacts on jurisdictional wetlands and non-wetland waters of the United States (aquatic resources) due to Proposed Project impacts during construction BIO-5.1: Avoid and protect sensitive natural communities, including riparian habitat, during construction BIO-5.2: Compensate for loss of sensitive natural communities (including riparian habitat)	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Impact BIO-6. Construction of the Proposed Project could substantially interfere with native resident or migratory fish or wildlife species movement, established migration corridors, or their use of nursery areas.	Potentially significant impact	BIO-2.3: Avoid valley elderberry longhorn beetle BIO-2.7: Avoid nesting birds BIO-2.8: Avoid Swainson's hawk BIO-2.9: Compensate for Swainson's hawk foraging habitat loss BIO-2.10: Avoid burrowing owl BIO-2.11: Compensate for burrowing owl habitat loss BIO-2.12: Avoid song sparrow (Modesto population), tricolored blackbird, and yellow-headed blackbird BIO-2.13: Avoid roosting bats BIO-3.3: Implement seasonal restrictions for in-water work HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters	Less than significant impact
Impact BIO-7. Construction of the Proposed Project could conflict with local biological resource policies, including tree preservation policies or ordinances.	Potentially significant impact	BIO-1.1: Conduct preconstruction surveys for special-status plant species BIO-1.2: Prepare a salvage, relocation, or propagation and monitoring plan for special-status plant species BIO-1.3: Document affected special-status plant species BIO-1.4: Prevent introduction or spread of invasive plant species BIO-2.1: Conduct a worker environmental training program for construction personnel BIO-2.2: Avoid vernal pool–endemic species BIO-2.3: Avoid valley elderberry longhorn beetle BIO-2.4: Avoid California tiger salamander and western spadefoot toad BIO-2.5: Avoid western pond turtle and giant garter snake BIO-2.6: Avoid coast horned lizard and Northern California legless lizard BIO-2.7: Avoid nesting birds BIO-2.8: Avoid Swainson's hawk BIO-2.9: Compensate for Swainson's hawk foraging habitat loss BIO-2.10: Avoid burrowing owl	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		BIO-2.12: Avoid Song sparrow (Modesto population), tricolored blackbird, and yellow-headed blackbird BIO-2.13: Avoid roosting bats BIO-2.14: Avoid San Joaquin kit fox and American badger BIO-3.1: Implement noise reduction measures for pile driving BIO-3.2: Develop and implement a hydroacoustic monitoring plan to minimize noise effects on fish BIO-3.3: Implement seasonal restrictions for in-water work BIO-4.1: Avoid and protect wetlands during construction BIO-5.1: Avoid and protect sensitive natural communities, including riparian habitat, during construction HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters BIO-7.1: Compensate for tree removal during construction	
Impact BIO-8. Construction of the Proposed Project would not conflict with provisions of adopted habitat conservation plans, natural community conservation plans, or approved local, regional, or state habitat conservation plans.	No impact	None required	--
Impact BIO-9. Operation of the Proposed Project could injure or kill special-status wildlife species.	Potentially significant impact	BIO-9.1: Avoid nesting bird impacts during operation and maintenance activities BIO-9.2: Avoid roosting bat impacts during operation and maintenance activities BIO-9.3: Conduct pre-activity survey for special-status wildlife species prior to conducting maintenance activities	Less than significant impact
Impact BIO-10. Operation of the Proposed Project could injure or kill special-status fish and remove or degrade their habitat.	Potentially significant impact	BIO-10.1: Model hydraulics of new bridges before construction	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Impact BIO-11. Operation of the Proposed Project would not substantially interfere with native resident or migratory fish or wildlife species movement, established migration corridors, or their use of nursery areas.	Less than significant impact	None required	--
Impact BIO-12. Operation of the Proposed Project could conflict with local biological resource policies, including tree preservation policies or ordinances.	Potentially significant impact	BIO-9.1: Avoid nesting bird impacts during operation and maintenance activities BIO-9.2: Avoid roosting bat impacts during operation and maintenance activities BIO-9.3: Conduct pre-activity survey for special-status wildlife species prior to conducting maintenance activities	Less than significant impact
Impact BIO-13. Operation of the Proposed Project would not conflict with provisions of adopted Habitat Conservation Plans, Natural Community Conservation Plans, or approved local, regional, or state habitat conservation plans.	No impact	None required	--
Impact C-BIO-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative impact on biological resources.	Significant cumulative impact	All mitigation measures identified for biological resources (see Impacts BIO-1 through Impact BIO-13).	Less than considerable contribution
3.5 Cultural Resources and Tribal Cultural Resources			
Impact CUL-1. Construction and operations of the Proposed Project would not directly or indirectly cause a substantial adverse change in the significance of a built environment historical resource.	Less than significant impact	None required	--

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Impact CUL-2. Construction and operation of the Proposed Project could cause a substantial adverse change in the significance of an archaeological resource or tribal cultural resource.	Potentially significant impact	CUL-2.1: Conduct cultural resources awareness training CUL-2.2: Implement cultural resources monitoring plan CUL-2.3: Conduct archaeological monitoring CUL-2.4: Implement procedures in case of inadvertent archeological discoveries CUL-2.5: Conduct archaeological testing CUL-2.6: Implement avoidance and protection measures	Less than significant impact
Impact CUL-3. Construction of the Proposed Project could disturb human remains, including those interred outside of formal cemeteries.	Potentially significant impact	CUL-2.1: Conduct cultural resources awareness training CUL-2.4: Implement procedures in case of inadvertent archeological discoveries CUL-3.1: Comply with state laws relating to Native American remains	Less than significant impact
Impact CUL-4. Construction of the Proposed Project could cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074.	Potentially significant impact	CUL-2.1: Conduct cultural resources awareness training CUL-2.4: Implement procedures in case of inadvertent archeological discoveries CUL-3.1: Comply with state laws relating to Native American remains CUL-4.1: Implement procedures in case of inadvertent tribal cultural resources discoveries	Less than significant impact
Impact C-CUL-1. Construction of the Project would not contribute considerably to a significant cumulative impact on cultural resources and tribal cultural resources. Operations of the Project, in combination with other foreseeable projects in the surrounding area, would not result in a significant cumulative impact on cultural resources and tribal cultural resources.	Construction: significant cumulative impact Operations: less than significant cumulative impact	CUL-1.1: Prepare and submit Historic American Engineering Record documentation CUL-1.2: Prepare interpretive exhibits CUL-2.1: Develop and implement an Archaeological Testing Plan CUL-2.2: Conduct cultural resources awareness training CUL-2.3: Implement cultural resources monitoring plan CUL-2.4: Implement avoidance and protection measures CUL-2.5: Conduct archaeological monitoring CUL-2.6: Implement procedures in case of inadvertent discoveries CUL-3.1: Comply with state laws relating to Native American remains CUL-4.1: Implement procedures in case of inadvertent tribal cultural resources discoveries	Less than considerable contribution

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
3.6 Energy			
Impact EN-1. Construction and operations of the Proposed Project would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources.	Less than significant (beneficial)	None required	--
Impact EN-2. Construction and operations of the Proposed Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	Less than significant	None required	--
Impact C-EN-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative impact on energy resources.	Less than considerable contribution (beneficial)	AQ-2.1: Implement advanced emissions controls for off-road equipment AQ-2.2: Implement advanced emissions controls for locomotives used for construction	--
3.7 Geology and Soils			
Impact GEO-1. Construction or operation of the Proposed Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving surface fault rupture, strong seismic ground shaking, liquefaction, seiches, landslides, subsidence and settlement, expansive soils, corrosive soils, and erosion.	Less than significant impact	None required	--
Impact GEO-2. Construction or operation of the Proposed	No impact	None required	--

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Project would not affect geologic resources, including oil and gas wells, mineral resources, or geothermal resources, and would not result in a loss of availability of regionally or locally important mineral resources.			
Impact GEO-3. Construction of the Proposed Project could directly or indirectly destroy a unique paleontological resource or site or unique geological feature.	Potentially significant impact	GEO-3.1: Monitor for discovery of paleontological resources, evaluate found resources, and prepare and follow a recovery plan for found resources.	Less than significant impact
Impact GEO-4. Operation and maintenance of the Proposed Project would not directly or indirectly destroy a unique paleontological resource or site or unique geological feature.	No impact	None required	--
Impact C-GEO-1. Construction of the Project would not contribute considerably to a significant cumulative impact on geology, soils, and unique paleontological/geologic resources. Operations of the Project, in combination with other foreseeable projects in the surrounding area, would not result in a significant cumulative impact on geology, soils, and unique paleontological/geologic resources.	Construction: significant cumulative impact Operations: less than significant cumulative impact	GEO-3.1:Monitor for discovery of paleontological resources, evaluate found resources, and prepare and follow a recovery plan for found resources	Less than considerable contribution

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
3.8 Greenhouse Gas Emissions			
Impact GHG-1. Construction and operation of the Proposed Project could generate GHG emissions, either directly or indirectly, that would not have a significant impact on the environment.	Less than significant impact (beneficial)	None required	--
Impact GHG-2. The Proposed Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.	Less than significant impact (beneficial)	None required	--
Impact C-GHG-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative GHG emissions impact.	Less than considerable contribution (beneficial)	None required	--
3.9 Hazardous Materials			
Impact HAZ-1. Construction, operation, and maintenance of the Proposed Project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal, or accidental release of hazardous materials.	Less than significant impact	None required	--
Impact HAZ-2. Construction, operation, and maintenance of the Proposed Project could create a significant hazard to the public or the environment involving reasonably foreseeable	Potentially significant impact	HAZ-2.1: Implement voluntary oversight agreement HAZ-2.2: Conduct site investigations HAZ-2.3: Implement construction risk management plan	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
upset conditions or the disturbance of existing hazardous materials.			
Impact HAZ-3. Construction, operation, and maintenance of the Proposed Project could create a potentially significant hazard for children by emitting hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.	Potentially significant impact	HAZ-2.3: Implement construction risk management plan AQ-2.1: Implement advanced emissions controls for off-road equipment AQ-2.2: Implement advanced emissions controls for locomotives used for construction	Less than significant impact
Impact HAZ-4. The Proposed Project is 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 it create a significant hazard to the public or the environment	Potentially significant impact	HAZ-2.1: Implement voluntary oversight agreement HAZ-2.2: Conduct site investigations HAZ-2.3: Implement construction risk management plan	Less than significant impact
Impact C-HAZ-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative impact from hazardous materials.	Significant cumulative impact	HAZ-2.1: Conduct site investigations HAZ-2.2: Implement construction risk management plan AQ-2.5: Implement fugitive dust controls during construction	Less than considerable contribution

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
3.10 Hydrology and Water Quality			
Impact HYD-1. Construction of the Proposed Project could violate water quality standards or WDRs or otherwise substantially degrade surface or groundwater quality.	Potentially significant impact	HYD-1.1: Avoid water quality impacts from groundwater or dewatering discharges HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters HYD-1.3: Limit groundwater or dewatering discharge flow rates HAZ-2.2: Conduct Site Investigations HAZ-2.3: Implement construction risk management plan	Less than significant impact
Impact HYD-2. Operation of the Proposed Project could violate water quality standards or WDRs or otherwise substantially degrade surface or groundwater quality.	Potentially significant impact	HAZ-2.3: Implement construction risk management plan	Less than significant impact
Impact HYD-3. Construction of the Proposed Project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Proposed Project may impede sustainable groundwater management of the basin.	Less than significant impact	None required	--
Impact HYD-4. Proposed Project operations would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Proposed Project may impede sustainable groundwater management of the basin.	Less than significant impact	None required	--
Impact HYD-5. Construction of the Proposed Project could	Potentially significant impact	HYD-5.1: Prevent construction materials and equipment from impeding or redirecting flood flows	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
substantially alter the existing drainage pattern of the site or area in a manner that would result in substantial erosion, siltation, or impede or redirect flood flows.			
Impact HYD-6. Proposed Project operations could substantially alter the existing drainage pattern of the site or area in a manner that would result in substantial erosion, siltation, or impede or redirect flood flows.	Potentially significant impact	HYD-6.1: Perform detailed hydraulic evaluations and modify designs for facilities within drainage courses and flood zones if required to reduce potential flooding impacts	Less than significant impact
Impact HYD-7. Construction of the Proposed Project could alter drainage patterns and/or create or contribute runoff water that could substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite, create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff.	Potentially significant impact	HYD-1.3: Limit groundwater or dewatering discharge flow rates	Less than significant impact
Impact HYD-8. Proposed Project operations could alter drainage patterns or create or contribute runoff water that could substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite, create or contribute runoff water which	Potentially significant impact	HYD-8.1: Perform detailed hydraulic evaluations and modify designs for stormwater controls if required to prevent storm drainage system capacity exceedance and/or reduce potential flooding impacts	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
would exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff.			
Impact HYD-9. In a flood hazard, construction of the Proposed Project could risk release of pollutants due to project inundation.	Potentially significant impact	HYD-5.1: Prevent materials and equipment from being exposed to storm flooding hazards	Less than significant impact
Impact HYD-10. In a flood hazard, Proposed Project operations could risk release of pollutants due to project inundation.	Potentially significant impact	HYD-6.1: Perform detailed hydraulic evaluations and modify designs for improvements within drainage courses and flood zones if required to reduce potential flooding impacts	Less than significant impact
Impact C-HYD-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative impact on hydrology and water quality.	Significant cumulative impact	HYD-5.1: Prevent construction materials and equipment from impeding or redirecting flood flows HYD-6.1: Perform detailed hydraulic evaluations and modify designs for improvements within drainage courses and flood zones if required to reduce potential flooding impacts HYD-8.1: Perform detailed hydraulic evaluations and modify designs for stormwater controls if required to prevent storm drainage system capacity exceedance and/or reduce potential flooding impacts HAZ-2.3: Implement construction risk management plan	Less than considerable contribution
3.11 Land Use			
Impact LU-1. Construction and operation of the Proposed Project would not physically divide an established community.	Less than significant impact	None required	--

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Impact LU-2. Construction and operation could conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the improvements for the purpose of avoiding or mitigating an environmental effect.	Potentially significant impact	AG-1.1: Avoid Important Farmlands and Restore Important Farmlands used for temporary staging areas AG-1.2: Conserve Important Farmlands (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, Unique Farmland, and Farmland of Local Importance) BIO-2.1: Conduct a worker environmental training program for construction personnel BIO-2.4: Avoid California tiger salamander and western spadefoot toad BIO-2.5: Avoid western pond turtle and giant garter snake BIO-2.7: Avoid nesting birds BIO-2.8: Avoid Swainson's hawk BIO-2.9: Compensate for Swainson's hawk foraging habitat loss BIO-2.10: Avoid burrowing owl BIO-2.11: Compensate for burrowing owl habitat loss BIO-2.13: Avoid roosting bats BIO-7.1: Compensate for tree removal during construction BIO-9.1: Avoid nesting bird impacts during operation and maintenance activities BIO-9.2: Avoid roosting bat impacts during operation and maintenance activities BIO-9.3: Conduct pre-activity survey for special-status wildlife species prior to conducting maintenance activities	Less than significant impact
Impact C-LU-1. Construction of the Project, in combination with other foreseeable projects in the surrounding area, would not result in a significant cumulative impact on land use and planning. Operations of the Project would not contribute considerably to a significant cumulative impact on land use and planning (apart	Construction: less than significant cumulative impact Operations: significant cumulative impact	All mitigation measures identified for agricultural resources (see Impacts AG-1 through Impact AG-5) and biological resources (see Impacts BIO-1 through Impact BIO-13).	Less than considerable contribution

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
from the separately disclosed considerable contribution to agricultural land conversion under Impact CU-AG-1)			
3.12 Noise and Vibration			
Impact NOI-1. Construction of the Proposed Project could generate a substantial temporary increase in ambient noise levels in the vicinity of the Proposed Project in excess of FTA thresholds.	Potentially significant impact	NOI-1.1: Implement a construction noise control plan	Significant and unavoidable impact
Impact NOI-2. Operation of the Proposed Project would not generate a substantial permanent increase in ambient noise levels in the vicinity of the Proposed Project in excess of FTA thresholds.	Less than significant impact	None required	--
Impact NOI-3. Construction of the Proposed Project could generate excessive groundborne vibration or groundborne noise levels	Potentially significant impact	NOI-3.1: Implement a construction vibration control plan	Less than significant impact
Impact NOI-4. Operation of the Proposed Project could generate excessive groundborne vibration or groundborne noise levels.	Potentially significant impact	NOI-4.1: Implement special trackwork	Less than significant impact
Impact C-NOI-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative impact on noise and vibration.	Significant cumulative impact	NOI-1.1: Implement a construction noise control plan NOI-3.1: Implement a construction vibration control plan NOI-4.1: Implement special trackwork	Considerable contribution (construction noise) Less than considerable contribution

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
			(operational noise; construction and operational vibration)
3.13 Population and Housing			
Impact POP-1. Construction and operation would not substantially induce, either directly or indirectly, unplanned population growth in an area.	Less than significant impact	None required	--
Impact POP-2. Construction and operation would not displace a substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere.	No impact	None required	--
Impact C-POP-1. Construction of the Project, in combination with other foreseeable projects in the surrounding area, would not result in a significant cumulative impact on population and housing. Operations of the Project would not contribute considerably to a significant cumulative impact on population and housing.	Construction: less than significant cumulative impact Operations: less than considerable contribution	None required	--
3.14 Public Services			
Impact PS-1. Construction and operations could increase fire protection, emergency responders and law enforcement service ratios, response times, or other performance objectives but would not result in the need	Potentially significant impact	TR-4.1: Implement a construction road traffic control plan	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
for new or physically altered fire protection or law enforcement facilities.			
Impact PS-1. Construction and operations would not change service ratios and performance objectives or result in the need for new or physically altered schools or other public facilities.	Less than significant impact	None required	--
Impact C-PS-1. Construction and Operations of the Project, in combination with other foreseeable projects in the surrounding area, would not result in a significant cumulative impact on public services.	Less than significant cumulative impact	TR-4.1: Implement a construction road traffic control plan	--
3.15 Recreation			
Impact REC-1. Construction of the Proposed Project could impair access to or quality of existing recreational facilities.	Potentially significant impact	AES-1.1: Install visual barriers between construction work areas and sensitive receptors AQ-2.1: Implement advanced emissions controls for off-road equipment AQ-2.2: Implement advanced emissions controls for locomotives used for construction NOI-1.1: Implement a construction noise control plan REC-1.1: Coordinate with Merced County and California Department of Parks and Recreation to provide advance notice of and maintain a safe open channel in the Merced River during construction activities	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Impact REC-2. Operation of the Proposed Project would not increase the use of existing recreational resources such that substantial physical deterioration of the facility would occur or be accelerated.	Less than significant impact	None required	--
Impact REC-3. The Proposed Project would not include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.	No impact	None required	--
Impact C-REC-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative impact on recreational resources.	Significant cumulative impact	AES-1.1: Install visual barriers between construction work areas and sensitive receptors AQ-2.1: Implement advanced emissions controls for off-road equipment AQ-2.2: Implement advanced emissions controls for locomotives used for construction NOI-1.1: Implement a construction noise control plan	Less than considerable contribution
3.16 Safety and Security			
Impact SAF-1. The Proposed Project would be located within an airport land use plan area, within 2 miles of a public airport or public-use airport, and within the vicinity of a private airstrip, but would not result in a safety hazard or excessive noise for people residing or working in the study area.	No impact	None required	--
Impact SAF-2. Construction and operation of the Proposed Project could impair	Potentially significant impact	TR-4.1: Implement a construction road traffic control plan	Less than significant impact

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.			
Impact SAF-3. Construction and operation of the Proposed Project would not increase exposure of people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires and the Proposed Project is not located in or near state responsibility areas or lands classified as high or very high fire hazard severity zones so would not result in any of the associated consequences of being in such a zone.	Less than significant impact	None required	--
Impact SAF-4. Construction and operation of the Proposed Project would not increase hazards to workers, passengers, or adjacent human and environmental receptors along rail routes due to a design feature (e.g. sharp curves or dangerous intersections) or increase in passenger train movements.	Less than significant impact	None required	--
Impact C-SAF-1. Construction and Operations of the Project would not contribute considerably to a significant cumulative impact on safety and security.	Significant cumulative impact	TR-4.1: Implement a construction road traffic control plan	Less than considerable contribution

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
3.17 Transportation			
Impact TR-1. Construction and operation of the Proposed Project could conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadways, bicycle and pedestrian facilities.	Potentially significant impact	TR-1.1: Implement construction railway disruption control plan	Less than significant impact
Impact TR-2. The Proposed Project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)(2).	Less than significant impact (beneficial)	None required	--
Impact TR-3. The Proposed Project would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	Less than significant impact	None required	--
Impact TR-4. Construction of the Proposed Project could result in inadequate emergency access and operations of the Proposed Project would not result in inadequate emergency access.	Potentially significant impact	TR-4.1: Implement construction road traffic control plan	Less than significant impact
Impact C-TRA-1: Construction and Operations of the Project would not contribute considerably to a significant cumulative impact on transportation.	Significant cumulative impact	TR-1.1: Implement construction railway disruption control plan TR-4.1: Implement construction road traffic control plan	Less than considerable contribution

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
3.18 Utilities and Service Systems			
Impact USS-1. Construction of the Proposed Project could 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.	Potentially significant impact	USS-1: Implement utility relocation and disruption plans	Less than significant impact
Impact USS-2. There would be sufficient water supplies available to serve the Proposed Project (due to construction operations) and reasonably foreseeable future development during normal, dry, and multiple dry years; and construction and operations of the Proposed Project would not result in a determination by the wastewater treatment provider that serves or may serve the Proposed Project that it does not have adequate capacity to serve the Proposed Project's projected demand in addition to the providers existing commitments.	Less than significant impact	None required	--

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Impact USS-3. Construction and operations of the Proposed Project would not 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/or violate federal, state, and local management and reduction statutes and regulations related to solid waste.	Less than significant impact	None required	--
Impact C-USS-1: Construction of the Project, in combination with other foreseeable projects in the surrounding area, would not result in a significant cumulative impact on utilities and service systems. Operations of the Project would not contribute considerably to a significant cumulative impact on land use and planning.	Construction: Less than significant cumulative impact. Operations: Less than considerable contribution	None required	--

1

Chapter 1
Introduction

1.1 Overview

The San Joaquin Regional Rail Commission (SJRRC) is the designated owner, operator, and policy-making body for the Altamont Corridor Express (ACE) service that presently connects the northern San Joaquin County, the Tri-Valley, and the Silicon Valley by providing weekday train service from Stockton to San Jose. To enhance intercity and commuter rail service and to promote greater transit connectivity between the Central Valley and the San Francisco Bay Area (Bay Area), SJRRC is proposing to expand ACE service to Merced.

SJRRC has undertaken the ACE Ceres–Merced Extension Project, which is referred to as the "Project" or "ACE Ceres–Merced Extension" in this environmental impact report (EIR). The Project is the second phase of a two-phased ACE extension program to allow trains to reach Merced. The first phase of the program was the extension of ACE service from Lathrop to Ceres (currently in final design). The second phase is proposing to extend ACE service from Ceres to Merced (currently in environmental clearance and the subject of this EIR).

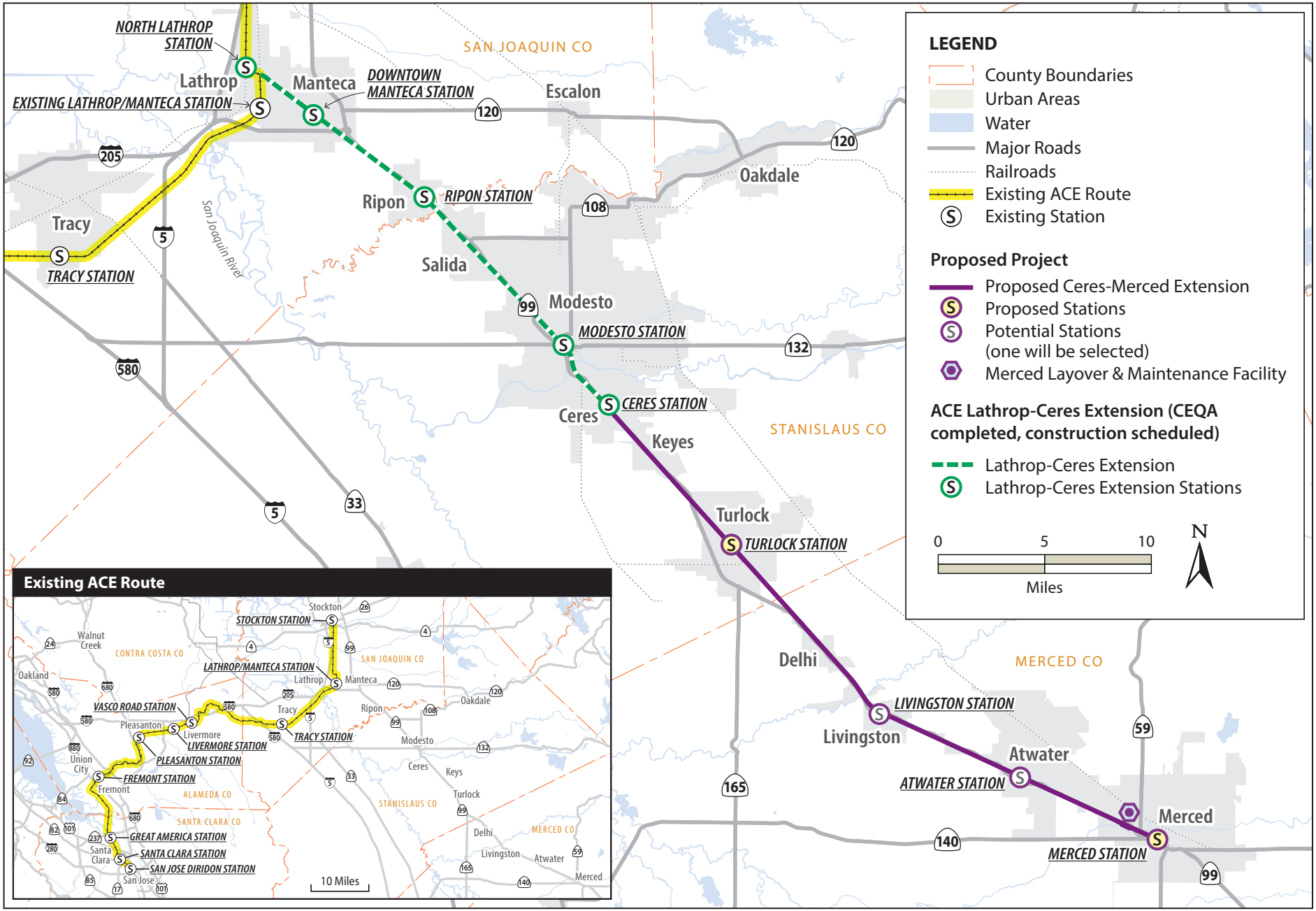
As part of the Project, SJRRC proposes to construct a set of new facilities, including track upgrades, new tracks, and new bridges within the Union Pacific Railroad (UPRR) Fresno Subdivision between Ceres and Merced; three new stations; and a new layover and maintenance facility.[1] Figure 1-1 depicts the Project location. These specific set of improvements are collectively referred to as the "Proposed Project" in this document, and include the following facilities:

- Ceres to Merced Extension Alignment
- Turlock Station
- Livingston Station
- Merced Station
- Merced Layover & Maintenance Facility

This EIR analyzes the impacts associated with these facilities.

In addition, SJRRC is considering an alternative to the Livingston Station – the Atwater Station Alternative. This EIR considers (at an equal level of detail) the potential impacts associated with the Atwater Station Alternative. Alternatives to the Merced Station and the Merced Layover & Maintenance Facility are also analyzed at a lesser level of detail in Chapter 5, *Alternatives*. Table 1-1 provides a summary of the Proposed Project facilities and the alternatives analyzed in this Draft EIR.

[1] A *subdivision* is a portion of railroad or railway that operates under a single timetable (authority for train movement in the area).



ACE
ALTAMONT CORRIDOR EXPRESS

Figure 1-1
Project Location
ACE Ceres-Merced Extension Project

Table 1-1. Summary of Proposed Project and Alternatives Analyzed in this EIR

Proposed Project	Alternatives other than the No Project Alternative	Evaluation Level of Detail
Ceres to Merced Extension Alignment	Rail alignment as described for the proposed alignment, but extended 0.6 mile southward to the Merced Station Alternative	Lesser level of detail (see Section 5.3.3)
Turlock Station	None	N/A
Livingston Station	Atwater Station Alternative	Equal level of detail (see Chapters 2, 3, and 4)
Merced Station	Merced Station Alternative	Lesser level of detail (see Section 5.3.3)
Merced Layover & Maintenance Facility	Merced Layover Facility Alternative	Lesser level of detail (see Section 5.3.3)

Overall, with operation of the Project and operation of other ACE projects that have already been environmentally cleared under CEQA (i.e., the Valley Rail Sacramento Extension Project and the Lathrop to Ceres Extension Project), ACE service would include the following trains.

- One train in the morning and one train in the evening between the Merced Station and San Jose Diridon Station.
- Two trains in the morning and two trains in the evening between the Stockton Station and San Jose Diridon Station.
- One train in the morning and one train in the evening between Natomas/ Sacramento Airport Station and San Jose Diridon Station.
- Three trains in the morning and three train in the evening between the Merced Station and Natomas/Sacramento Airport Station.
- One train in the morning and one train in the evening between the Natomas/ Sacramento Airport Station and Stockton Station.

1.2 Project History

SJRRC manages and operates the ACE service, which provides commuter rail service between San Jose and Stockton. The existing 86-mile ACE service corridor passes through Santa Clara, Alameda, and San Joaquin Counties, with 10 stations along the route. At the western end of the ACE corridor, ACE operates on an approximately 4-mile segment of track between San Jose and Santa Clara, which is owned and operated by the Peninsula Corridor Joint Powers Board (PCJPB). North of the Santa Clara Station to Stockton, ACE operates on approximately 82 miles of track owned by UPRR. ACE operates on portions of UPRR's Coast, Niles, Oakland, and Fresno subdivisions.

As part of Senate Bill (SB) 132, passed in April 2017, SJRRC was awarded $400 million for the ACE service expansion to Ceres/Merced, including associated system improvements. SJRRC prepared the *ACE Extension Lathrop to Ceres/Merced EIR* (Prior EIR) in 2017–2018. The Prior EIR analyzed the Phase I extension of ACE service from Lathrop to Ceres at a project-level detail and the Phase II extension from Ceres to Merced at a programmatic-level of detail. The Prior EIR was certified and

Phase I of the Project was approved by the SJRRC Board of Commissioners on August 3, 2018. The extension from Lathrop to Ceres is currently in the final engineering design and permitting phase and is anticipated to start construction in fall of 2021.

The ACE Ceres–Merced Extension Project, for which this EIR is being prepared, is Phase II of the Project that was analyzed in the Prior EIR. This EIR is being prepared by the SJRRC and will analyze the potential environmental impacts from expanding ACE service between Ceres and Merced at a project level of detail. Where appropriate, this EIR will incorporates analysis from the Prior EIR that is still current.

1.3 Need for the ACE Ceres–Merced Extension Project

Since its inception, SJRRC has primarily operated ACE as a weekday commuter rail service between Stockton and San Jose. ACE service began in October 1998 with two westbound morning trains from Stockton to San Jose and two eastbound afternoon trains from San Jose to Stockton on weekdays. In November 2009, a third roundtrip for ACE passengers was added, providing a third westbound morning train and a third eastbound afternoon train on weekdays. A fourth weekday roundtrip train, providing an additional westbound morning train and eastbound afternoon train, was added in September 2012. ACE provided Saturday service under a pilot program, which began on September 7, 2019; however, this service was suspended on March 21, 2020 in response to the Novel Coronavirus (COVID-19) pandemic. ACE trains consist of one diesel locomotive and five to seven bi-level passenger coaches and operate at a top speed of 79 miles per hour (mph).

Due to the current circumstances associated with the COVID-19 pandemic, ACE service was reduced. During the COVID-19 pandemic, ACE has been operating two westbound trains in the morning from Stockton to San Jose and two eastbound trains in the afternoon from San Jose to Stockton. It is anticipated that ACE service will be restored to its pre-COVID-19 levels once the pandemic is over.

The need for the ACE Ceres–Merced Extension is driven by the following considerations.

- Transportation demand driven by the economic relationships between the Bay Area, and the Sacramento area and northern San Joaquin Valley counties.
- Roadway congestion along primary routes from the northern San Joaquin Valley to the Bay Area, and the Sacramento area and limited roadway expansion options.
- Air quality issues in the northern San Joaquin Valley, the Bay Area, and the Sacramento area, and the related imperative to reduce greenhouse gas (GHG) emissions in California and globally.

Each factor contributing to the need for the ACE Ceres–Merced Extension is discussed in detail in the following sections.

1.3.1 Transportation Demand

1.3.1.1 Existing Altamont Corridor Express Service Area

The analysis of transportation demand for the Project was completed using the best available data and forecasts from prior to the Novel Coronavirus (COVID-19) health emergency. The exact long-

term impact of COVID-19 on transportation patterns and travel demand is not known and cannot be estimated without engaging in speculation. California Environmental Quality Act (CEQA) guidelines specifically prohibit the use of speculation in CEQA analyses. While the specific scale and duration of COVID-19 effects on transportation patterns and travel demand are not known at this time, it is logical to consider that travel demand will return to the northern San Joaquin Valley and San Francisco Bay Area in time, although it is possible that the exact timing and rate of population and economic growth may be slower than estimated prior to the COVID-19 health emergency. If that occurs, it is still expected that travel demands between the northern San Joaquin Valley and the Bay Area will increase over time and thus there will be increase pressures on overcapacity roadways and demand for alternatives such as the Project. The forecasts for future year ridership may ultimately occur a few years later than estimated, but the demand is still expected to be realized in time.

Between 1990 and 2013, the number of people commuting from the northern San Joaquin Valley to the Bay Area more than doubled, growing from 32,000 to nearly 65,000 commuters (Bay Area Council Economic Institute 2016). Since then, the number of people commuting from the northern San Joaquin Valley to the Bay Area has grown to 86,445 in 2017 and 93,398 in 2018 (Bay Area Council Economic Institute 2017 and 2018). In 2015, approximately 1.33 million annual riders traveled on ACE. The annual ridership (calculated between July 2018 and June 2019), prior to the COVID-19 pandemic, was calculated to be 1.50 million riders (San Joaquin Regional Rail Commission 2020a).

Due to this great demand between northern San Joaquin Valley and the Bay Area, road congestion along the I-205 and I-580 corridors resulted in substantial travel delays prior to the COVID-19 health emergency (see discussion of COVID-19 health emergency on estimates of future demand above). ACE service provides a critical alternative to travel between northern San Joaquin Valley and the Bay Area.

The need for ACE passenger rail service stems from the social and economic ties that bind together the San Joaquin Valley and the Bay Area (specifically the Tri-Valley and the Silicon Valley/South Bay regions). To-date, the most characteristic ACE trips are journeys to and from employment areas in the Bay Area during peak commute times, from riders' places of residence in the San Joaquin Valley or the Tri-Valley to riders' places of work in the Tri-Valley or Silicon Valley/South Bay.

Table 1-2 summarizes the anticipated increases in population and employment growth in the counties within the existing ACE corridor. Population growth in Santa Clara, Alameda, and San Joaquin Counties was projected to grow at a generally steady rate from 2020 to 2030, with San Joaquin County experiencing the greatest population growth among the three counties. Employment growth within the three counties was anticipated to be the highest from 2020 to 2025, with San Joaquin County also experiencing the greatest employment growth among the three counties during this time. San Joaquin County will also continue to have the greatest discrepancy in the ratio of employment opportunities to population (jobs/person ratio) compared to Santa Clara and Alameda Counties. The jobs/person ratio for Santa Clara and Alameda Counties remains stable at 1:1.6 and 1:1.3 jobs/person respectively, from 2020 to 2035. San Joaquin County has a greater discrepancy in the jobs/person ratio than in the Bay Area counties, with 1:2.9 jobs/person in 2020 and 1:2.8 jobs/person in 2025 and 2030. Although San Joaquin County was projected to have the greatest employment growth of the three counties from 2020 to 2025 and from 2025 to 2030, this would not substantially reduce the discrepancy in the county's jobs/person ratio. The primary drivers of these imbalances are the relative robust economy in the Bay Area (Santa Clara and Alameda Counties)

combined with dramatic increases in housing prices compared to historically lower employment opportunities and lower housing prices in San Joaquin County. These population and employment projections support the general characteristics of current ACE trips and contribute to the need for future increased ACE service from San Joaquin County.

Table 1-2. Projected Population and Employment Growth in the Existing ACE Service Areas

Counties	2020	2025	2030	% Change 2020–2025	% Change 2025–2030
Population					
Santa Clara County	1,967,585	2,023,194	2,094,936	2.8	3.6
Alameda County	1,685,886	1,756,709	1,832,576	4.2	4.3
San Joaquin County	782,545	832,480	879,055	6.4	5.6
Employment					
Santa Clara County	1,200,520	1,268,920	1,337,320	5.7	5.4
Alameda County	1,269,560	1,339,260	1,408,960	5.5	5.2
San Joaquin County	274,100	293,100	312,100	6.9	6.5

Source: California Department of Finance 2020; California Employment Development Department 2019a, 2019b, 2019c.

Note: 2020, 2025, and 2030 employment figures are based upon a linear interpolation of 2016 and 2026 employment estimates from the California Employment Development Department (California Employment Development Department 2019a, 2019b, 2019c).

1.3.1.2 Extended Altamont Corridor Express Service Area

SJRRC proposes to extend ACE service from Ceres to Turlock, Livingston or Atwater, and Merced. As described in the 2013 San Joaquin Council of Governments' *Interregional Multi-Modal Commute Trip Planning Study*, a large number of employed residents of San Joaquin, Stanislaus, and Merced Counties work outside the region or in a county other than their county of residence (San Joaquin Council of Governments 2013). Since the three-county region in the San Joaquin Valley has fewer jobs than workers, this imbalance leads to significant proportions of the workforce commuting out of the three-county region for work. Residents of the three-county region who work outside the county in which they reside travel mostly to the Bay Area (approximately 14 percent of all employed residents in the region) or commute within the three-county region but to a different county from their county of residence (approximately 9 percent of all employed residents in the region) (San Joaquin Council of Governments 2013). Given these travel characteristics, there is an existing and growing demand for transit services between the Bay Area and the San Joaquin Valley.

Table 1-3 summarizes the anticipated increases in population and employment in Stanislaus and Merced Counties, where the Project would be located. As shown, the anticipated populations in Stanislaus, and Merced Counties are significantly greater than the number of jobs offered in the respective counties for 2020, 2025, and 2030. This population and employment growth pattern are likely to increase the existing trend for commutes from the three-county region to the Bay Area and commutes within the three-county region.

These population and employment growth patterns contribute to the need for future increased ACE service from Stanislaus and Merced Counties.

Table 1-3. Projected Population and Employment Growth in the Extended ACE Service Areas

Counties	2020	2025	2030	% Change 2020–2025	% Change 2025–2030
Population					
Stanislaus County	562,303	584,055	606,900	3.9	3.9
Merced County	287,420	307,981	329,635	7.2	7.0
Employment					
Stanislaus County	213,460	220,240	231,540	3.2	5.1
Merced County	90,100	92,500	96,500	2.7	4.3

Source: California Department of Finance 2020; California Employment Development Department 2019d and 2019e.

Note: 2020, 2025, and 2030 employment figures are based upon a linear interpolation of 2016 and 2026 employment estimates from the California Employment Development Department (California Employment Development Department 2019d and 2019e).

This Project will allow ACE riders to travel from Merced to Sacramento. ACE service to Sacramento currently does not exist but is planned and has been environmentally cleared under CEQA as a part of the Valley Rail Sacramento Extension Project. As described in the Final EIR for the Valley Rail Sacramento Extension Project, there is a need to increase service between the San Joaquin Valley and Sacramento due to the region's unbalanced ratio of housing and jobs, which will continue to diverge, with even more people moving out of the Sacramento to find affordable housing in the San Joaquin Valley (San Joaquin Regional Rail Commission 2020b).

1.3.2 Roadway Congestion

The predominant mode of personal travel where the existing and extended ACE corridor are located is the automobile. In addition, many of the roadway corridors are influenced by truck traffic between the Central Valley, Bay Area, and the Sacramento area, particularly Interstate (I-) 205 and I-580. Economic growth and the corresponding demand for transportation services in Santa Clara, Alameda, San Joaquin, Stanislaus, and Merced Counties have exceeded the region's ability to provide the needed roadway capacity. The existing and extended ACE corridor provides transportation services in the vicinity of the following freeway segments.

- State Route (SR) 99 and I-5 from Merced to Stockton and Sacramento
- SR 152 from I-5 near Los Banos to US 101 in Gilroy and then north to San Jose
- SR 140 from SR 99 in Merced to I-5 west of Gustine
- SR 132 from SR 99 in Modesto to I-5 and I-580
- SR 120 from SR 99 to I-5
- I-5 from Stockton to Lathrop and points south
- I-205 from Lathrop to the San Joaquin County line
- I-580 from San Joaquin County line to Pleasanton
- SR 84 from Livermore to Fremont

- I-680 from Pleasanton to San Jose
- I-880 from Fremont to San Jose

The rapid increase in travel demand between the San Joaquin Valley, the Tri-Valley, the Silicon Valley/South Bay, and the Sacramento area coupled with the growth in population in the surrounding areas, has placed increasing pressures on the highways serving the region. Santa Clara and Alameda are the first and second most congested counties within the nine-county Bay Area (California Department of Transportation 2020).

The congestion experienced on the freeway segments in the Bay Area carry over onto freeway segments in the San Joaquin Valley. As it connects with I-580 near the Alameda–San Joaquin County line, I-205 serves as a major interregional connector for moving people and goods between the northern San Joaquin Valley and the Bay Area. The commute pattern on I-205 is unidirectional, with San Joaquin Valley residents commuting to jobs in the Bay Area during the morning period and returning in the afternoon period. Congestion on I-205 correlates with this travel pattern, which stems from the growing jobs and housing imbalance within the San Joaquin Valley. In the future, this commute pattern from the San Joaquin Valley to the Bay Area is expected to continue and become even more pronounced. With this pattern, congestion and bottlenecking on I-205 is anticipated to worsen. In the northern San Joaquin Valley, congestion locations occur most frequently in urban areas where the annual average daily traffic tends to be higher, exit and entry ramps or interchanges are more frequent, and the risk of crashes is more prominent. Congestion on SR 99 primarily occurs near urban centers, such as Stockton, Modesto, and Merced (Fresno Council of Governments 2017).

Congestion on freeway corridors in the vicinity of ACE are anticipated to increase to the point at which travel peak periods would spread into midday and to later in the evening, even if planned roadway improvements take place. Bottlenecks would continue to constrain movement through the corridor. As shown in Table 1-2, job growth in the Bay Area was expected to increase between 5 and 6 percent between 2020 and 2025 and between 2025 and 2030. As shown in Tables 1-2 and 1-3, population growth and job growth are expected to increase in both the Bay Area and the San Joaquin Valley. The resultant new transportation demand will lead to high levels of congestion that will take a toll on economic development by constraining goods and people movement.

As one example, between 2013 and 2040, peak hour traffic was projected to increase as follows on routes of regional significance in the Tri-Valley and adjacent areas (DKS Associates 2017).

- I-680 south of SR 84 (Sunol Grade)—52 percent increase in peak hour traffic
- I-580 east of Tassajara Road—35 percent
- I-580 east of Vasco Road—59 percent
- I-680 overall in Tri-Valley
    - 2013—a.m. peak average speeds of 56 mph (northbound) to 57 mph (southbound) and p.m. peak average speeds of 45 mph (northbound) to 58 mph (southbound)
    - 2040—a.m. peak average speeds of 46 mph (northbound) to 52 mph (southbound) and p.m. peak average speeds of 40 mph (southbound) to 46 mph (northbound)
- I-580 overall in Tri-Valley
    - 2013—a.m. peak average speeds of 35 mph (westbound) to 62 mph (eastbound) and p.m. peak average speeds of 49 mph (eastbound) to 59 mph (westbound)

- 2040—a.m. peak average speeds of 26 mph (westbound) to 51 mph (eastbound) and p.m. peak average speeds of 35 mph (eastbound) to 48 mph (westbound)

Similar increases in congestion are expected for I-880, SR 84, I-205, and SR 99.

Opportunities to improve highway capacity are constrained by a number of factors, including funding availability, the need for extensive and costly right-of-way acquisitions, and potential environmental impacts, such as displacement of residences and businesses, and impacts on natural resources and redesign of local roadways beyond the interchanges. For these reasons, substantial capacity improvements to I-880, I-680, SR 84, I-580, I-205, SR 120, I-5, and SR 99 cannot be relied upon to fully address long-term travel demands in the corridor. In this environment, ACE provides an essential and viable transportation alternative to costly highway capacity expansion. By reducing trip times and increasing transit ridership, the ACE Ceres–Merced Extension Project would help to ease congestion on the Bay Area and San Joaquin Valley freeways.

This Project will allow ACE riders to travel from Merced to Sacramento. The benefits associated with relieving traffic congestion for travelers in the San Joaquin Valley to the Sacramento area has been identified previously in the Final EIR for the Valley Rail Sacramento Extension Project (San Joaquin Regional Rail Commission 2020b). The ACE Ceres–Merced Extension Project would contribute to the overall benefit of relieving traffic congestion along I-5 and SR-99.

1.3.3 Air Quality and Greenhouse Gas Emissions

High rates of automobile ownership and increasing vehicle miles traveled (VMT) have contributed to air quality problems throughout California. Pollutants of concern include nitrogen oxides and reactive organic gases, which are precursors of ozone (also referred to as *smog*); sulfur dioxides; carbon monoxide; and particulate matter. GHGs (including carbon dioxide, nitrous oxide, methane, and other gases) are now a focus of environmental planning in California because of their role in global climate change. Motor vehicles are substantial contributors to the production of all of these pollutants.

The existing ACE corridor and the proposed extension of ACE service to Merced includes portions of two air basins: the San Francisco Bay Area Air Basin (SFBAAB), for which air quality conditions are regulated by the Bay Area Air Quality Management District (BAAQMD), and the San Joaquin Valley Air Basin (SJVAB), for which air quality conditions are regulated by the San Joaquin Valley Air Pollution Control District (SJVAPCD). While the air quality has improved in recent years, largely in response to technological improvements in motor vehicles and fuels, both air basins face substantial challenges to meet air quality standards.

The SFBAAB is designated a marginal nonattainment area for the 8-hour federal standard for ozone, a moderate nonattainment area for the federal PM2.5 (particulate matter smaller than 2.5 microns in diameter) standard, and a maintenance area for the federal carbon monoxide standard. With respect to the California standards, the SFBAAB is currently a serious nonattainment area for the 1-hour ozone standard and a nonattainment area for the 8-hour ozone, PM2.5, and PM10 (particulate matter smaller than 10 microns in diameter) standards.

The San Joaquin Valley has more challenging air quality issues than the SFBAAB. The SJVAB is designated an extreme nonattainment area for the 8-hour federal standard for ozone and a nonattainment area for the federal PM2.5 standard. With respect to California standards, the SJVAB

is currently a severe nonattainment area for the 1-hour ozone standard and a nonattainment area for the 8-hour ozone, PM2.5, and PM10 standards.

Section 3.3, *Air Quality*, provides a summary of data collected at the air quality monitoring stations nearest to the ACE corridor and a discussion of the total number of days that state and federal ambient air quality standards were exceeded.

Because transportation is the major contributor to ozone precursors, increasing auto travel threatens the area's improvement in air quality. Growing traffic generation and congestion will add to the potential problems because of increased emissions due to increased number of vehicles operating and also due to this increased traffic being subjected to increased frequency of stop-and-go traffic. Shifting commuters and other travelers to higher occupancy modes is highly desirable as a means to partially offset the effects on air quality produced by the growth in auto travel. Expanded ACE service offers the greatest potential for increased high-occupancy travel from the San Joaquin Valley to the Bay Area and the Sacramento area, including in areas with the most severe air quality problems in the corridor. Compared to the conditions without the Project, by 2040, the ACE Ceres-Merced Extension would result in reduction in emissions of up to 0.2 tons per year of ozone precursors and 9.6 tons per year of PM10 in the BAAQMD and up to 6.9 tons per year of PM10 in the SJVAPCD as a result of extended ACE service (see Section 3.3, *Air Quality*). The ACE Ceres-Merced Extension would also result in reductions to air pollutants in the Sacramento area.

The transportation sector is the largest source of GHG emissions in California and in most communities along the existing and extended ACE corridor (California Air Resources Board 2018). The Stanislaus Council of Governments and the Merced County Association of Governments have both adopted Regional Transportation Plans (RTP)/ Sustainable Community Strategies (SCS) to reduce GHG emissions. California has ambitious goals to reduce GHG emissions throughout the state, including Assembly Bill (AB) 32 and Senate Bill (SB) 32, which outline the state's GHG reduction goals of achieving 1990 emissions levels by 2020 and a level 40 percent below 1990 emissions levels by 2030 (see Section 3.8, *Greenhouse Gas Emission*). By reducing vehicle travel on regional roadways, the ACE Ceres–Merced Extension would also help communities along the existing ACE corridor; along the extended ACE corridor from Merced to Ceres, Ceres to Lathrop, and Lathrop Sacramento; and California as a whole to meet their goals for GHG reductions. Compared to the conditions without the Project, operations of the ACE Ceres–Merced Extension would result in a reduction of approximately 4,082 metric tons of carbon dioxide equivalent of GHG emissions by 2040 (see Section 3.8, *Greenhouse Gas Emissions*).

1.4 Project Objectives

The primary objectives of the Project are:

- To enhance commuter rail and intercity service and transit connections in the San Joaquin Valley;
- Reduce traffic congestion, improve regional air quality, and reduce greenhouse gas (GHG) emissions; and
- Promote local and regional land use and transportation sustainability goals.

Each of these objectives is discussed in detail below.

- **Enhance commuter rail and intercity service and transit connections in the San Joaquin Valley.**

  Project improvements would support enhanced commuter rail and intercity passenger rail and transit access and connectivity, as well as provide additional surface passenger transportation capacity in the San Joaquin Valley. The ACE Ceres–Merced Extension Project would extend the reach of the existing commuter and intercity rail transportation network of the San Joaquin Valley. The Project would provide additional service to areas currently lacking access to passenger rail transportation as well as supplementing rail service to other areas. The Project would support transit-oriented development near proposed station locations. The Project would also provide an opportunity to connect with the future California High-Speed Rail System, which would integrate ACE service into a unified northern California rail network. These commuter and intercity rail connections are expected to stimulate additional ACE ridership.

- **Reduce traffic congestion, improve regional air quality, and reduce greenhouse gas emissions.**

  An expanded and improved ACE system would provide a transportation alternative to automobile use, which would alleviate traffic congestion on corridor highway segments (along SR 99, I-205, I-580, I-680, I-5, and I-880) and result in air quality benefits and a reduction in GHG emissions. In addition, by maximizing connections with other transit services within the San Joaquin Valley, the Project would contribute to indirect benefits related to alleviating congestion and improving regional air quality. Reductions in air pollutant emissions represent long-term health benefits for ACE riders, and for residents and employees along the ACE corridor. In addition, reduction of GHG emissions would help California to meet its goals under Assembly Bill 32, the 2006 Global Warming Solutions Act (as amended by Senate Bill 32), as well as other state GHG emission reduction goals.

- **Promote local and regional land use and transportation sustainability goals.**

  Metropolitan areas are implementing strategies to encourage more efficient use of land resources, improve mobility, and provide alternative transportation facilities and services in order to lower GHG emissions and to maintain air quality standards. One statewide strategy adopted in the California State Implementation Plan is the development of multi-use transportation corridors, including the addition of more transit and the expansion of rail modal options. This Project would further improve regional air quality and reduce GHG emissions, beyond reducing VMT from automobiles, by supporting regional land use and transportation planning goals under the Sustainable Communities and Climate Protection Act of 2008 (also known as SB 375) and other local, regional, and state sustainability initiatives. ACE is evaluating potential new ACE stations between Ceres and Merced. The new transit stations could act as a catalyst for smart growth in communities by revitalizing city core areas and addressing traffic congestion issues in the cities of the northern San Joaquin Valley.

1.5 Existing and Projected Ridership with the ACE Ceres–Merced Extension

SJRRC is proposing to expand ACE service to Merced. This service expansion would increase ACE ridership to meet the Project's objectives. Table 1-4 summarizes anticipated ridership in 2030 and 2040 with and without the Project.

Table 1-4. System Ridership with Operations of the Project

Year	No Project Conditions[a]	Proposed Project (with Livingston Station)[b]		Atwater Station Alternative[b]	
		Forecasted Annual Riders	Net New Annual Riders	Forecasted Annual Riders	Net New Annual Riders
2030	3,735,500	4,176,800	441,300	4,180,900	445,400
2040	4,797,100	5,364,100	567,000	5,367,500	570,400

Source: Appendix D, *ACE Extension Ridership, Revenue, and Benefits Report*.

Notes:

[a] The No Project conditions include ACE service, with the addition of the approved Sacramento Extension and Ceres Extension. Service includes the following: two direct trains between Stockton and San Jose; one direct train between Ceres and San Jose with connecting bus service between Ceres and Merced; one direct train between Natomas and San Jose; one direct train between Natomas and Stockton; three trains between Ceres and Natomas via the Natomas Extension with connecting bus service between Ceres and Merced, these three trains also connect at North Lathrop to other inbound ACE trains with service to San Jose; and four buses between Ceres and Merced, connecting to the trains at Ceres.

[b] Project operations would include the following ACE service: one train in the morning and one train in the evening between the Merced Station and San Jose Diridon Station; two trains in the morning and two trains in the evening between the Stockton Station and San Jose Diridon Station, one train in the morning and one train in the evening between Natomas/ Sacramento Airport Station and San Jose Diridon Station; three trains in the morning and three train in the evening between the Merced Station and Natomas/Sacramento Airport Station; and one train in the morning and one train in the evening between the Natomas/ Sacramento Airport Station and Stockton Station.

1.6 Environmental Review Process

1.6.1 California Environmental Quality Act

CEQA applies to all discretionary activities proposed to be implemented by California public agencies, including state, regional, county, and local agencies (California Public Resources Code [Public Res. Code] 21000 et seq.). CEQA requires agencies to estimate and evaluate the environmental impacts of their actions, avoid or reduce significant environmental impacts when feasible, and consider the environmental implications of their actions prior to making a decision. CEQA also requires agencies to inform the public and other relevant agencies and consider their comments in the evaluation and decision-making process. The State CEQA Guidelines are the primary source of rules and interpretations of CEQA (Public Res. Code 21000 et seq.; 14 California Code of Regulations 1500 et seq.).

1.6.2 Purpose of this Environmental Impact Report

The purpose of this EIR is to provide the information necessary for SJRRC to make an informed decision about the ACE Ceres–Merced Extension Project and to supply the information necessary to support related permit applications and review processes.

This draft EIR has been prepared in compliance with CEQA to achieve the following goals.

- Identify potential direct, indirect, and cumulative environmental impacts.
- Describe feasible mitigation measures intended to avoid or reduce potentially significant impacts to a less-than-significant level.

- Disclose the environmental analyses, including potential impacts and mitigation measures, for public and agency review and comment.
- Discuss potential alternatives to the Proposed Project that meet the purpose and need, are feasible, and would avoid or reduce identified significant impacts.

One of the purposes of CEQA is to provide an opportunity for the public and relevant agencies to review and comment on projects that might affect the environment. Scoping activities are discussed in Section 1.7, *Scope and Content of this Environmental Impact Report*. SJRRC will provide a public review period for this draft EIR 45 days from its release for comment. SJRRC will also conduct public meetings to receive comments during the comment period. Once the public review period is complete, SJRRC will prepare a final EIR that includes all the comments received on the draft EIR, responses to all comments, and any necessary revisions to the draft EIR. CEQA requires the SJRRC decision-making body, the SJRRC Board (Board), to review and consider the information in the EIR before making a decision on the ACE Ceres–Merced Extension Project.

1.7 Scope and Content of this Environmental Impact Report

Scoping refers to the process used to assist the lead agency in determining the focus and content of an EIR. Scoping solicits input on the potential topics to be addressed in the EIR, the range of alternatives, and possible mitigation measures. Scoping is also helpful in establishing methods of assessment and in selecting the environmental effects to be considered in detail.

1.7.1 Notice of Preparation and Scoping Meetings

The scoping process for this EIR was formally initiated on May 28, 2020, when SJRRC submitted an NOP to the California State Clearinghouse; federal, regional, and local elected officials; and federal, state, and local agencies, including the planning and community development directors in Stanislaus County, Merced County, and the cities where the Project would be located; and the interested public. The purpose of the NOP is to solicit participation from relevant agencies and from the public in determining the scope of an EIR. The scoping period ended July 7, 2020.

Three virtual public scoping meetings were held during the scoping period. In accordance with social distancing guidance related to the Novel Coronavirus (COVID-19), all scoping meetings for the Project were held online as webinars. Two were held on June 25, 2020, and one was held on June 30, 2020. Appendix A, *ACE Ceres-Merced Extension Scoping Memorandum*, contains the scoping report detailing the scoping process, including the notification, and scoping activities undertaken. Written comments received during the scoping process are also included in Appendix A.

1.7.2 Resource Topics

Consistent with Appendix G of the CEQA Guidelines, this draft EIR evaluates the potential impacts of the ACE Ceres–Merced Extension Project for the following resource areas.

- Aesthetics
- Agricultural resources

- Air quality
- Biological resources
- Cultural resources and tribal cultural resources
- Energy
- Geology and soils
- GHG emissions
- Hazards and hazardous materials
- Hydrology and water quality
- Land use and planning
- Noise and vibration
- Population and housing
- Public services
- Recreation
- Safety and security (including wildfire)
- Transportation
- Utilities and service systems

The following topics are also analyzed in this draft EIR.

- Cumulative impacts
- Significant and unavoidable impacts
- Significant irreversible changes in the environment
- Growth inducement
- Alternatives to the Proposed Project

1.8 Environmental Impact Report Organization

This draft EIR is organized into the following chapters and appendices.

- *Executive Summary* provides a summary of the key information and conclusions in the EIR.
- Chapter 1, *Introduction*, provides a brief overview of the ACE Ceres–Merced Extension Project improvements; the Project objectives; an overview of the environmental review process; and the scope, content, and organization of the draft EIR.
- Chapter 2, *Project Description*, provides a comprehensive description of the improvements associated with the Proposed Project and the Atwater Station Alternative.
- Chapter 3, *Environmental Impact Analysis*, provides an evaluation of the Proposed Project impacts on the environmental resource topics outlined above. Each resource-specific section discusses the environmental setting, regulatory setting, and any impacts and mitigation

measures. The one alternative analyzed at an equal level of detail (Atwater Station Alternative) is also included in Chapter 3.

- Chapter 4, *Other CEQA-Required Analysis*, provides a discussion of cumulative impacts, significant environmental impacts that cannot be avoided, significant irreversible changes in the environment, and growth-inducing impacts.
- Chapter 5, *Alternatives,* provides a description of the No Project Alternative, an explanation of the development of alternatives, an evaluation of alternatives considered but dismissed from further consideration, and analysis of a range of alternatives to the Project. This chapter also identifies the environmentally superior alternative.
- Chapter 6, *Public and Agency Involvement*, provides a description of the outreach by SJRRC to the public, stakeholders, and agencies over the course of project definition, alternatives development, and environmental review.
- Chapter 7, *List of Preparers*, provides a list of firms and staff who contributed to the preparation of this draft EIR.
- Chapter 8, *References*, provides a list of the printed references and personal communication cited in this draft EIR.
- Appendices
    - Appendix A: *ACE Ceres–Merced Extension Scoping Memorandum*
    - Appendix B: *ACE Ceres–Merced Extension Environmental Footprint*
    - Appendix C: *ACE Ceres–Merced Extension 15% Preliminary Engineering Plans*
    - Appendix D: *ACE Ceres–Merced Extension Ridership, Revenue, and Benefits Report*
    - Appendix E: *ACE Ceres–Merced Extension Opinion of Probable Cost Report*
    - Appendix F: *ACE Ceres–Merced Extension Operations and Maintenance Cost Technical Memorandum*
    - Appendix G: *Regional Plans and Local General Plans*
    - Appendix H: *Supporting Aesthetics Information*
    - Appendix I: *Supporting Agricultural Resources Information*
    - Appendix J: *Air Quality, Greenhouse Gas, and Health Risk Assessment Supporting Documentation*
    - Appendix K: *Supporting Biological Resources Information*
    - Appendix L-1: *Historical Resources Inventory and Evaluation Report*
    - Appendix L-2: *Archaeological Inventory Report*
    - Appendix M: *Public and Agency Coordination*

Chapter 2
Project Description

The Altamont Corridor Express (ACE) Ceres–Merced Extension (Project) would support the extension of ACE service to Merced. The Proposed Project is the extension of ACE service from Ceres to Merced and includes the development of the following facilities.

- The Ceres to Merced Extension Alignment, which consists of upgrades to track, new track, and bridges within the Union Pacific Railroad (UPRR) Fresno Subdivision between Ceres and Merced.[1]
- New Turlock, Livingston, and Merced Stations, which are located along the Ceres to Merced Extension Alignment.
- The Merced Layover & Maintenance Facility, which is located in north Merced to support extension operations.

In addition, the San Joaquin Regional Rail Commission (SJRRC) has identified the Atwater Station Alternative as an alternative to the Livingston Station. Only one station would be implemented in either Livingston or Atwater. This EIR analyzes both stations at an equal level of detail. The final decision as to whether to adopt the Proposed Project and/or an alternative will be made after completion of the final environmental impact report (EIR) for this Project. This chapter provides information regarding operations and maintenance activities, construction activities, potential right-of-way (ROW) and easement needs, costs and funding sources, and required permits and approvals.

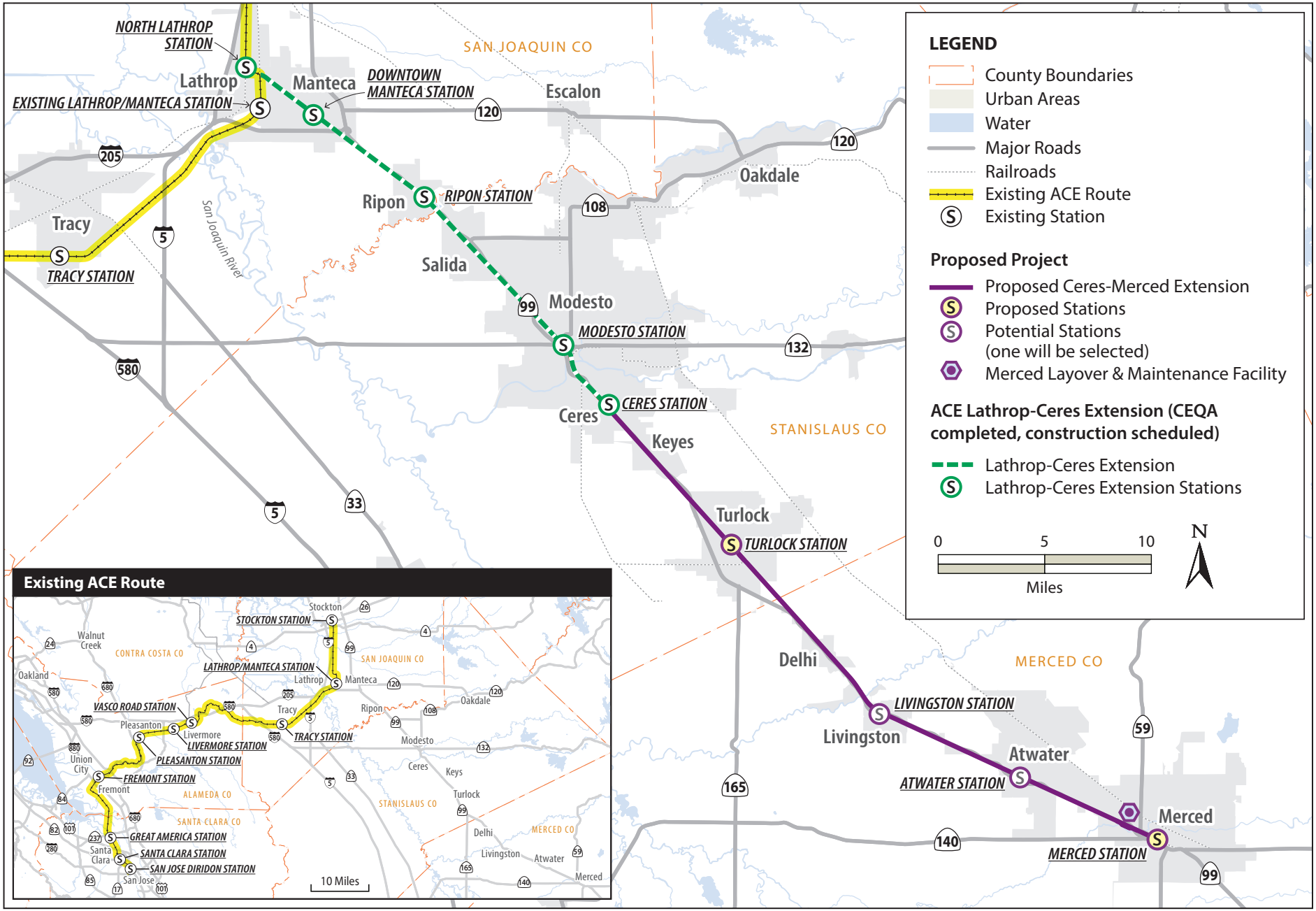
2.1 Project Location and Limits

As shown in Figure 2-1, the limits of the Project span Stanislaus and Merced Counties. SJRRC proposes to extend ACE passenger rail service from Ceres to Merced by constructing and upgrading tracks within the existing UPRR Fresno Subdivision ROW, a distance of approximately 34 miles. New stations and operating facilities would be constructed along the Ceres to Merced Extension Alignment. Project improvements include portions of the UPRR Fresno Subdivision ROW and additional ROW for new facilities (stations and layover yards) and for any construction or access areas located outside the ROW.

2.2 Background

SJRRC does not own the tracks on which ACE operates, but instead has entered into passenger rights agreements with both the Peninsula Corridor Joint Powers Board (PCJPB, also referred to as Caltrain) and UPRR to operate on portions of their respective tracks. ACE shares tracks with freight trains dispatched by UPRR within the UPRR ROW and with freight trains dispatched by Caltrain in the Caltrain corridor. In addition, other passenger train services (Caltrain, Amtrak Coast Starlight, and Capitol Corridor) also operate on PCJPB and UPRR tracks where ACE trains travel.

[1] A *subdivision* is a portion of railroad or railway that operates under a single timetable (authority for train movement in the area).



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ACE ALTAMONT CORRIDOR EXPRESS

Figure 2-1
Project Location
ACE Ceres-Merced Extension Project

To enhance commuter and intercity rail service and to promote greater transit connectivity between the San Joaquin Valley and the San Francisco Bay Area (Bay Area), SJRRC is proposing to expand ACE service. On August 3, 2018, the SJRRC Board of Commissioners approved the *ACE Extension Lathrop to Ceres/Merced EIR* (Prior EIR) for Phase I of the extension, which includes the extension of ACE to Ceres with stations in downtown Manteca, Ripon, Modesto, and Ceres. The Prior EIR included a programmatic analysis for Phase II of the extension, which includes the extension of ACE from Ceres to Merced with stations in Turlock, Livingston or Atwater, and Merced. This EIR updates the programmatic analysis previously analyzed for the ACE Extension Ceres to Merced (i.e., Phase II) and includes project-level details that were not previously available.

2.3 Proposed Alignment, Stations, and Layover & Maintenance Facility

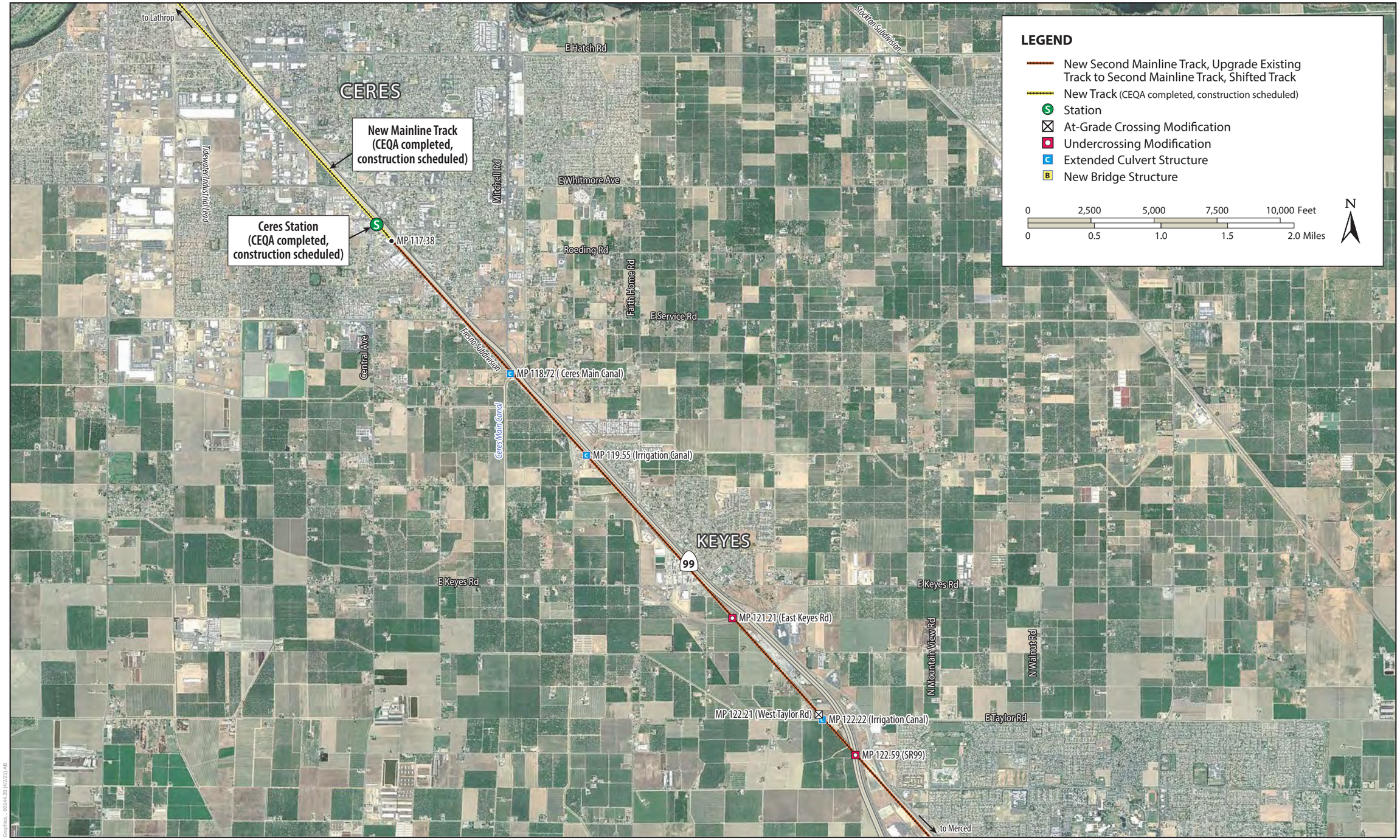
ACE currently does not operate passenger rail services between Ceres and Merced and is proposing to extend passenger rail service from Ceres to Merced on the UPRR Fresno Subdivision. No facilities are proposed as part of the Project between Ceres and Lathrop, though facilities are being pursued as part of a separate previously approved project. Additionally, no facilities are proposed as part of the Project along the existing ACE corridor between Stockton and San Jose. However, where applicable, this EIR analyzes operations impacts of the Project due to increased ridership at existing ACE destination stations in the Bay Area.

Specific proposed track improvements, stations, and the layover & maintenance facility are illustrated in Figures 2-1 through 2-7. The environmental footprint is illustrated in Appendix B, *ACE Ceres-Merced Extension Environmental Footprint*.[2] In addition, Appendix C, *ACE Ceres-Merced Extension 15% Preliminary Engineering Plans*, contains track plans and section drawings, structure plans, roadway plans, utility plans, station plans, and ROW plans for these improvements.

The analysis in this EIR would allow subsequent implementation of individual facilities, and prioritization and phasing of facilities. Infrastructure improvements and passenger service can be increased in a phased approach over time. Thus, the development of physical improvements and implementation of ACE service could be phased in over time, as follows.

- Initial improvements: Construction of stations, parking, and key track/infrastructure improvements and commencement of initial service (one or more trains).
- Interim improvements: Construction of additional track improvements, such as the additional new mainline track, at specific areas of train congestion, and possibly additional parking improvements necessary because of increased ridership, which would allow further expansion of service beyond the initial service or expansion.
- Full build: Completion of all proposed improvements and implementation of the full service plans.

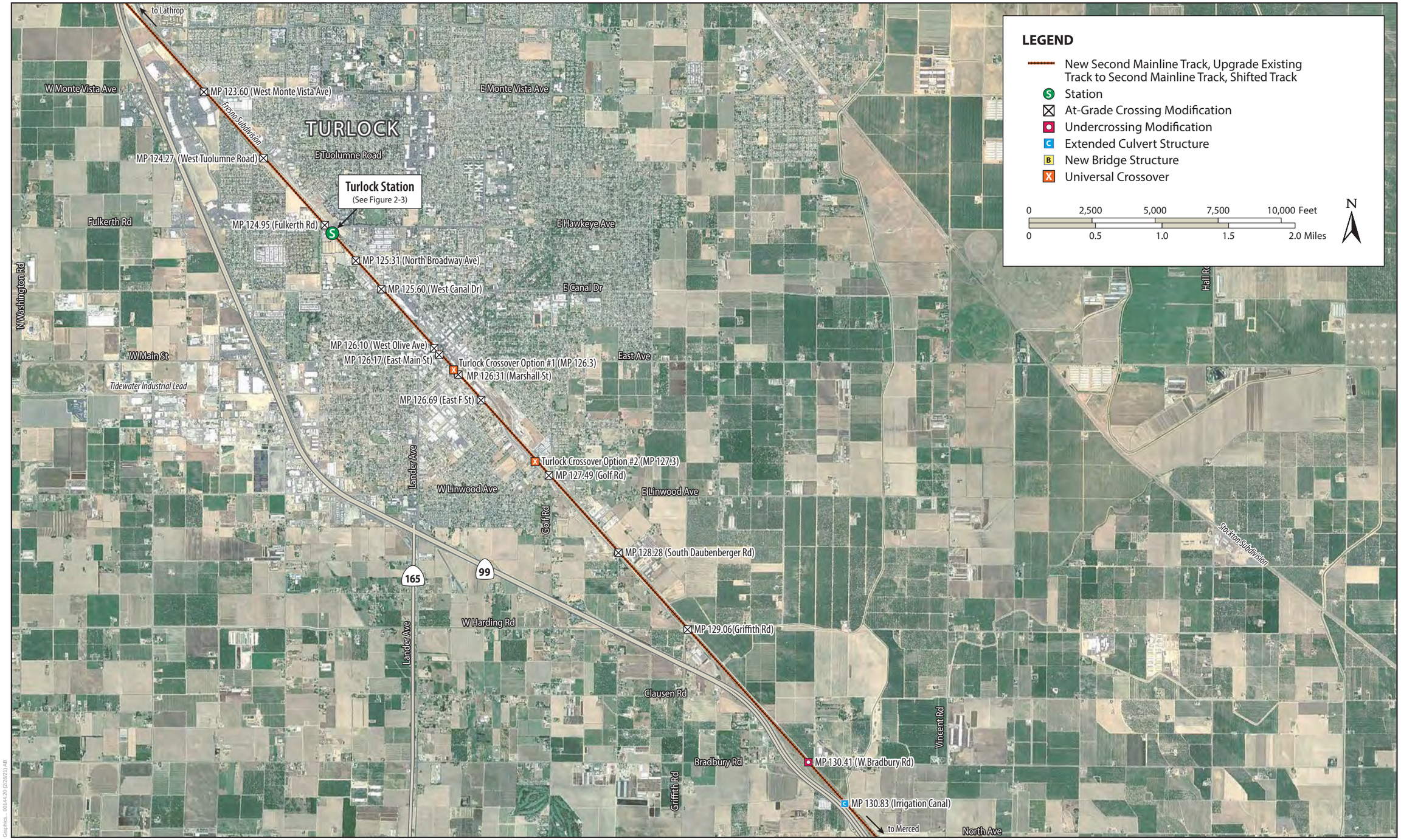
[2] The *footprint* is defined as the area covered by a facility or affected by construction activities.



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ACE ALTAMONT CORRIDOR EXPRESS

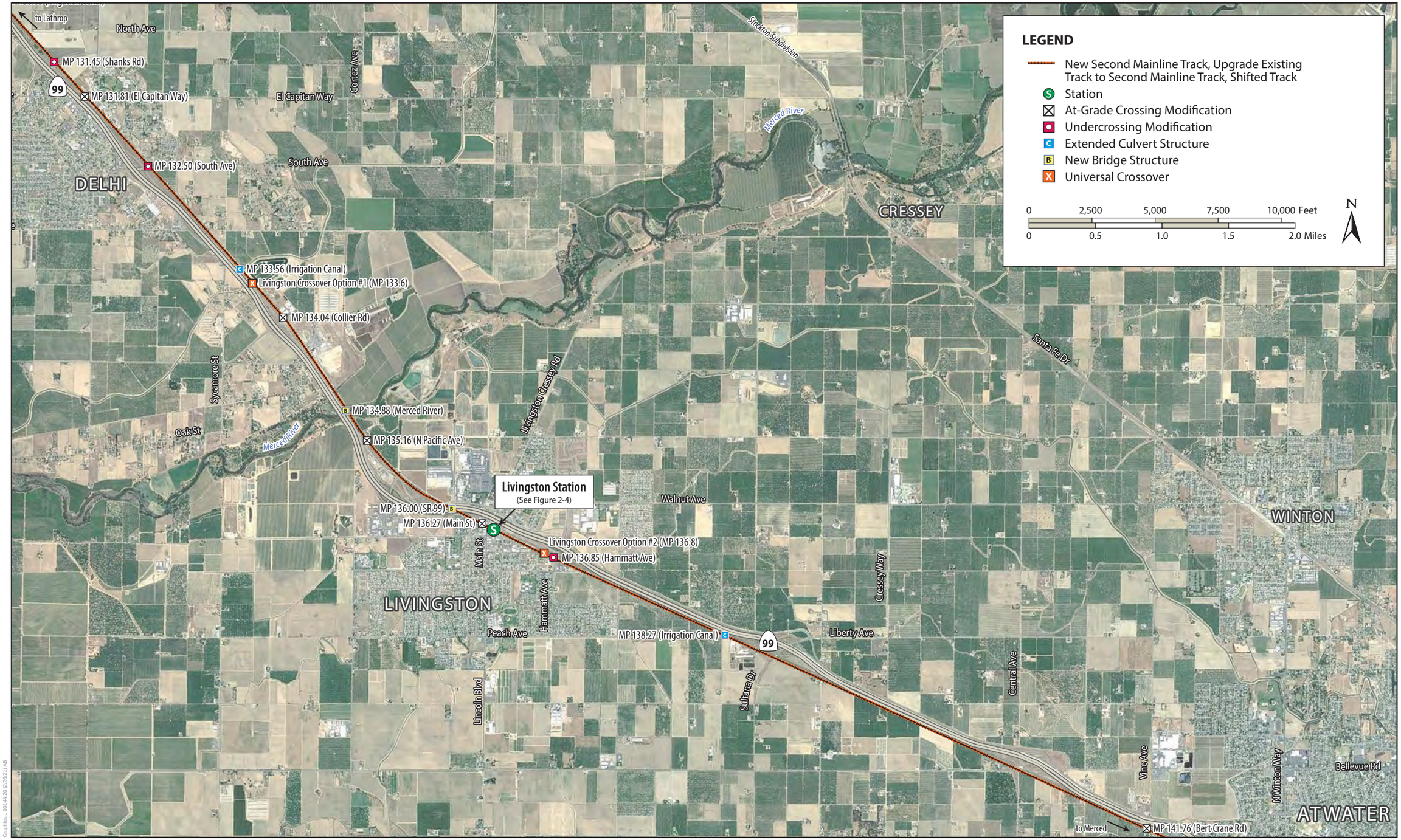
Figure 2-2a
Ceres to Merced Extension Alignment
ACE Ceres-Merced Extension Project



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ACE
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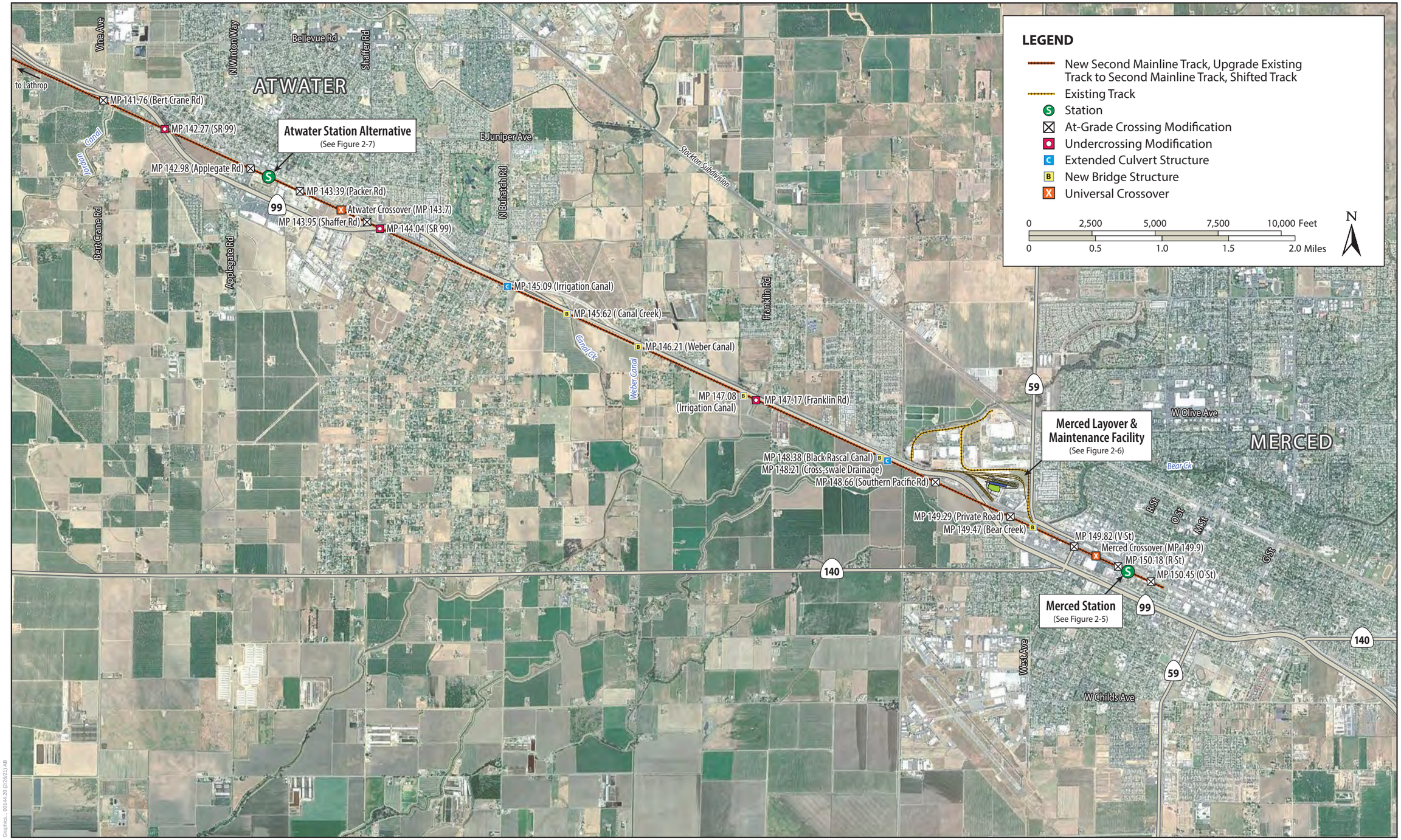
Figure 2-2b
Ceres to Merced Extension Alignment
ACE Ceres-Merced Extension Project



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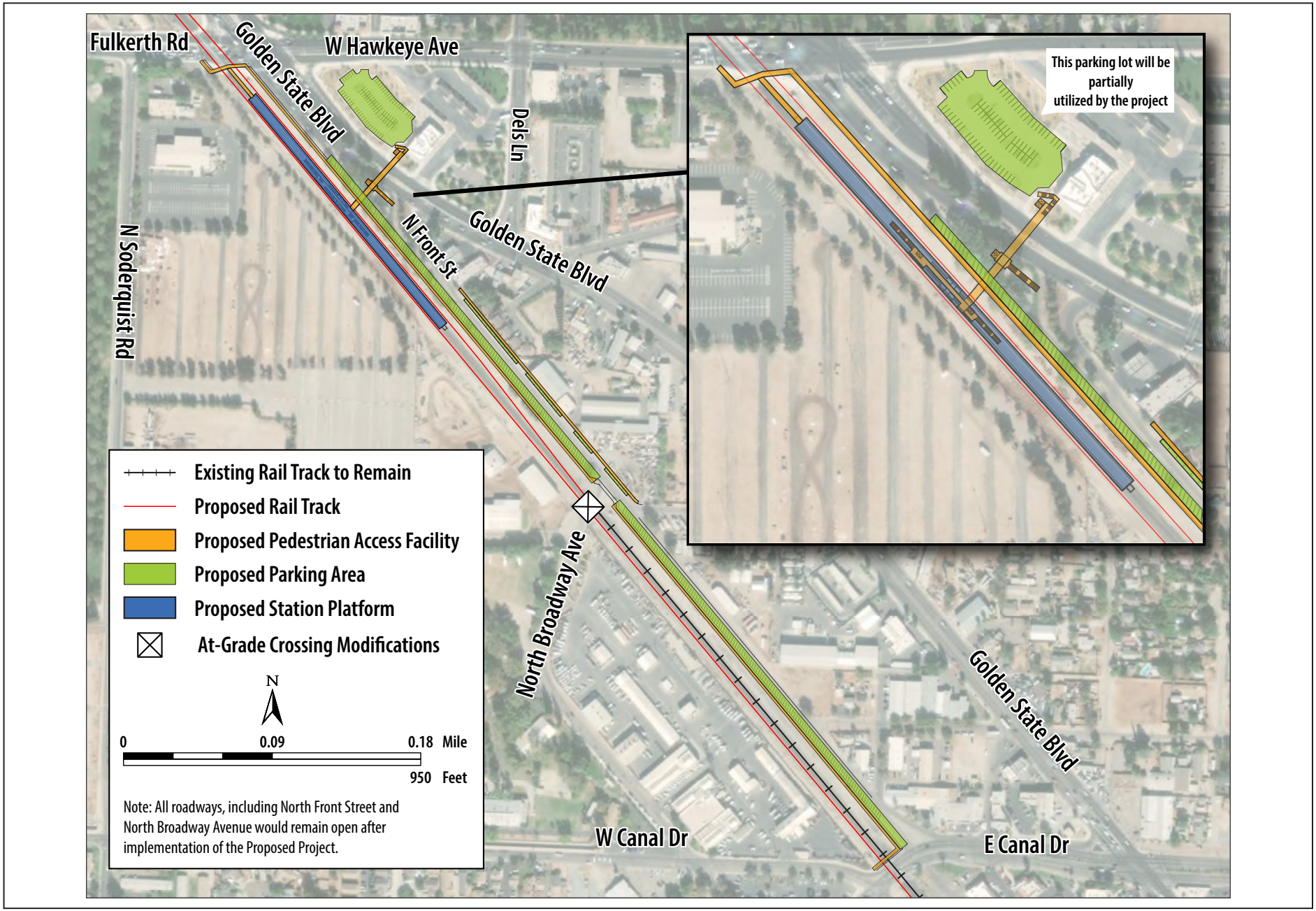
Figure 2-2c
Ceres to Merced Extension Alignment
ACE Ceres-Merced Extension Project



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ACE ALTAMONT CORRIDOR EXPRESS

Figure 2-2d
Ceres to Merced Extension Alignment
ACE Ceres-Merced Extension Project



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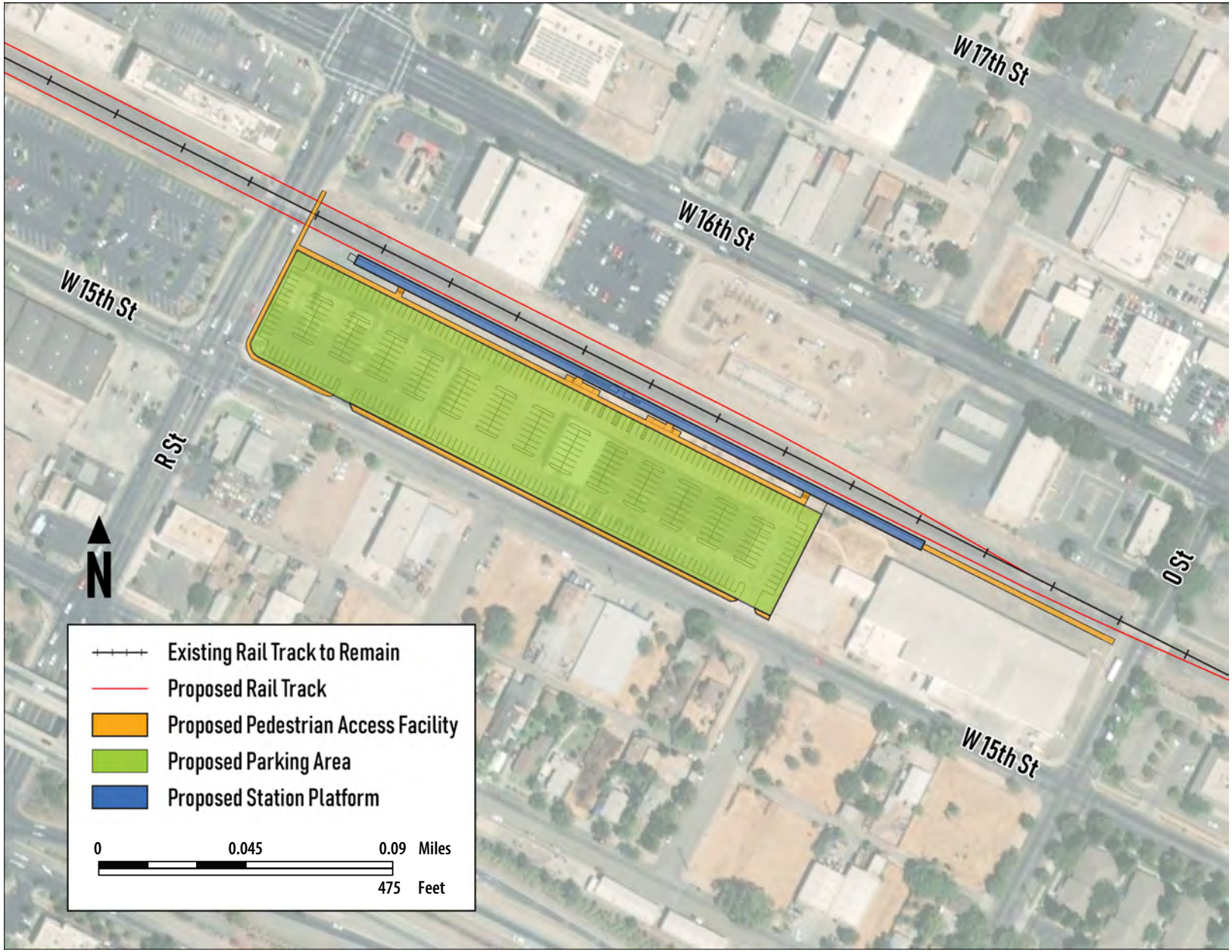
Figure 2-3
Turlock Station
ACE Ceres-Merced Extension Project



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ACE
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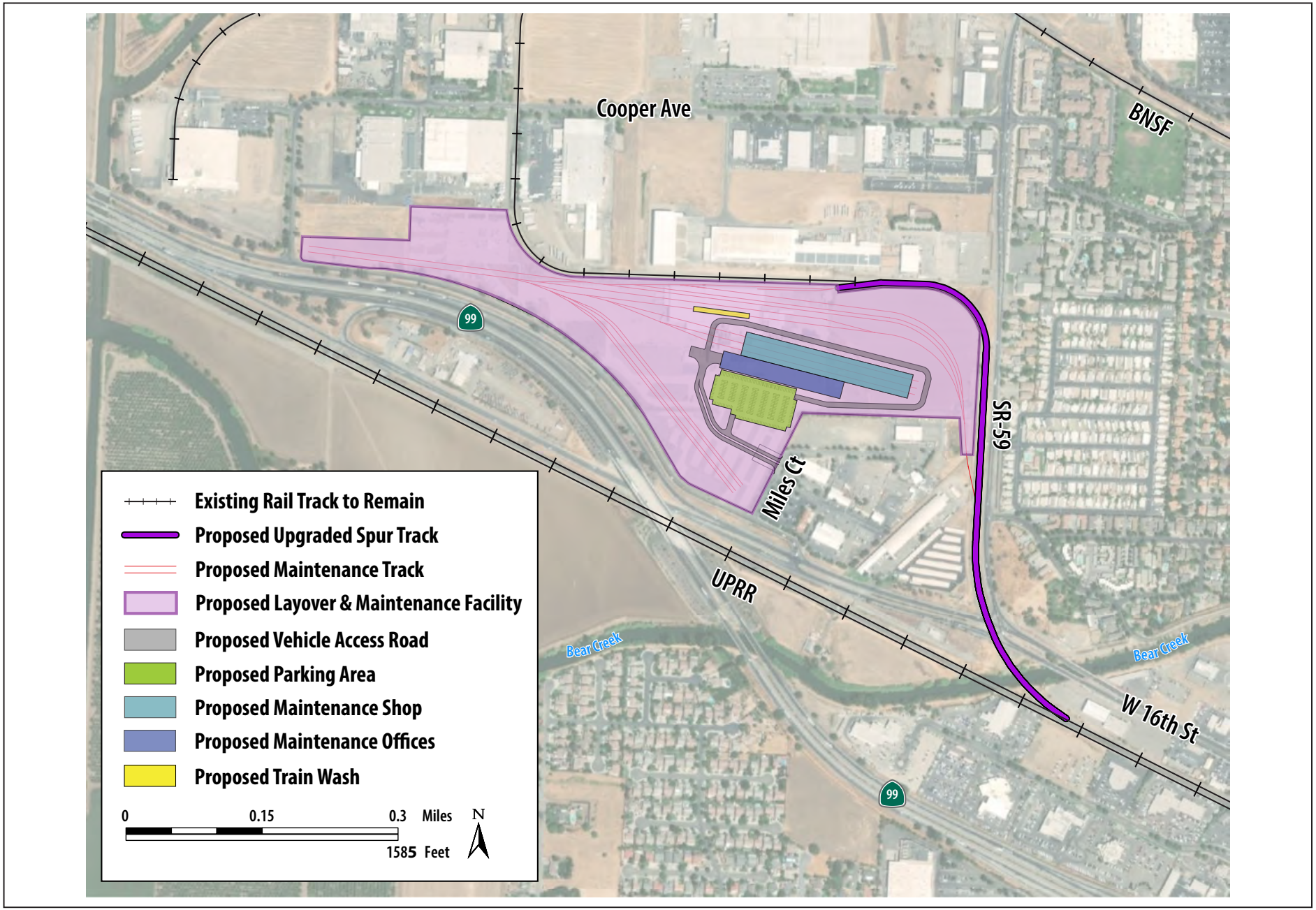
Figure 2-4
Livingston Station
ACE Ceres-Merced Extension Project



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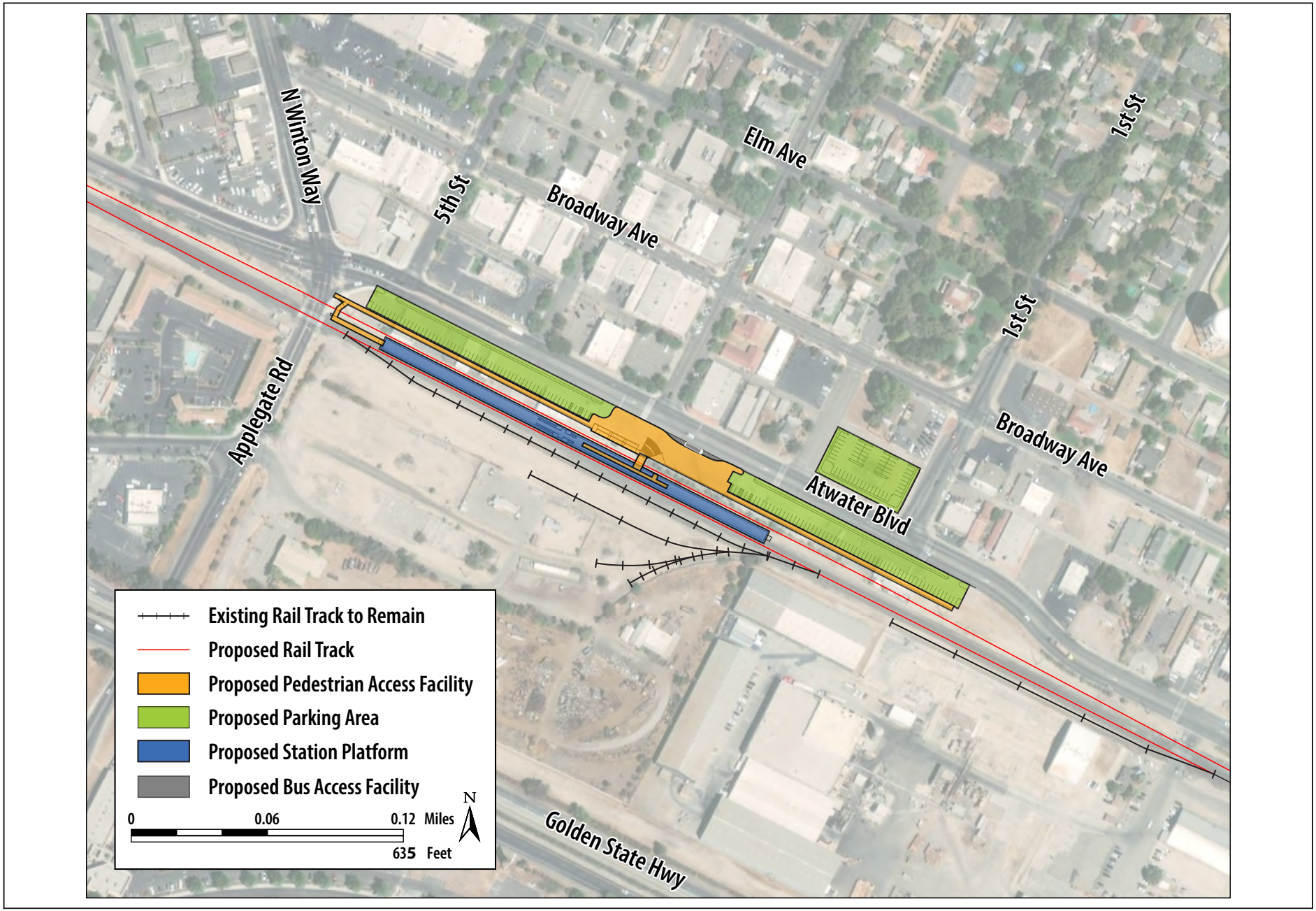
Figure 2-5
Merced Station
ACE Ceres-Merced Extension Project



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ACE
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Figure 2-6
Merced Layover & Maintenance Facility
ACE Ceres-Merced Extension Project



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ACE
ALTAMONT CORRIDOR EXPRESS

Figure 2-7
Atwater Station Alternative
ACE Ceres-Merced Extension Project

2.3.1.1 Proposed Project

Ceres to Merced Extension Alignment

As shown in Figures 2-2a through 2-2d, the extension to Merced would construct a combination of track upgrades and new track, which would result in a second mainline on the UPRR Fresno Subdivision between Ceres and Merced. Improvements on the UPRR Fresno Subdivision that are part of the Ceres to Merced Extension Alignment are as follows.

- Construction of new track and track upgrades between MP 117.38 and MP 150.4 on the UPRR Fresno Subdivision.
    - From MP 117.38 to MP 117.6, shift tracks to transition from Ceres Station (already environmentally cleared as a part of the Prior EIR) to conform with existing track geometry.
    - Upgrade of sidings[3] to a new second mainline track from MP 117.6 to MP 118.9; MP 119.5 to MP 119.9; MP 126.4 to MP 126.6; MP 128.7 to MP 130.3; MP 138.9 to MP 140.6 (Arena siding); MP 142.8 to MP 143.7; MP 146.3 to MP 147.9 (Fergus siding); MP 149.7 to MP 150.1.
    - Removal of turnout at MP 118.9 and MP 119.5
    - Construction of a new second mainline track from MP 118.9 to MP 119.5; MP 120.1 to MP 120.8; MP 121.0 to MP 122.3; MP 122.7 to MP 126.4; MP 127.2 to MP 128.3; MP 130.3 to MP 133.7; MP 134.2 to MP 134.8; MP 135.8 to MP 136.0; MP 136.2 to MP 136.4; MP 136.6 to MP 138.9; MP 140.6 to MP 142.1; MP 142.4 to MP 142.6; MP 142.8 to MP 143.0; MP 143.7 to MP 143.8; MP 144.0 to MP 145.2; MP 145.4 to MP 146.3; MP 147.9 to MP 149.1; MP 149.3 to MP 149.7; MP 150.1 to MP 150.4.
    - Shift of tracks to transition to a new second mainline track from MP 119.9 to 120.1; MP 120.8 to MP 121.0; MP 122.3 to MP 122.7; 124.8 to MP 125.3; MP 128.3 to MP 128.7; MP 133.7 to MP 134.2; MP 134.8 to MP 135.8; MP 136.0 to MP 136.2; MP 136.4 to MP 136.6; MP 142.0 to MP 142.4; MP 142.6 to MP 142.8; MP 143.0 to MP 143.3; MP 143.8 to MP 144.0; MP 145.2 to MP 145.4; MP 149.1 to MP 149.3.
    - Construction of a turnout at MP 150.4 at the end of the Ceres to Merced Extension Alignment.
- Modification of 9 existing undercrossings, as shown in Table 2-1.
- Modification of 28 existing at-grade crossings, as shown in Table 2-2.
- Construction of new culvert crossings at eight locations, as shown in Table 2-3.
- Construction of a new single-track concrete bridge crossing over the Merced River at milepost (MP) 134.88.
- Construction of a new single-track steel bridge crossing over the State Route (SR) 99 underpass in Livingston at MP 136.00.
- Construction of a new single-track concrete bridge crossing over Canal Creek at MP 145.62
- Construction of a new single-track concrete bridge crossing over Weber Canal at MP 146.21.

[3] A *siding* is a section of track alongside the mainline track where a train can temporarily pull off the mainline track for maintenance, coupling up cars or locomotives, or to let other trains pass along the mainline track.

- Construction of a new single-track concrete bridge crossing over an irrigation canal at MP 147.08.
- Construction of a new single-track concrete bridge crossing over a cross-swale drainage at MP 148.21.
- Construction of a new single-track concrete bridge crossing over Black Rascal Canal at MP 148.38.
- Construction of a new single-track concrete bridge crossing over Bear Creek at MP 149.47.

The proposed track upgrades and new track described above for the Ceres to Merced Extension Alignment would be located east or west of the existing mainline track. Existing siding tracks would be upgraded, including 1.7 miles of the Ceres siding, 1.6 miles of the Alcant siding, 1.7 miles of the Arena siding, and 1.6 miles of the Fergus siding. Approximately 26 miles of new mainline track will be installed as part of the Project and will be located between existing sidings, which will also be upgraded, resulting in two mainline tracks running the full extent of the corridor between Ceres and Merced.

Four short portions of spur turnouts[4] in this segment would be realigned to accommodate the new mainline track and to allow for the continued use of the spur track[5] to transport materials to and from the industrial users in the area. These areas include a 0.07-mile portion of an existing spur turnout at MP 119.5; a 0.08-mile portion of an existing spur turnout at MP 120.1; a 0.04-mile portion of an existing spur turnout at MP 126.6; and a 0.02-mile portion of an existing spur turnout at MP 134.1 on the UPRR Fresno Subdivision.

A total of four universal crossovers would be implemented as a part of the Ceres to Merced Extension Alignment: one in Turlock, one in Livingston, one in Atwater, and one in Merced. At Turlock, there are two locations that are being considered for the universal crossover at MP 126.3 and MP 127.3. Only one of these locations will be selected by the SJRRC upon consultation with UPRR. At Livingston, there are two locations that are being considered for the universal crossover at MP 133.6 and MP 136.8. Only one of these locations will be selected by the SJRRC upon consultation with UPRR. The universal crossover at Atwater would be located at MP 143.7. The universal crossover at Merced would be located at MP 149.9.

Following the same alignment as the existing mainline track, the new track would cross over 28 existing at-grade crossings, under 10 existing overhead structures, and over several roadway and water features that would require the construction of new bridges or culverts or expansion of an existing bridge. Notable roadways and water features crossed by the track extension to Merced requiring the construction of new bridges or culverts are the Ceres Main Canal, Merced River, Jordan Canal, SR 99 underpass in Livingston, Canal Creek, Weber Canal, Black Rascal Canal, and Bear Creek.

Tables 2-1 and 2-2 list the modifications to existing undercrossings and at-grade crossings to accommodate the new second mainline track. Modifications to existing overhead structure undercrossings generally entail installation of pier protection along the existing piers for the overhead structures and retaining walls along the length of existing abutment slopes.[6] Modifications

[4] A *turnout track* enables trains to be guided from one track to another.

[5] A *spur track* is a short, usually dead-end section of track used to access a facility or loading/unloading ramp.

[6] Overhead structures with a pier closer than 25 feet from the centerline of a new track require *pier protection* in the form of a crash wall. Pier protection is designed to resist impact and redirect equipment in case of derailment.

to the existing at-grade crossings generally require installation of concrete crossing panels where the new mainline track crosses the roadway; relocation of railroad crossing signals, guards or gates, and signal houses; and installation of stop bars. [7, 8, 9]

Tables 2-3 and 2-4 detail the specifications of extensions to existing culverts and new bridge structures crossing waterways and roadways that would be constructed to accommodate the new second mainline track. New culvert crossings would vary in type and material but would generally extend from the existing culvert structure for the existing mainline track. The new bridge structures would be approximately 17-foot-wide single-track structures with varying length, depending on the length of the feature crossed, located adjacent to the existing bridge structure supporting the existing mainline track.

All improvements for the Ceres to Merced Extension Alignment would be located within the existing UPRR ROW, and no new ROW would be acquired for this improvement.

[7] A *signal house* stores the electrical devices used to operate the at-grade crossing signals.
[8] *Crossing panels* are installed so that the tracks lie flush with the roadway.
[9] A *stop bar* is placed near an at-grade crossing to warn drivers and pedestrians of an approaching railroad crossing.

Table 2-1. Undercrossing Modifications

Existing Overhead Structure (west to east)	Modifications
Keyes	
MP 121.21 East Keyes Road overhead structure	• Install pier protection along two of East Keyes Road overhead structure's west piers
Turlock	
MP 122.59, SR 99 overhead structure in Turlock	• Install pier protection along two of northbound SR 99 overhead structure's east piers and two of the west piers • Install pier protection along two of southbound SR 99 overhead structure's east piers and two of the west piers
MP 130.41, West Bradbury Road overhead structure	• Install pier protection along two of West Bradbury Road overhead structure's east piers
Delhi	
MP 131.45, Shanks Road overhead structure	• Install pier protection along two of Shanks Road overhead structure's east piers
MP 132.50, South Avenue overhead structure	• Install pier protection along two of South Avenue overhead structure's east piers
Livingston	
MP 136.85, Hammatt Avenue overhead structure	• Install pier protection along two of Hammatt Avenue overhead structure's west piers
Atwater	
MPs 142.27, SR 99 overhead structure in west Atwater	• Install pier protection along four of northbound SR 99 overhead structure's center piers • Install pier protection along four of southbound SR 99 overhead structure's center piers
MPs 144.04, SR 99 overhead structure in east Atwater	• Install pier protection along four of northbound SR 99 overhead structure's center piers • Install pier protection along four of southbound SR 99 overhead structure's center piers
MP 147.17, Franklin Road overhead structure	• Install pier protection along two of Franklin Road overhead structure's west piers

MP = milepost.
SR = State Route.

Table 2-2. Ceres to Merced Extension Alignment—At-Grade Crossing Modifications

Existing Roadway (west to east)	Modifications
Turlock	
MP 122.21, West Taylor Road	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach • Relocate signal house
MP 123.60, West Monte Vista Avenue	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Relocate signal house
MP 124.27, West Tuolumne Road	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach
MP 124.95, Fulkerth Road	• Install concrete crossing panels where the new mainline track crosses the roadway • Install concrete crossing panels where the shifted mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound and eastbound approaches • Install stop bars at the westbound and eastbound approaches • Relocate signal house
MP 125.31, North Broadway Avenue	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach
MP 125.60, West Canal Drive	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach • Relocate signal house
MP 126.10, West Olive Avenue	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach

Existing Roadway (west to east)	Modifications
MP 126.17, East Main Street	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach
MP 126.31, Marshall Street	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach • Relocate signal house
MP 126.69, East F Street	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach • Relocate signal house
MP 127.49, Golf Road	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach • Replace signal house
MP 128.28, South Daubenberger Road	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach • Replace signal house
MP 129.06, Griffith Road	• Shift concrete crossing panels where the existing track crosses the roadway
Delhi	
MP 131.81, El Capitan Way	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach • Replace signal house
MP 134.04, Collier Road	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach • Relocate signal house

Existing Roadway (west to east)	Modifications
Livingston	
MP 135.16, North Pacific Avenue	• Install concrete crossing panels where the new mainline track crosses the roadway
MP 136.27, Main Street	• Install concrete crossing panels where the new mainline track crosses the roadway • Install concrete crossing panels where the shifted main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound and eastbound approach • Install stop bar at the westbound and eastbound approach • Relocate signal house
Atwater	
MP 141.76, Bert Crane Road North	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach
MP 142.98, Applegate Road	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install standard stop marking at the southbound Atwater Boulevard approach • Install stop bar at the westbound approach
MP 143.39, Packer Street	• Shift concrete panels where the existing tracks cross the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach
MP 143.95, Shaffer Road	• Install concrete crossing panels where the new mainline track crosses the roadway • Shift concrete panels where the existing tracks cross the roadway • Relocate railroad crossing signals and guard/gates at the eastbound and westbound approach • Install stop bars at the eastbound and westbound approaches
Merced	
MP 148.66, Southern Pacific Avenue	• Install concrete crossing panels where the new mainline track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach
MP 149.29, Private Road	• Install concrete crossing panels where the new mainline track crosses the roadway • Shift concrete panels where the existing tracks cross the roadway

Existing Roadway (west to east)	Modifications
MP 149.82, V Street	• Shift concrete crossing panels where the existing track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach
MP 150.18, R Street	• Install concrete crossing panels where the new mainline track and siding track cross the roadway • Relocate railroad crossing signals and guard/gates at the eastbound and westbound approach • Install stop bars at the eastbound and westbound approaches
MP 150.45, O Street	• Install concrete crossing panels where the new siding track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach

MP = milepost.

Table 2-3. Extended Culvert Structures

Location (west to east)	Culvert Structure
MP 118.72, Ceres Main Canal	• Install a 10-foot-long section of double-cell concrete box culvert, extending from the existing culvert located to the east for the existing tracks
MP 119.55, Irrigation canal	• Install a 15-foot-long section of double-cell concrete box culvert, connecting to existing culvert located to the east for the existing tracks • Remove existing headwalls and wingwalls
MP 122.22, Irrigation canal	• Install a 25-foot-long section of single-cell concrete box culvert, extending from the existing culvert located to the east for the existing track
MP 130.83, Irrigation canal	• Install a 20-foot-long section of metal pipe culvert, extending from the existing culvert located to the west for the existing track
MP 133.56, Irrigation canal	• Install a 20-foot-long section of triple-cell concrete box culvert, extending from the existing culvert located to the west for the existing track • Remove portion of existing canal wall
MP 138.27, Irrigation canal	• Install a 30-foot-long section of double-cell concrete box culvert, extending from the existing culvert located to the east for the existing track
MP 145.09, Irrigation canal	• Install a 25-foot-long section of concrete pipe culvert, extending from the existing culvert located to the west for the existing track • Install a 5-foot-long section of concrete pipe culvert, extending from the existing culvert located to the east for the existing track
MP 148.21, Cross-swale drainage	• Install a 20-foot-long section of triple metal pipe culvert, extending from the existing culvert located to the east for the existing track

MP = milepost.

Table 2-4. New Bridge Structures

Location (west to east)	Bridge Structure
MP 134.88, Merced River	• Install a single-track, steel deck plate girder (DPG) bridge with precast/prestressed double cell concrete box (PCB) approach spans, to the west of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: Approximately 369 feet; a seven-span structure consisting of four PCB spans on the north approach and three DPG spans crossing the Merced River • Supporting structures: two abutments at each end of bridge and six piers located to match the supports for the existing bridge to minimize any impacts to the hydraulic conveyance capacity of the channel.
MP 136.00, SR 99 underpass in Livingston	• Install a single-track steel bridge, northeast of the existing single-track bridge • Width of bridge: 22 feet • Length of bridge: 940 feet, five-span structure consisting of three 210-foot truss spans at the northern end, one 168-foot truss span, and one 126-foot truss span at the southern end • Supporting structures: two abutments at each end of bridge and four piers located between the span sections
MP 145.62, Canal Creek	• Install a single-track concrete bridge with steel bracing, west of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 150 feet, ten-span structure consisting of 15-foot spans for the length of the bridge • Supporting structures: two abutments at each end of bridge and nine piers located between the span sections; nine supporting piers would be placed in the canal
MP 146.21, Weber Canal	• Install a single-track concrete bridge with steel bracing, west of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 60 feet, four-span structure consisting of 15-foot spans for the length of the bridge • Supporting structures: two abutments at each end of bridge and three piers located between the span sections; three supporting piers would be placed in the canal
MP 147.08, Irrigation canal	• Widen existing double-track bridge to the west • Width of bridge widening: 5 feet • Length of bridge: 60 feet, four-span structure consisting of 15-foot spans for the length of the bridge • Supporting structures: two abutments at each end of bridge and three piers located between the span sections; three supporting piers would be placed in the canal

Location (west to east)	Bridge Structure
MP 148.38, Black Rascal Canal	• Install a single-track concrete bridge with steel bracing, west of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 90 feet, six-span structure consisting of 15-foot spans for the length of the bridge • Supporting structures: two abutments at each end of bridge and five piers located between the span sections; five supporting piers would be placed in the canal
MP 149.47, Bear Creek	• Install a single-track concrete bridge with steel bracing, east of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 225 feet, fourteen-span structure consisting of thirteen 15-foot spans, and one 30-foot span at the center of the bridge structure • Supporting structures: two abutments at each end of bridge and 13 piers located between the span sections; 13 supporting piers would be placed in Bear Creek

MP = milepost.
SR = State Route.

Proposed Stations

Turlock Station

The Turlock Station would be constructed between the Fulkerth Road at-grade crossing and the West Canal Drive at-grade crossing in Turlock. This proposed station would connect to the Turlock Transit Center by a pedestrian bridge. The Turlock Transit Center operates as a hub for local and commuter bus services provided by Turlock Transit, Stanislaus Regional Transit, and Merced County Transit. As shown in Figure 2-3, development of the Turlock Station would consist of the following improvements.

- Construction of a station platform and fences outside of the two mainline tracks.
- Construction of street parking providing a total of 261 parking spaces. Use of up to 50 parking spaces in the Turlock Transit Center parking lot would provide a total of 311 parking spaces.
- Construction of a new pedestrian bridge, connecting the Turlock Transit Center and the station platform. The pedestrian bridge would cross over the railroad tracks and North Golden State Boulevard and would include associated elevators and stairways.

To provide ACE service at this new station, a new station platform would be constructed to allow passengers to board and disembark the train. A 30-foot-wide and 955-foot-long center platform located between the re-aligned existing mainline track and new mainline track would be constructed between MP 124.98 and MP 125.17 on the UPRR Fresno Subdivision, south of the Fulkerth Road at-grade crossing. The new platform would accommodate up to 10 ACE rail cars and one locomotive. A pedestrian overcrossing over North Golden State Boulevard to the east would be constructed to provide pedestrian access from the Turlock Transit Center and areas east of North Golden State Boulevard, as well as from the on-street parking area along North Front Street to the station platform. To access the pedestrian overpass structure, one or two elevators would be provided at each access point, including at the Turlock Transit Center, the area in between North Golden State Boulevard and North Front Street, and from the station platform. One stairway would

be provided at the Turlock Transit Center and one at the area in between North Golden State Boulevard and North Front Street, while 1 or 2 stairways would be provided from the platform. Additional platform access would be provided via an at-grade crossing over the tracks along Fulkerth Road, which would connect to a ramp extending from the station platform. Passenger amenities and safety features, such as patron shelters with benches and map boxes, ticket validation machines, streetlamps, guardrails, security equipment, and emergency call box stations would be installed on the station platform area. Two 3,000-foot-long fences would be constructed outside of the two mainline tracks from Fulkerth Road to the south. These fences would be to prevent passengers from accessing the platform across the train tracks. To meet future parking demands generated by ACE service, an on-street parking lot would be constructed along North Front Street between Golden State Boulevard and West Canal Drive.

The street parking and pedestrian bridge for the Turlock Station would be located outside the UPRR ROW.

Livingston Station

The Livingston Station would be constructed in downtown Livingston, northeast of the Main Street grade crossing. As shown in Figure 2-4, development of the Livingston Station would consist of the following improvements.

- Construction of a station platform and fences outside of the two mainline tracks.
- Construction of a new surface parking lot providing a total of 238 parking spaces.
- Construction of a new pedestrian tunnel under the railroad tracks, including associated ramps and stairways.
- Construction of bus/shuttle drop off areas.
- Relocation of the detention basin and its associated facilities within the environmental footprint.

To provide ACE service at the Livingston Station, a new station platform would be constructed to allow passengers to board and disembark the train. A 30-foot-wide and 955-foot-long center platform located between the re-aligned existing mainline track and new mainline track would be constructed between MP 136.33 and MP 136.42 on the UPRR Fresno Subdivision, southeast of the Main Street and Court Street intersection. The new platform would accommodate up to 10 ACE rail cars and one locomotive. Construction of a pedestrian tunnel, which would include 2 ramps and 2 stairways, would provide access to the platform on the south end of the platform. Platform access would also be via an at-grade crossing over the northbound and southbound tracks along Main Street and connecting to a ramp extending from the north end of the platform to Main Street. Passenger amenities and safety features, such as patron shelters with benches and map boxes, ticket validation machines, streetlamps, guardrails, security equipment, and emergency call box stations, would be installed on the station platform area. Two 3,000-foot-long fences would be constructed outside of the two mainline tracks from Main Street to the south. These fences would be to prevent passengers from accessing the platform across the train tracks.

To meet future parking demands generated by ACE service, a new surface parking lot would be constructed north of the railroad tracks. Vehicle access to the new surface parking lot would be provided by two entrances on Main Street. Construction of the new surface parking lot would require the demolition of an existing commercial building onsite. In addition, landscaping would be

installed at the station, including at surface parking lot areas. A bus/shuttle drop-off area would also be incorporated within the parking area.

An existing detention basin is located in an area where parking is proposed for the Livingston Station. This detention basin and its associated facilities would be relocated within the footprint for the Livingston Station.

The majority of improvements at the Livingston Station would be located outside the UPRR ROW, particularly the parking improvements.

SJRRC has included the Livingston Station as part of the Proposed Project for the following reasons:

- *Spacing between stations*. The Livingston Station would be 14 miles from the Merced Station and 11 miles from the Turlock Station, which allows better freight operations than the Atwater Station Alternative. The Atwater Station Alternative is located only 7 miles from the Merced Station, which could create more freight bottlenecks.
- *Parking accessibility*. With the Livingston Station, ACE riders would be able to access the station platform from one contiguous lot and would not need to cross a roadway to access the station. The Atwater Station Alternative would require two parking lots, with one adjacent to the station and another across the street.
- *Number of Parcels.* The Livingston Station would require the acquisition of one parcel and one area that is Caltrans excess ROW. The Atwater Station Alternative would require the acquisition of ten parcels (see Tables 2-11 and 2-12).
- *Demolition and Business Impacts.* The Livingston Station would require the demolition of only one existing building and the potential relocation of any associated active business operations. The Atwater Station Alternative would require the demolition of four existing buildings and the potential relocation of any associated active business operations.
- *Cost*. The cost associated with the Livingston Station, as shown in Table 2-13, is expected to be $6.4 million less than the Atwater Station Alternative.

Merced Station

The Merced Station would be constructed adjacent to the UPRR Fresno Subdivision between R Street and O Street in downtown Merced. As shown in Figure 2-5, development of the Merced Station would consist of the following improvements.

- Construction of a station platform and fence between the new station track and existing mainline track.
- Construction of a new surface parking lot, providing a total of 380 parking spaces.

To provide ACE service at this new station, a new station platform would be constructed to allow passengers to board and disembark the train. An approximately 15-foot-wide and 955-foot-long side platform would be constructed between MP 150.15 and MP 151.33 on the UPRR Fresno Subdivision on the west side of a re-aligned existing mainline track, between the R Street and O Street at-grade crossings. The new platform would accommodate up to 10 ACE rail cars and one locomotive. Pedestrian access to the platform would be provided from a walkway along the north side of the proposed parking lot. This walkway would also connect to the existing sidewalk along R Street. Additionally, pedestrian access would be provided from the existing sidewalk along O Street and the station platform via a new walkway that would be installed between the southern side of the

platform and R Street, as depicted on Figure 2-5. A 1,100-foot-long fence would be constructed between the existing mainline track and the station track, in the vicinity of the station platform.

To meet future parking demands generated by ACE service, a new surface parking lot would be constructed between the station platform and 15th Street. Vehicle access to the new surface parking lot would be provided by two entrances on West 15th Street. Construction of the new surface parking lot would require the demolition of existing buildings onsite. In addition, landscaping would be installed at the station, including at surface parking lot areas. The parking improvements for the Merced Station would be located outside the UPRR ROW.

The California High-Speed Rail Authority (CHSRA) intends to extend high-speed rail (HSR) service to Merced in the future. In the CHSRA environmental impact report/environmental impact statement (EIR/EIS) for the Merced to Fresno HSR project section (California High-Seed Rail Authority and Federal Railroad Administration 2014), CHSRA included an HSR station in Merced located adjacent to the UPRR Fresno Subdivision between G Street and Martin Luther King Jr. Way. However, the City of Merced has identified that it would prefer that both the ACE Station and the HSR station be located in closer proximity to the Merced Transit Station, which is on 16th Street between N Street and O Street. The proposed Merced Station is at the location preferred by the City of Merced, and the City has urged CHSRA to relocate its adopted station. If CHSRA decides to move its station to the City-preferred location, then the new ACE station and HSR station would be adjacent to each other. If CHSRA chooses to keep its station at the previously approved location, then the ACE station and the HSR station would be approximately 0.5 mile apart and passengers transferring from one system to the other would either walk or potentially use a shuttle.

SJRRC is proposing to locate the ACE Merced Station in the location preferred by the City of Merced. The City of Merced prefers a more northerly location for both the ACE station and the HSR station for the following reasons (City of Merced pers. comm.):

- It would have greater transit-oriented development potential.
- It would extend the revitalization of downtown Merced to the northwest providing a catalyst for further economic development.
- It would be adjacent to the City's existing transit center.
- It would avoid relocation of the City's central Fire Department and Station.
- It would avoid disruption to historic buildings in the downtown.
- It would avoid disruption to the City's recent investments in G Street, which is the primary emergency route to Dignity Health.
- It would not require the roadway crossing relocations that are needed for the more southerly HSR station location.

Merced Layover & Maintenance Facility

To support train layovers, storage, maintenance, and operations associated with the extension to Merced, a new layover facility would be constructed north of downtown Merced. As shown in Figure 2-5, improvements that are part of the Merced Layover & Maintenance Facility are as follows.

- Construction of four new storage tracks, ranging from 0.4 to 0.5 mile, in an industrial area north of SR 59.[10]
- Construction of a train wash facility.
- Construction of a 140,000 square foot maintenance building.
- Construction of a parking lot for employees and visitors.

The Merced Layover & Maintenance Facility would be constructed in an industrial area north of SR 99 and west of SR 59. The existing lead track would be utilized to provide access to the layover and maintenance facility and would cross an existing bridge over Bear Creek and cross 16th Street at-grade. Four new storage tracks, ranging from 0.4 to 0.5 mile would turn out from the lead track to the layover and maintenance facility. The maintenance building would also be constructed and include support facilities such as administrative offices, crew facilities, light vehicle repair facilities, parts storage, fueling facilities, wayside power, and train cleaning function areas. The maintenance building would be constructed along the length of the new storage tracks and a fence would be constructed around the perimeter of the layover and maintenance facility. All of the improvements for the Merced Layover & Maintenance Facility would be located outside the UPRR ROW. As explained in Chapter 5, *Alternatives,* this location is proposed instead of the location considered in the Prior EIR because it is more consistent with land use planning (located in an industrial park instead of on farmland) and would have lower impacts on prime farmland, biological resources, and visual aesthetics.

2.3.1.2 Alternative Analyzed at an Equal Level of Detail

Atwater Station Alternative

The Atwater Station Alternative would include a station at Atwater instead of a station at Livingston as part of the Proposed Project. The station would be constructed in southwestern Atwater, between the Applegate Road at-grade crossing and the Packer Street at-grade crossing. This potential station would be located adjacent to the Atwater Transpo located south of Atwater Boulevard, between Third Street and First Street. The Atwater Transpo operates as a bus stop for local and intercity bus services provided by Merced County Transit and as a parking lot for bus users. As shown in Figure 2-7, development of the Atwater Station Alternative would consist of the following unique improvements instead of a station in Livingston.

- Construction of a station platform and fences outside of the two mainline tracks.
- Construction of a new surface parking lots providing a total of 172 parking spaces.
- Modification of Atwater Boulevard to allow vehicle access to parking lot.
- Construction of a new pedestrian tunnel under the railroad tracks, including associated ramps and stairways.
- Sidewalk improvements and crosswalk enhancements on First Street.

To provide ACE service at this new station, a new station platform would be constructed to allow passengers to board and disembark the train. A 30-foot-wide and 955-foot-long center platform located between the re-aligned existing mainline track and new mainline track would be

[10] A *lead track* is a non-mainline track connecting a railroad yard or facility to the main line or running track.

constructed between MP 143.13 and MP 143.32 on the UPRR Fresno Subdivision, between the Applegate Road and Packer Street at-grade crossing. The new platform would accommodate 10 ACE rail cars and one locomotive. Construction of a pedestrian tunnel, which would include 2 ramps and 2 stairways, would provide access to the platform on the south end of the platform. Platform access would also be via an at-grade crossing at the north end of the platform. Passenger amenities and safety features, such as patron shelters with benches and map boxes, ticket validation machines, streetlamps, guardrails, security equipment, and emergency call box stations, would be installed on the station platform area. Two 3,000-foot-long fences would be constructed outside of the two mainline tracks from Fulkerth Road to the south. These fences would be to prevent passengers from accessing the platform across the train tracks.

To meet future parking demands generated by ACE service, two new surface parking lots would be constructed. A new surface parking lot (Main Lot) would be constructed just north-east of the station platform with 120 parking spaces. Vehicle access to the Main Lot would be provided by two entrances on Atwater Boulevard. Designated turning lanes on Atwater Boulevard between Fourth Street and Fifth Street would be installed to facilitate vehicles accessing the Main Lot. Construction of the Main Lot would require the demolition of existing industrial and commercial buildings onsite. In addition, landscaping would be installed at the station, including at-surface parking lot areas. A new surface parking lot (East Lot) would be constructed on a lot located off of Atwater Boulevard, between First Street and Second Street with 52 parking spaces. Vehicle access to the East Lot would be provided by two entrances on First Street and Second Street.

The parking improvements at the Atwater Station Alternative would be located outside the UPRR ROW.

2.3.2 Existing Parking

The Project is not expected to induce parking demand at the existing ACE stations or the ACE stations that are proposed for the Ceres Extension (i.e., the Phase I stations in the Prior EIR). With the Project, people would access ACE from Turlock, Livingston or Atwater, and Merced in the morning and commute to the Tri-Valley and Silicon Valley. Those same commuters would return in the evening using ACE. Thus, these commuters would not park at any of the existing ACE stations or the stations proposed for the Ceres Extension. Appendix D, *ACE Ceres–Merced Extension Ridership, Revenue, and Benefits Report,* shows that the Project would not increase the demand for parking at the existing ACE stations or the stations proposed for the Ceres Extension. As such, there are no impacts associated with an increasing demand for parking at those stations.

2.4 Operations and Maintenance

2.4.1 Conceptual Service Plan

Due to the current circumstances associated with the Novel Coronavirus (COVID-19) pandemic, ACE service has been reduced. During the COVID-19 pandemic, ACE is operating two westbound trains in the morning from Stockton to San Jose and two eastbound trains in the afternoon from San Jose to Stockton on weekdays. No weekend service is provided. It is anticipated that ACE service would be restored to its pre-COVID-19 levels once the pandemic is over. As such, the pre-COVID-19 service levels are identified below.

Prior to the COVID-19 pandemic, ACE operated four westbound trains in the morning from Stockton to San Jose and four eastbound trains in the afternoon from San Jose to Stockton during weekdays only. There was approximately one train per hour in the westbound direction departing the Stockton Station from approximately 4 a.m. until 7 a.m. and one train per hour in the eastbound direction departing the San Jose Station from approximately 3:30 p.m. to 6:30 p.m. Prior to the COVID-19 pandemic, ACE provided Saturday service under a pilot program; however, this service was suspended on March 21, 2020 in response to the COVID-19 pandemic.

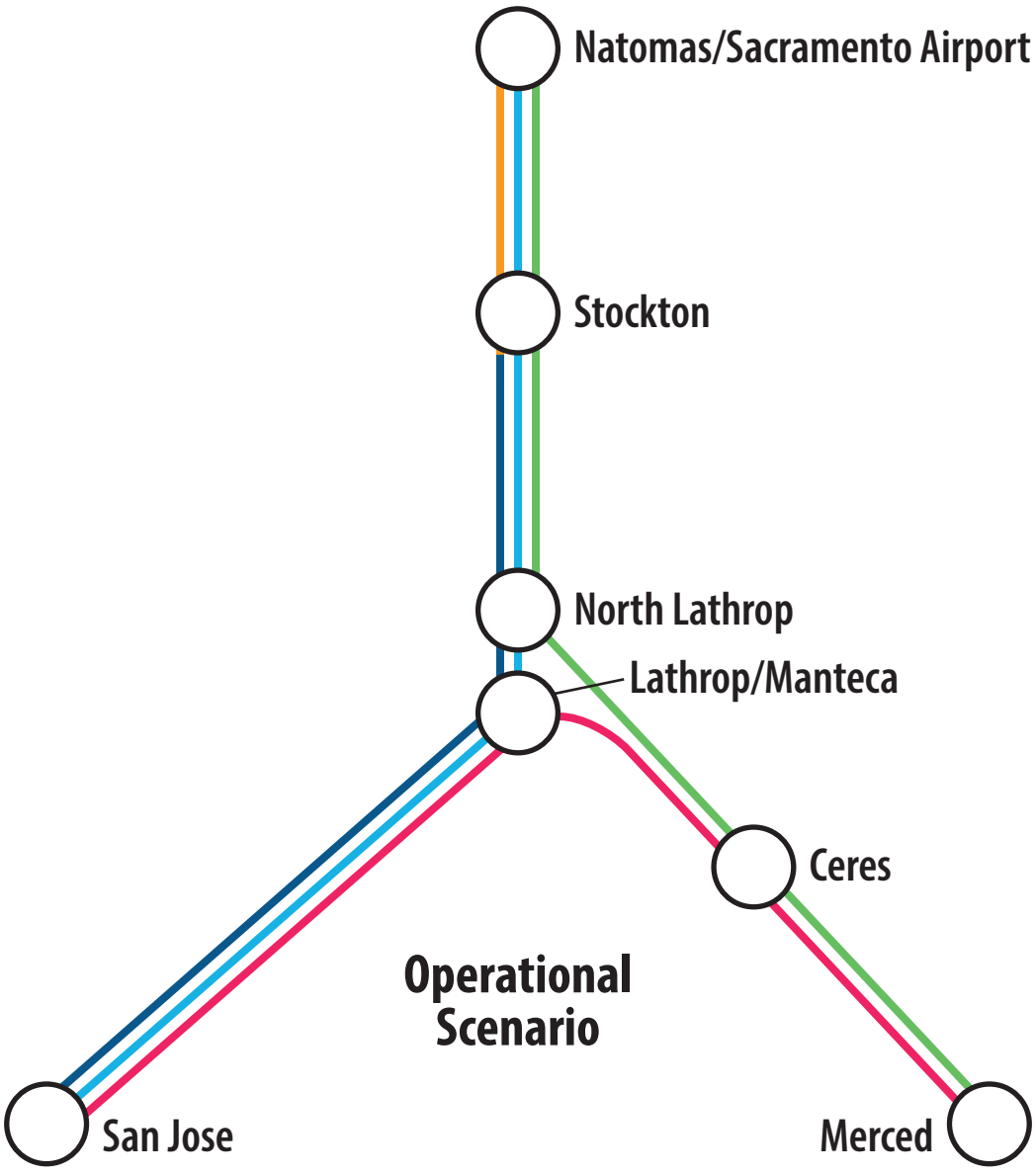
Upon implementation of full operations for the Project, ACE train service originating/terminating in Merced would consist of the following service, which would be limited to weekdays:

- In the morning, three northbound trains would run from Merced Station to the Natomas/ Sacramento Airport Station (included within the approved Valley Rail Sacramento Extension Project). Passengers boarding in Merced and Stanislaus Counties and Southern San Joaquin County would either stay on the train in the direction of Sacramento or transfer onto the three westbound trains in the direction of San Jose at the North Lathrop Station (timed transfers). One westbound train would run from Merced Station to San Jose Diridon Station directly.
- In the evening, three southbound trains would run from Natomas/Sacramento Airport Station to Merced Station. ACE passengers returning from the Bay Area would transfer at the North Lathrop Station (timed transfers) onto the three Sacramento to Merced trains. One eastbound/southbound train would run from San Jose Diridon Station to Merced Station directly.

Figure 2-8 depicts the conceptual service plans for operation of the Project. The Project would not change existing service between the San Jose Diridon Station and Stockton Station; the proposed service to the Natomas/ Sacramento Airport Station, which is a part of the approved Valley Rail Sacramento Extension Project and is analyzed in its own environmental document; or the proposed service between the North Lathrop Station and Ceres Station, which was analyzed previously at a project-level detail in the Prior EIR. The change in service due to the Project would be limited to four additional trains in the morning and four additional trains (as extended trains from trains serving Ceres) in the evening between the Ceres Station and Merced Station.

As summarized in Tables 2-5 and 2-6, overall, with operation of the Project, operation of the approved Valley Rail Sacramento Extension Project, and operation of the service between Ceres and Lathrop, ACE service would include the following trains.

- One train in the morning and one train in the evening between the Merced Station and San Jose Diridon Station.
- Two trains in the morning and two trains in the evening between the Stockton Station and San Jose Diridon Station.
- One train in the morning and one train in the evening between Natomas/ Sacramento Airport Station and San Jose Diridon Station.
- Three trains in the morning and three train in the evening between the Merced Station and Natomas/Sacramento Airport Station.
- One train in the morning and one train in the evening between the Natomas/ Sacramento Airport Station and Stockton Station.



Legend

- Merced–San Jose (1 round trip; leaving Merced in the AM & returning in the PM)
- Natomas/Sacramento Airport–Stockton (1 round trip; leaving Natomas/Sacramento Airport in the AM & returning in the PM)
- Merced–Natomas/Sacramento Airport (3 round trips; leaving Merced in the AM & returning in the PM)
- Stockton–San Jose (2 round trips; leaving Stockton in the AM & returning in the PM)
- Natomas/Sacramento Airport–San Jose (1 round trip; leaving Natomas/Sacramento Airport in the AM & returning in the PM)

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ACE ALTAMONT CORRIDOR EXPRESS

Figure 2-8
Conceptual Service Plan
ACE Ceres-Merced Extension Project

Full service between Ceres and Merced (e.g., four trains in the morning and four trains in the evening) is expected to commence by 2029. An initial service between Ceres and Merced, of up to two trains in the morning and up to two trains in the evening, is expected to commence by 2025. For the purposes of analysis, this EIR identifies the potential impacts for the Project in 2030. Please note that using 2030 as the full buildout is a more conservative analysis for determining potential impacts on air quality, greenhouse gas emissions, and energy resources. Given the progressive improvement in passenger vehicle efficiency, the benefits of diverting passenger vehicle use through increase train use would be lower in 2030 than in 2025 or 2029 on a per vehicle-mile travelled (VMT) diverted basis and thus the analysis for 2030 would be conservative compared to 2025 or 2029.

2.4.2 Shuttle Services

ACE currently provides shuttle services at the Great America and Pleasanton Stations. In 2030, the No Project Conditions is anticipated to require 164 daily shuttle trips provided by the existing routes at the Great America Station. To support the increased ridership system wide with the Project, an additional 3 daily shuttle trips provided by the existing routes are required at the Great America Station, beyond the 2030 No Project Conditions. In 2040, the No Project Conditions is anticipated to require 197 daily shuttle trips provided by the existing routes at the Great America Station. To support the increased ridership system-wide with operation of the Project, an additional 11 daily shuttle trips provided by the existing routes are required at the Great America Station, beyond the 2040 No Project Conditions.

At the Pleasanton Station, in 2030, the No Project Conditions is anticipated to require 23 daily shuttle trips provided by the existing routes at the Pleasanton Station. To support the increased ridership system-wide with operation of the Project, one additional daily shuttle trip provided by the existing route is required at the Pleasanton Station, beyond the 2030 No Project Conditions. In 2040, the No Project Conditions is anticipated to require 26 daily shuttle trips provided by the existing routes at the Pleasanton Station. No additional daily shuttles at the Pleasanton Station would be required in 2040.

In addition, the Prior EIR identified a bus service that would consist of four buses in the morning that would shuttle passengers from Merced to Ceres and four buses in the evening that would meet passengers disembarking eastbound San Jose to Stockton trains and provide bus services to Merced. With the Project, these bus trips would be discontinued.

Tables 2-5 and 2-6 provides the prototypical schedule of proposed ACE service with the extension to Merced. This schedule was developed to derive ridership estimates and for use in the analysis in this EIR. The actual schedules may vary.

Table 2-5. Prototypical Schedule – Inbound

Station	A01	A03	A05	A07	A09	302	204	304
Merced	3:43					4:31	5:31	6:31
Atwater/Livingston**	3:57/4:01					4:45/4:49	5:45/5:49	6:45/6:49
Turlock	4:08					4:56	5:56	6:56
Ceres	4:17					5:05	6:05	7:05
Modesto	4:25					5:13	6:13	7:13
Ripon	4:36					5:24	6:24	7:24
Manteca	4:44					5:32	6:32	7:32
North Lathrop						5:41	6:41	7:41
Stockton		5:33	6:33	7:33	8:39	5:52	6:52	7:52
Lodi				7:18	8:25	6:09	7:09	8:09
Elk Grove				6:56	7:56	6:31	7:31	8:31
Sutterville				6:42	7:42	6:45	7:45	8:45
Midtown Sacramento				6:36	7:36	6:51	7:51	8:51
North Sacramento				6:29	7:29	6:58	7:58	8:58
Natomas				6:19	7:19	7:09	8:09	9:09
North Lathrop		5:45	6:45	7:45		5:45	6:45	7:45
Lathrop-Manteca	4:52	5:52	6:52	7:52		5:52	6:52	7:52
Tracy	5:04	6:04	7:04	8:04		6:04	7:04	8:04
Vasco	5:33	6:33	7:33	8:33		6:33	7:33	8:33
Livermore	5:38	6:38	7:38	8:38		6:38	7:38	8:38
Pleasanton	5:46	6:46	7:46	8:46		6:46	7:46	8:46
Fremont	6:08	7:08	8:08	9:08		7:08	8:08	9:08
Great America	6:26	7:26	8:26	9:26		7:26	8:26	9:26
Santa Clara	6:33	7:33	8:33	9:33		7:33	8:33	9:33
San Jose	6:45	7:45	8:45	9:45		7:45	8:45	9:45

*Grey highlighted timestamps indicate transfers to another train.

**The first timestamp in a cell refers to the Atwater Station Alternative and the second timestamp refers to the Livingston Station.

Table 2-6. Prototypical Schedule – Outbound

Station	A98	A04	A06	A08	A10	215	315	217
Merced		18:17				19:35	20:35	21:35
Atwater/ Livingston**		18:03/17:59				19:21/19:17	20:21/20:17	21:21/21:17
Turlock		17:52				19:10	20:10	21:10
Ceres		17:43				18:55	19:55	20:55
Modesto		17:37				18:49	19:49	20:49
Ripon		17:25				18:37	19:37	20:37
Manteca		17:17				18:28	19:28	20:28
North Lathrop						18:20	19:20	20:20
Stockton	14:28		18:28	19:27	20:27	18:07	19:07	20:07
Lodi	14:44		18:44			17:53	18:53	19:53
Elk Grove	15:06		19:06			17:31	18:31	19:31
Sutterville	15:20		19:20			17:17	18:17	19:17
Midtown Sacramento	15:26		19:26			17:11	18:11	19:11
North Sacramento	15:33		19:33			17:04	18:04	19:04
Natomas	15:41		19:41			16:51	17:51	18:51
North Lathrop			18:16	19:16	20:16	18:16	19:16	20:16
Lathrop-Manteca		17:10	18:10	19:10	20:10	18:10	19:10	20:10
Tracy		16:51	17:51	18:51	19:51	17:51	18:51	19:51
Vasco		16:22	17:22	18:22	19:22	17:22	18:22	19:22
Livermore		16:17	17:17	18:17	19:17	17:17	18:17	19:17
Pleasanton		16:08	17:08	18:08	19:08	17:08	18:08	19:08
Fremont		15:45	16:45	17:45	18:45	16:45	17:45	18:45
Great America		15:29	16:29	17:29	18:29	16:29	17:29	18:29
Santa Clara		15:20	16:20	17:20	18:20	16:20	17:20	18:20
San Jose		15:15	16:15	17:15	18:15	16:15	17:15	18:15

*Grey highlighted timestamps indicate transfers to another train.

**The first timestamp in a cell refers to the Atwater Station Alternative and the second timestamp refers to the Livingston Station.

2.4.3 Ridership

The annual ridership (calculated in 2020) was calculated to be 1,506,203 riders (San Joaquin Regional Rail Commission 2020). Implementation of the Project is anticipated to result in increased ridership by 2030. Table 2-7 summarizes the projected annual ridership for the entire ACE system without the Project, the forested annual ridership for the entire ACE system with the Project, and the net new annual ridership due to this Project. Ridership for the Project is presented in more detail in Appendix D, *ACE Ceres–Merced Extension Ridership, Revenue, and Benefits Report*.

Table 2-7. System Ridership with Operations of the Project

		Proposed Project (with Livingston Station)[b]		Atwater Station Alternative[b]	
Year	No Project Conditions[a]	Forecasted Annual Riders	Net New Annual Riders	Forecasted Annual Riders	Net New Annual Riders
2030[c]	3,735,500	4,176,800	441,300	4,180,900	445,400
2040[c]	4,797,100	5,364,100	567,000	5,367,500	570,400

Source: Appendix D, *ACE Extension Ridership, Revenue, and Benefits Report*.

Notes:

[a] The No Project Conditions include ACE service, with the addition of the approved Sacramento Extension and Ceres Extension. Service includes the following: two direct trains between Stockton and San Jose; one direct train between Ceres and San Jose with connecting bus service between Ceres and Merced; one direct train between Natomas and San Jose; one direct train between Natomas and Stockton; three trains between Ceres and Natomas via the Natomas Extension with connecting bus service between Ceres and Merced, these three trains also connect at North Lathrop to other inbound ACE trains with service to San Jose; and four buses between Ceres and Merced, connecting to the trains at Ceres.

[b] The scenario for the Proposed Project with the Livingston Station or the Atwater Station Alterative consists of converting the Ceres–Merced bus connection under the No Project conditions to rail.

[c] For the 2040 scenario, ACE service is the same as the ACE service used in 2030 scenario.

2.4.4 Energy Consumption

The primary sources of energy used to operate ACE trains and at maintenance and station facilities are diesel fuel and electricity. Existing diesel fuel consumption is approximately 455,000 gallons per year (based on 2017 figures). Operations at the existing stations and maintenance facility required approximately 2,353,000 kilowatt hours (kWh) of electricity in 2016.

With operation of the Project, ACE diesel trains would require approximately 124,953 additional gallons of fuel per year. By 2025 when an initial service between Ceres and Merced is expected to commence, all ACE trains are expected to use renewable diesel. Electrical use at new stations and facilities with operation of the Project would require approximately additional 1,026,516 kWh of electricity per year. Section 3.6, *Energy*, provides a detailed analysis of energy demand associated with operation of the Project.

2.4.5 Maintenance Activities

2.4.5.1 Track Maintenance

SJRRC does not own the tracks on which ACE operates; instead, SJRRC has entered into trackage rights agreements with host railroads (both PCJPB and UPRR) to operate on portions of their

respective tracks. Maintenance-of-way (MOW) is the responsibility of the host railroad. In general, MOW is the ongoing maintenance of track (e.g., tie replacement, switch greasing, ballast recontouring), track structures, bridges, drainage features, signal apparatus and other signal infrastructure. Maintenance activities are both ongoing responses to daily issues and planned preventive maintenance. Maintenance of bridges would include routine removal of woody debris, sediment, and other materials that accumulate near the piers of the bridges. Host railroads would have other maintenance activities that are required, specific to the features located in the corridor.

PCJPB maintenance activities also include tree pruning and removal in areas where trees would pose a maintenance or safety concern. UPRR maintenance activities include annual vegetation trimming and herbicide application. With operation of ACE from Ceres to Merced, PCJPB and UPRR would continue to conduct maintenance activities associated with the rail corridor in accordance with their current practices.

2.4.5.2 Station Maintenance

ACE stations, served solely by ACE, are maintained by SJRRC even though the land may be owned by the local jurisdiction. The Fremont, Great America, Santa Clara, and San Jose Diridon Stations are maintained by other transit entities. SJRRC's Facility Department is responsible for maintenance and cleanup of stations from Pleasanton to Stockton. Maintenance crews are located at the ACE Rail Maintenance Facility in Stockton and are dispatched as needed from Stockton to the various stations. Typical maintenance activities include trash pickup, landscaping, painting, minor concrete work, and light bulb replacement. Contractors are hired for more extensive maintenance activities, such as major concrete work, platform extension, and paving. Certain stations have specific agreements with the local jurisdictions regarding maintenance activities that would be the responsibility of the local jurisdiction.

SJRRC would own and maintain the station platforms at all new stations. Maintenance of parking at new stations would vary depending on the nature of ownership of the underlying land and future agreements between SJRRC and local jurisdictions.

2.4.5.3 Fleet Maintenance

SJRRC's existing fleet maintenance activities for ACE are conducted at the ACE Rail Maintenance Facility located at 1020 East Alpine Avenue in Stockton, approximately 1.5 miles north of the Stockton Station. Regular train maintenance consists of daily inspections of equipment (as required by the Federal Railroad Administration), cleaning, and servicing activities such as fueling, filling of sand boxes, emptying of toilet tanks, and replenishing of fluids, supplies, and consumables (including trail crew supplies). Train washing can occur up to several times per week, or as required for any special event trains. Preventive and periodic maintenance, including light and heavy repairs of passenger coaches and locomotives, are conducted as needed. With operation of ACE from Ceres to Merced, heavy maintenance activities would continue at the ACE Rail Maintenance Facility. The Merced Layover & Maintenance Facility would support train layovers, storage, light maintenance, and daily servicing. For heavy maintenance and repairs, trains would be cycled back to the ACE Rail Maintenance Facility.

2.5 Construction

Appendix B, *ACE Ceres–Merced Extension Environmental Footprint*, and Appendix C, *ACE Ceres–Merced Extension 15% Preliminary Engineering Plans* include conceptual details regarding the areas of disturbance associated with the proposed or alternative facilities, potential utility conflicts and whether the utility would be protected or relocated, and construction staging areas and access for the proposed or alternative facilities. A description of the construction activities that could be undertaken and the estimated construction durations based on conceptual engineering are provided in the following subsections.

2.5.1 Construction Methods

2.5.1.1 Trackwork

Construction of new track or upgrades to existing track would include grading for the track subgrade with graders and excavators and the placement of subballast and ballast. Concrete ties are then laid out. Continuous Welded Rail (1,000-foot-long rail strings) are welded together and clipped to ties. The ballast is tamped with on-track machinery along with the final adjustments to the alignment and profile. Construction of a new mainline track within the UPRR ROW would occur in segments; once the subgrade, ballast, and mainline track are installed for one segment, construction would continue down the alignment. The duration of construction activities for a new track generally lasts approximately a few days to a week for a given location.

Track construction could conflict with existing utility lines, and these lines would be relocated or protected. Appendix C depicts the potential utility conflicts and whether the utility would be protected or relocated.

2.5.1.2 Bridges, Underpasses, and Overpasses

Trackwork would also involve the construction of track-supporting structures, such as new bridges (track over waterway) and modifications to existing at-grade crossings and grade separation structures such as overheads (roadway over the rail) or underpasses (rail over roadway).

Bridges over Waterways

The typical bridge (track over waterway) shown in Appendix C consists of a combination of short spans supported on driven steel H-pile bents with precast concrete bent caps. Structures that require longer spans to avoid obstacles or provide adequate opening to pass design flows would likely be supported on cast-in-place reinforced concrete (RC) pier caps and columns extended from RC cast-in-drilled-hole pile shafts. The short spans consist of either precast concrete slab beams or double-cell box girders, and the longer spans would typically consist of either single-cell precast concrete box girders, steel-plate girders, steel-plate through-girders, or a steel through-truss.

Tables 2-7 and 2-8 summarize the piles that would be installed for the bridges over the Merced River and Bear Creek, including the number of piles that would be installed in water and on land, and the method that would be used to install the piles. Construction would include installation of a casing that would extend about 20 feet into the ground. The top of the casing would be above water level. The casing for the piles would be installed either using the vibration method or be advanced by the drilling equipment. There may be some local dewatering of the casing prior to drilling;

however, the construction method would be slurry displacement, which would eliminate the need for dewatering during construction. This method uses a slurry in the hole during drilling and concrete pours, which keeps the water out. As the final concrete is poured, the concrete is heavier than the slurry, and the slurry is removed at the top of the hole as concrete fills the bottom. The portion of the casing above the pile would be removed once the column is poured.

The permanent impact from installation of the bridges would be 3 square feet per H-pile and approximately 20 square feet per Cast-In-Drilled-Hole-Pile (CIDHP).[11, 12] As shown in Table 2-8, no piles would be placed in the water; therefore, construction of the bridge over the Merced River would result in no permanent impact on the river. As shown in Table 2-9, 27 H-piles would be placed within the water of Bear Creek; therefore, construction of the bridge over Bear Creek would result in a permanent impact of 81 square feet in the creek.

As summarized in Tables 2-7 and 2-8, pile driving would be required for the installation of the bridges over the Merced River and Bear Creek. Pile driving would occur on land and in water. During the pile driving, five piles would be installed per day, there would be 500 strikes per pile, and a 5-second interval between strikes.

Table 2-8. Construction Details for the Bridge over the Merced River

No.	Pile type	Number of Piles	On Land or In Water?	Installation Method	Approximate Distance from Water's Edge (feet)	Days of Construction
1	Abutment – H-pile	3	Land	Impact	135	1.0 days
2	H-pile	3	Land	Impact	105	0.5 days
3	H-pile	3	Land	Impact	75	0.5 days
4	H-pile	3	Land	Impact	45	0.5 days
5	60-inch CIDH	2	Land	Drilled	15	3–5 days
6	60-inch CIDH	2	Land	Drilled	5	3–5 days
7	60-inch CIDH	2	Land	Drilled	95	3–5 days
8	Abutment – H-pile	8	Land	Impact	185	0.5 days

Table 2-9. Construction Details for the Bridge over Bear Creek

No.	Pile type	Number of Piles	On Land or In Water?	Installation Method	Approximate Distance from Water's Edge (feet)	Days of Construction
1	Abutment – H-pile	3	Land	Impact	35	1.0 days
2	H-pile	3	Land	Impact	20	0.5 days
3	H-pile	3	Land	Impact	5	0.5 days
4	H-pile	3	Water	Impact	N/A	0.5 days

[11] The area was calculated based on the measurements of the H-pile. The area was calculated with the assumption of a 14-inch square (1.167 feet). 3 square feet = 1.167 feet * 1.167 feet.

[12] The area was calculated based on the measurements of the CIDH-pile. The area was calculated with the assumption of a circle with a 60-inch (5 foot) diameter. A 5-foot diameter corresponds to a 2.5-inch radius. The area of a circle is equal to πr^2. 20 square feet = π * 2.5 feet * 2.5 feet.

No.	Pile type	Number of Piles	On Land or In Water?	Installation Method	Approximate Distance from Water's Edge (feet)	Days of Construction
5	H-pile	3	Water	Impact	N/A	0.5 days
6	H-pile	3	Water	Impact	N/A	0.5 days
7	H-pile	3	Water	Impact	N/A	0.5 days
8	H-pile	3	Water	Impact	N/A	0.5 days
9	H-pile	3	Water	Impact	N/A	0.5 days
10	H-pile	3	Water	Impact	N/A	0.5 days
11	H-pile	3	Water	Impact	N/A	0.5 days
12	H-pile	3	Water	Impact	N/A	0.5 days
13	H-pile	3	Land	Impact	5	0.5 days
14	H-pile	3	Land	Impact	20	0.5 days
15	Abutment – H-pile	3	Land	Impact	35	1.0 days

N/A = not applicable.

The foundations for the piles outside the waterway are typically accessed by temporary dirt roads with the construction equipment working in a temporary construction easement that extends about 50 feet from the edges of the bridge deck on both sides. Wherever possible, the main waterway is crossed by a single span placed by cranes operating on both banks reaching out and passing the girders across, with the new pier foundations located just outside of the anticipated waterway.

Pier foundations within the waterway may be accessed from the ground by pushing clean fill into the waterway on top of temporary pipe culverts, or narrowing or diverting the waterway, then restoring the original condition when done. For the standard railroad trestle consisting of short spans on H-pile bents, it is possible to construct in a top-down, span-by-span process with a crane on the back span reaching out to build the next pier and place the next span. The reach and lifting capacity of the crane limits the feasibility of the span-by-span top-down method for longer spans. An alternative way of accessing pier foundations in the waterway is to build a temporary work trestle bridge from which the construction equipment can work. The temporary work trestle would include installation of two platforms located on both banks of the river. A steel cap and stringers are installed, and timber crane mats are used for the surface. The temporary work trestle would be used to support equipment that would install the piers located within the water. Thus, no equipment would be located within the water itself, and no damming or blocking of the water would result because work would occur from the temporary work trestle on the banks of the river.

A temporary work trestle would require the installation of 18- to 24-inch steel pipe piles, including some that would be located within the water. These piles would be installed using a vibratory hammer. These piles, along with the trestle, would be pulled out once construction is completed. Thus, the only temporary impact on the Merced River and Bear Creek would be from the installation of these temporary piles in the water. The estimated surface area of the temporary work trestle over the Merced River is 5,000 square feet, and the estimated surface area of the temporary work trestle over Bear Creek is 4,000 square feet. The temporary impact on the Merced River and Bear Creek is conservatively estimated to be 5,000 square feet and 4,000 square feet, respectively. The actual impacts on this river and creek would be lower because the temporary impact area would be limited to the areas where the piles would be installed within the water for the construction of the

temporary work trestle. No dewatering would be required for the installation of a temporary work trestle.

A typical construction sequence for the bridges (track over water) follows.

- Prepare temporary construction access road(s).
- Construct temporary work trestle within the waterway.
- Install proposed cast-in-drilled-hole pile shafts.
- Form and cast RC columns.
- Form and cast RC pier caps.
- Place and install precast concrete box girders or steel girders with steel deck.
- Drive steel H-piles for standard railroad trestle bents.
- Place precast concrete bent caps and field weld connections to the piles.
- Place precast concrete abutment wingwalls.
- Place precast beams with attached curbs and sidewalks.
- Install deck waterproofing, ballast, and track.
- Restore landscaping (revegetation).

Typical equipment used in the bridge construction may include the following.

- Excavator with bucket or breaker.
- Bulldozer with blade or ripper.
- Backhoe.
- Loader.
- Dump truck.
- Crane with pile driving rig.
- Crane with pile drilling rig.
- Trucks with flatbed trailers and large crane(s) to haul, pick and place rebar cages, pile casings, column forms, girders, etc.
- Concrete trucks and pump trucks for cast-in-place concrete.

Based on similar projects, construction of a railroad bridge crossing the river could last approximately 14 to 36 months, depending on the access and in-water work windows.

Modifications to At-Grade and Grade-Separated Crossings

Modifications to at-grade crossings to support new track generally require clearing and grubbing for the installation of concrete crossing panels where the new mainline track crosses the roadway; relocation of railroad crossing signals, guards or gates, and signal houses; and installation of stop bars. Based on similar projects, construction associated with modified at-grade crossings would last approximately 7 to 15 working days, with an average of 9 working days.

Modifications to existing overhead structures generally require clearing, grubbing, and rough grading for the installation of pier protection along the existing piers supporting the overhead roadway structure and retaining walls along the length of existing abutment slopes. The structure types for overhead structures normally follow the code/design guidelines promulgated by either the local agency or California Department of Transportation. Based on similar projects, construction associated with modified overhead structure undercrossings would last approximately 30 to 120 working days, with an average of 60 working days.

2.5.1.3 Station Improvements

Station improvements would include the construction of new station facilities, such as station platforms, station tracks, and passenger amenities including surface parking lots and pedestrian connection between the parking areas and station platforms.

Construction activities associated with station platforms include clearing and grubbing, rough grading, structural excavation for walls, forming and pouring concrete for the walls, access stairs and ramps, platform surface, installation of signage, shelters, lighting, security, railings, benches and trash receptacles. Based on similar projects, construction of a station platform would last approximately 3 months. Construction activities associated with station tracks would be similar to trackwork activities described in Section 2.5.1.1, *Trackwork*. Construction activities associated with surface parking areas include clearing and grubbing, rough grading, installation of drainage and utilities, final grading, installation of aggregate base, installation of curb and gutter, paving, landscaping, installation of lighting and security, installation of signage and striping.

Construction activities associated with pedestrian overpasses and underpasses include clearing and grubbing, rough grading, installation of utilities, installation of cast-in-drilled-hole piles, installation of ramp footings, placing column reinforcing steel, pouring structural concrete for columns, placing falsework for ramps and abutments, pouring structural concrete for ramps and abutments, placing reinforcing steel and pouring structural concrete for decks, placing handrails for ramps, erecting steel superstructure, installation of elevators, and installation of lighting.

2.5.2 Construction Schedule and Durations

SJRRC proposes to initiate service along the Ceres to Merced Extension by 2025. Table 2-10 identifies the duration for construction of each proposed or alternative facility. The construction durations presented are not sequential; construction could occur simultaneously at several locations. The durations noted below are for actual construction activity. These facilities would require permitting, contractor selection, and final design prior to construction and, thus, the total duration could be longer than the construction durations noted in the table.

Table 2-10. Construction Durations

Proposed and Alternative Facilities	Construction Duration (months)
Ceres to Merced Extension Alignment	36
Merced Layover & Maintenance Facility	24
Turlock Station	14
Livingston Station	12
Merced Station	10
Atwater Station Alternative	12

2.6 Right-of-Way and Easement Needs

Table 2-11 lists the parcels outside the UPRR ROW that would be affected by the Proposed Project. Table 2-12 lists the parcels outside the UPRR ROW that would be affected by the Atwater Station Alternative**.** These parcels may be acquired or require easements for track ROW or rail support facilities.

Table 2-11. Right-of-Way and Easement Needs for the Proposed Project

Parcel (APN)	Ownership	Area (Acres)	Reason for Acquisition or Easement
Livingston Station			
024-083-004	A.V. Thomas Produce	0.81	Fee Take (station parking)
Merced Station			
031-173-013	Merced City School District	0.60	Fee Take (station parking)
031-173-014	Merced City School District	0.25	Fee Take (station parking)
031-173-015	Merced City School District	0.93	Fee Take (station parking)
031-173-017	Private	0.93	Fee Take (station parking)
Merced Layover & Maintenance Facility			
059-051-002	Private	3.00	Fee Take
059-051-010	Private	7.8	Fee Take
059-051-029	Private	40	Fee Take
059-051-028	City of Merced	0.23	Fee Take
059-051-036	Private	0.30	Fee Take
059-051-042	Private	0.14	Fee Take
059-450-046	Private	5.9	Fee Take
059-450-057	Private	2.3	Fee Take

Notes:
APN = Assessor Parcel Number.

Table 2-12. Right-of-Way and Easement Needs for the Atwater Station Alternative

Parcel (APN)[a]	Ownership	Area (Acres)	Reason for Acquisition or Easement
Atwater Station Alternative [b]			
002-219-010	Private	0.38	Fee Take (station parking)
002-219-011	Private	0.13	Fee Take (station parking)
003-170-001	Private	0.14	Fee Take (station parking)
003-170-002	Private	0.33	Fee Take (station parking)
003-170-003	Private	0.21	Fee Take (station parking)
003-170-004	Private	0.22	Fee Take (station parking)
003-170-030	Private	0.45	Fee Take (station parking)
003-170-031	City of Atwater	0.79	Permanent Easement (station parking)
003-170-033	Private	0.30	Fee Take (station parking)
003-170-034	City of Atwater	0.27	Permanent Easement (station parking)

Notes:

a. APN = Assessor Parcel Number.

b. If SJRRC chooses not to advance the Atwater Station Alternative, then the parcels identified as being required for acquisition for the Atwater Station Alternative would not be acquired.

2.7 Costs and Revenues

2.7.1 Capital Costs

With the Livingston Station, capital costs associated with the Project could cost approximately $481 million for infrastructure improvements, depending on coordination with the host railroad (UPRR). With the Atwater Station Alternative, capital costs associated with the Project could cost approximately $488 million for infrastructure improvements, depending on coordination with the host railroad (UPRR). The extension of service to Merced does not necessarily require the full build of the Project in order to extend service. Train service could be initially expanded or extended with station, parking and key track/infrastructure improvements, be expanded over time with additional improvements, and then be expanded fully with the full build suite of improvements.

As shown in Table 2-13, capital costs associated with the construction of the Project differ slightly, depending on whether the Livingston Station or Atwater Station Alternative is implemented. Capital costs associated with the Project are presented in more detail in Appendix E, *ACE Ceres–Merced Extension Opinion of Probable Cost Report.*

Table 2-13. Construction Cost Estimates for the Project (2021 dollars)

Proposed or Alternative Facility	Construction Cost
Ceres to Merced Extension Alignment	$346,410,846
Merced Maintenance & Layover Facility	$73,495,973
Turlock Station	$26,023,143
Livingston Station	$21,126,387
Atwater Station Alternative	$27,558,046
Merced Station	$14,434,294
Proposed Project (i.e., with Livingston Station)	$481,490,463
Project with Atwater Station Alternative	$487,922,302

Source: Appendix E, *ACE Ceres–Merced Extension Opinion of Probable Cost Report*

2.7.2 Operating and Maintenance Costs and Revenues

As shown in Table 2-14, existing annual operations and maintenance costs are estimated at approximately $24.5 million (this estimate is in 2021 dollars). Under the No Project Conditions, annual operations and maintenance costs are estimated at approximately $43.1 million in 2021 dollars. With operation of service between Ceres and Merced, annual operations and maintenance costs are estimated at approximately $50.2 million in 2021 dollars.

Table 2-14. Summary of Annual Projected Operations & Maintenance Cost (2021 dollars in millions)

	Existing Cost	No Project Conditions Cost[a]	Project Cost
Total	$24.5	$43.1	$50.2

a. The No Project Conditions include ACE service, with the addition of the approved Sacramento Extension and Ceres Extension. Service includes the following: two direct trains between Stockton and San Jose; one direct train between Ceres and San Jose with connecting bus service between Ceres and Merced; one direct train between Natomas and San Jose; one direct train between Natomas and Stockton; three trains between Ceres and Natomas via the Natomas Extension with connecting bus service between Ceres and Merced, these three trains also connect at North Lathrop to other inbound ACE trains with service to San Jose; and four buses between Ceres and Merced, connecting to the trains at Ceres.

As shown in Table 2-15, anticipated revenue associated with the No Project Conditions in 2030 and 2040 would be approximately $24.5 million and $31.6 million, respectively. Anticipated revenue associated with operation of the Project would be approximately $27.0 million in 2030 and approximately $34.8 million in 2040. Operations and maintenance costs and revenues are presented in more detail in Appendix F, *ACE Ceres–Merced Extension Operating and Maintenance Cost Technical Memorandum.*

Table 2-15. ACE System Revenue

Ridership Scenarios	Annual Fare Revenue				
	2016 [a]	2030 [b]	% Increase from 2016	2040 [b]	% Increase from 2016
No Project Conditions	$8,135,417	$24,511,200	201%	$31,632,200	289%
Operation of Proposed Project (with Livingston Station)	--	$27,033,900	232%	$34,872,300	329%
Operation of Project (with Atwater Station Alternative)	--	$27,041,500	232%	$34,872,800	329%

a. The annual fare revenue was identified in Table 2-11 from the Prior EIR (San Joaquin Regional Rail Commission 2018).

b. The 2030 and 2040 annual fare revenues for the No Project Conditions and the Project are identified in Appendix D, *ACE Ceres–Merced Extension Ridership, Revenue, and Benefits Report*.

2.8 Permits and Approvals

Table 2-16 lists the anticipated permits and approvals that could be required. SJRRC would coordinate with all local, regional, and state agencies to ensure that permits and approvals are received.

Table 2-16. Anticipated Permits, Funding, and Other Approvals

Agency	Funding, Approval, or Permit
Federal Agencies	
Federal Railroad Administration (FRA)	National Environmental Policy Act (NEPA) review if federal funding is proposed
Federal Transit Administration (FTA)	National Environmental Policy Act (NEPA) review if federal funding is proposed
National Marine Fisheries Service (NMFS)	Concurrence of effects on listed fish species under the federal Endangered Species Act (ESA) Section 7 consultation process; issuance of a biological opinion
U.S. Army Corps of Engineers (USACE)	Permit for effects on wetlands and other waters of the United States under Section 404 of the Clean Water Act (CWA)
U.S. Coast Guard	Potential bridge permit for new structures crossing over Merced River, Canal Creek, Weber Canal, Black Rascal Canal, and Bear Creek (if determined navigable)
U.S. Fish and Wildlife Service (USFWS)	Concurrence of effects on listed terrestrial wildlife and plant species under ESA Section 7 consultation process; issuance of a biological opinion

Agency	Funding, Approval, or Permit
State Agencies	
California State Transportation Authority (CalSTA)	Potential source of funding
California Department of Fish and Wildlife (CDFW)	Permits for the placement of structures affecting waterways under Section 1602 streambed alteration agreement; incidental take permits for effects on listed state wildlife and plant species under the California Endangered Species Act Section 2081
California Department of Toxic Substances (DTSC)	Review of worker health and safety plan
California Department of Transportation (Caltrans)	Encroachment permit for encroachment on state roadways and highways
California Public Utilities Commission (CPUC)	Approvals required for rail crossing improvements
California State Lands Commission (SLC)	Approval required for structures crossing over Merced River and Bear Creek
Central Valley Flood Protection Board (CVFPB)	Encroachment permit for CVFPB floodways and levees
Regional Water Quality Control Board (Regional Water Board)—Central Valley	Permit under the CWA Section 401 water quality certification/waste discharge requirements for placement of structures affecting waterways and under the Porter-Cologne Water Quality Control Act
San Joaquin Valley Air Pollution Control District (SJVAPCD)	Permits for authority to construct and to operate emergency generators at the Merced Layover & Maintenance Facility
State Historic Preservation Office (SHPO)	Concurrence of effects on historic resources under Section 106 of the National Historic Preservation Act consultation process; potential development of a memorandum of agreement
State Water Resources Control Board (State Water Board)	General construction activity storm water permit under Section 402 National Pollutant Discharge Elimination System (NPDES)
Regional Agencies and Transportation Agencies	
San Joaquin Regional Rail Commission (SJRRC)	Certification of California Environmental Quality Act (CEQA) environmental document; project proponent; project funding
San Joaquin Council of Governments	Funding coordination
Stanislaus Council of Governments	Funding coordination
Merced Council of Governments	Funding coordination
Central Valley Flood Protection Board	Encroachment Permit
Local Agencies (from west to east)[a]	
Stanislaus County	Encroachment permit for construction in county ROW; use and building permits for improvements outside rail ROW
City of Turlock	Encroachment permit for construction in the city ROW; use and building permits for improvements outside rail ROW
Merced County	Encroachment permit for construction in county ROW; use and building permits for improvements outside rail ROW

Agency	Funding, Approval, or Permit
City of Livingston	Encroachment permit for construction in the city ROW; use and building permits for improvements outside rail ROW
City of Atwater	Encroachment permit for construction in the city ROW; use and building permits for improvements outside rail ROW
City of Merced	Encroachment permit for construction in the city ROW; use and building permits for improvements outside rail ROW
Other Parties	
Union Pacific Railroad (UPRR)	Project approval; right of entry permit(s) for work conducted within UPRR ROW; design and installation permits/construction maintenance agreements for structures and facilities

[a] UPRR is not subject to the land use jurisdiction of local governments.

Chapter 3
Environmental Impact Analysis

Introduction

Organized by environmental resource area, this chapter provides an integrated discussion of the regulatory setting, environmental setting, and impact analyses (including mitigation measures for potentially significant impacts) associated with the construction, operation, and maintenance of the Proposed Project and the Atwater Station Alternative.

This analysis is based on the environmental footprints for the Proposed Project and for the Atwater Station Alternative (Appendix B, *ACE Ceres–Merced Extension Environmental Footprint*), 15 percent preliminary engineering plans (Appendix C, *ACE Ceres–Merced Extension 15% Preliminary Engineering Plans*), and the conceptual service plan and projected ridership (Appendix D, *ACE Ceres–Merced Extension Ridership, Revenue, and Benefits Report*). The analysis presented in this section uses a "reasonable worst-case" (i.e., the greatest level of impact) approach to analyzing potential impacts. The environmental footprints that have been identified for the Proposed Project and for the Atwater Station Alternative represent the greatest level of impact that could occur. In certain areas, the environmental footprints may be reduced in the future; however, because it is not known where the environmental footprints could be reduced, this analysis considers the reasonable worst-case scenario.

Chapter Organization

This chapter is organized into the following environmental resource sections.

- 3.1, *Aesthetics*
- 3.2, *Agricultural Resources*
- 3.3, *Air Quality*
- 3.4, *Biological Resources*
- 3.5, *Cultural Resources and Tribal Cultural Resources*
- 3.6, *Energy*
- 3.7, *Geology and Soils*
- 3.8, *Greenhouse Gas Emissions*
- 3.9, *Hazardous Materials*
- 3.10, *Hydrology and Water Quality*
- 3.11, *Land Use and Planning*
- 3.12, *Noise and Vibration*
- 3.13, *Population and Housing*

- 3.14, *Public Services*
- 3.15, *Recreation*
- 3.16, *Safety and Security*
- 3.17, *Transportation*
- 3.18, *Utilities and Service Systems*

Each environmental resource section in this chapter includes the following information.

- **Introduction**—Presents an overview of the environmental resource and cross-references related issues addressed elsewhere in the environmental impact report (EIR).
- **Regulatory Setting**—Identifies the federal, state, regional, and local laws, as well as regulations, ordinances, and policies that are relevant to each environmental resource area and would be applicable to the construction, operation, and maintenance of the Proposed Project and the Atwater Station Alternative. Appendix G, *Regional Plans and Local General Plans*, provides a list of applicable goals, policies, and objectives from regional and local plans of the jurisdictions in which the Proposed Project and the Atwater Station Alternative would be located.
- **Environmental Setting**—Provides an overview of the existing physical considerations of an environmental resource in the area at the time of, or prior to, the publication of the Notice of Preparation, which could be affected by implementation of the Proposed Project and the Atwater Station Alternative. A specific study area is identified for each environmental resource as the extent of a study area varies with each resource. The *study area* is defined as the limits of an area in which impacts could be expected to occur for each environmental resource. The environmental setting provides the basis of analysis of potential impacts related to each resource.
- **Impact Analysis**—Describes the methodology used for the analysis, the criteria used to determine the significance of potential impacts, and corresponding discussion of impacts associated with the Proposed Project and the Atwater Station Alternative. For each potential impact, the analysis makes a significance determination (i.e., no impact, less than significant, potentially significant, less than significant with mitigation, or significant and unavoidable). If required to reduce a potentially significant impact, feasible mitigation measures are identified. The *Approach to Impact Analysis* section describes the contents of the impact analysis discussion in further detail.

A discussion how the Proposed Project or the Atwater Station Alternative contribute to cumulative impacts is discussed separately in Chapter 4, *Other CEQA-Required Analysis*.

Approach to Impact Analysis

Significance Criteria

The significance criteria used in this EIR to define the level at which an impact would be considered significant in accordance with the California Environmental Quality Act (CEQA) are presented under the subheading *Thresholds of Significance* in each environmental resource section. In accordance with Section 15022(a) of the CEQA Guidelines, the San Joaquin Regional Rail Commission uses

significance criteria based on CEQA Guidelines Appendix G; factual or scientific information and data; and regulatory standards of federal, state, regional, and local jurisdictions in which Proposed Project facilities are proposed.

Impact Identification and Levels of Significance

Each environmental resource section identifies, and lists impacts sequentially. For example, CUL-1 denotes the presentation of the first impact in the cultural resources section. An impact statement precedes the discussion of each impact and provides a summary of the impact topic.

The level of significance associated with an impact is determined by comparing the environmental effects of constructing, operating, and maintaining the Proposed Project or the Atwater Station Alternative, with the existing environmental conditions, and applying the identified significance threshold. This EIR uses a variety of terms to describe the levels of significance of impacts identified within the environmental analysis. Each impact is categorized as one of the following.

- **No impact**—The Proposed Project or the Atwater Station Alternative would not cause any adverse change in the environment.
- **Less-than-significant impact**—The Proposed Project or the Atwater Station Alternative would not cause a substantial adverse change in the environment as the specified standard of significance would not be exceeded; thus, no mitigation measures are required. An impact is considered *beneficial* if it would result in the improvement of an existing physical condition of the environment. Beneficial impacts are identified within this *less-than-significant impact* significance category.
- **Potentially significant impact**—The Proposed Project or the Atwater Station Alternative would cause a substantial adverse change in the physical conditions of the environment in excess of the specified standard. This is typically the level of significance of an impact prior to the application of feasible mitigation measures.
- **Less than significant impact with mitigation**—The Proposed Project or the Atwater Station Alternative would cause a substantial adverse change in the physical conditions of the environment in excess of the specified standard of significance; however, one or more feasible mitigation measures would reduce environmental effects to levels below the specified standard of significance.
- **Significant and unavoidable impact**—The Proposed Project or the Atwater Station Alternative would cause a substantial adverse change in the physical condition of the environment; there is no feasible mitigation available or, even with implementation of feasible mitigation measures, the Proposed Project or the Atwater Station Alternative would cause a significant adverse effect on the environment in excess of the specified standard of significance.

Mitigation Measures

CEQA Guidelines Section 15126.4(a) (1) states that an EIR "shall describe feasible measures which could minimize significant adverse impacts." Mitigation measures identified in this EIR were developed during the analysis and are designed to reduce, minimize, or avoid potential environmental impacts associated with the Proposed Project and the Atwater Station Alternative. The mitigation measures are numbered to correspond to the impacts they address. For example, Mitigation Measure CUL-2.1 refers to the first mitigation measure for Impact CUL-2 in the cultural

resources section. The description of the mitigation measure identifies which specific facility (e.g., proposed alignment, proposed or alternative station, layover & maintenance facility) to which the measure would apply.

The *ACE Extension Lathrop to Ceres/Merced EIR* (Prior EIR) identified mitigation measures that would apply to the Proposed Project and the Atwater Station Alternative. This EIR incorporates the mitigation measures from the Prior EIR and makes updates to the mitigation measures, as needed.

Topics Considered but Dismissed from Further Analysis

Although forestry resources are identified in Appendix G of the CEQA Guidelines, this EIR does not include this topic because there would be no impact.

Forestry Resources

The Proposed Project would not be located in or intersect forest lands within identified timberland production zones (TPZ), which are lands dedicated to timber growing for a 10-year period. There are no TPZs identified in the vicinity of the Proposed Project throughout the two counties (Stanislaus, and Merced) where facilities are proposed (Ballard pers. comm.; Maxey pers. comm). In addition, the Proposed Project is generally located within or adjacent to the existing Union Pacific Railroad right-of-way where forestry resources would not likely occur. Thus, there would be no impact on forestry resources.

Likewise, the Atwater Station Alternative would not be located in or intersect forest lands within an identified TPZ. As such, implementation of the Atwater Station Alternative would result in no impact on forestry resources.

3.1 Aesthetics

3.1.1 Introduction

This section describes the regulatory setting and environmental setting for aesthetic resources in the vicinity of the Proposed Project and the Atwater Station Alternative. It also describes the impacts on aesthetic resources that would result from implementation of the Proposed Project and the Atwater Station Alternative and mitigation measures that would reduce significant impacts, where feasible and appropriate. Appendix H, *Supporting Aesthetics Information*, contains additional technical information for this section.

The study area for aesthetic resources, also referred to as the area of visual effect (AVE), is defined in Section 3.1.3, *Methods of Analysis*. Cumulative impacts on aesthetic resources, in combination with planned, approved, and reasonably foreseeable projects, are discussed in Chapter 4, *Other CEQA-Required Analysis*.

3.1.2 Regulatory Setting

This section summarizes federal, state, regional, and local regulations related to aesthetic resources and applicable to the Proposed Project and the Atwater Station Alternative.

3.1.2.1 Federal

There are no federally designated National Wild and Scenic Rivers (U.S. Fish and Wildlife Service 2020) or National Scenic Byways (Federal Highway Administration 2020) in the study area. No lands administered by the Bureau of Land Management would be affected (Bureau of Land Management 2020). No national parks or monuments are located in the study area (National Park Service 2020). There are no National Historic Trails or National Wildlife Refuges in the study area.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) establishes the federal government policy on historic preservation. Section 106 of the NHPA requires federal agencies to consider the effects of their undertakings on historic properties. Potential adverse effects include changes in the physical features of the property's setting that contribute to its historic significance, or introduction of visual elements that diminish the integrity of the property's significant historic features (16 United States Code 470 et seq.). Section 3.5, *Cultural Resources*, documents and analyzes impacts on historic properties, including how visual changes resulting from the Proposed Project and the Atwater Station Alternative would affect such resources.

3.1.2.2 State

There are no state-designated Wild and Scenic Rivers in the study area (California Public Resources Code § 5093.54). No state parks are in the study area (California Protected Areas Data Portal 2020).

State Scenic Roadways and Highways

There are no officially designated or eligible state scenic highways within 3 miles of the environmental footprint (California Department of Transportation 2019a).

Designated Landscaped Freeways

Several designated landscaped freeways are within view of the Proposed Project (California Department of Transportation 2019b). Freeways within 3 miles in rural settings and within a half mile in urban areas of the corridor are considered in this analysis and are listed in Table 3.1-1.

Table 3.1-1. Designated Landscaped Freeways Potentially in View of the Proposed Project

County	Freeway	Freeway Segment (Post Mile Limits)
Stanislaus	SR 99	R2.83/R3.87
		R7.86/8.69
		R11.24/R11.90
		R12.91/R14.92
Merced	SR 99	11.14/12.98
		12.98/13.30
		13.71/16.00
		16.00/16.06
		16.06/16.18
		16.44/17.08
		22.30/23.05
		23.28/23.47
		23.59/24.10
		24.40/25.73
		26.90/27.52
		28.84/30.57
		33.17/34.43

Sources: California Department of Transportation 2019b, 2020.
SR = State Route.
R = First realignment.

As defined by the Outdoor Advertising Act (California Business and Professions Code [Cal. BPC] § 5216), a landscaped freeway "means a section or sections of a freeway that is now, or hereafter may be, improved by the planting at least on one side or on the median of the freeway ROW of lawns, trees, shrubs, flowers, or other ornamental vegetation requiring reasonable maintenance." Landscaped freeways must have planting areas that are at least 1,000 feet in length that are in healthy condition and improve the aesthetic appearance of the highway. Functional plantings (i.e., plantings for erosion control, traffic safety, reduction of fire hazards, and traffic noise abatement, or other non-ornamental purposes) do not qualify (4 California Code of Regulations [Cal. Code Regs.] § 2508). Per Cal. BPC Section 5440, the placement of advertising is prohibited within 1,000 feet of the edge of the right-of-way (ROW) of a landscaped freeway.

3.1.2.3 Regional and Local

The San Joaquin Regional Rail Commission (SJRRC), a state joint powers agency, proposes improvements inside and outside of the Union Pacific Railroad (UPRR) ROW. The Interstate Commerce Commission Termination Act (ICCTA) affords railroads engaged in interstate commerce

considerable flexibility in making necessary improvements and modifications to rail infrastructure,[1] subject to the requirements of the Surface Transportation Board (STB). ICCTA broadly preempts state and local regulation of railroads, and this preemption extends to the construction and operation of rail lines. As such, activities within the UPRR ROW are clearly exempt from local building and zoning codes and other land use ordinances. However, facilities located outside of the UPRR ROW, including proposed stations, the proposed Merced Layover & Maintenance Facility, and the Atwater Station Alternative would be subject to regional and local plans and regulations. Though ICCTA does broadly preempt state and local regulation of railroads, SJRRC intends to obtain local agency permits for construction of facilities that fall outside of the UPRR ROW even though SJRRC has not determined that such permits are legally necessary or required.

Appendix G of this EIR, *Regional Plans and Local General Plans*, provides a list of applicable goals, policies, and objectives from regional and local plans of the jurisdictions in which the Proposed Project and the Atwater Station Alternative improvements are proposed. Section 15125(d) of the California Environmental Quality Act (CEQA) Guidelines requires an environmental impact report (EIR) to discuss "any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans." These plans were considered during the preparation of this analysis and were reviewed to assess whether the Proposed Project and the Atwater Station Alternative would be consistent with the plans of relevant jurisdictions.[2] The Proposed Project and the Atwater Station Alternative would be generally consistent with the applicable goals, policies, and objectives related to aesthetic resources identified in Appendix G in particular because the Proposed Project alignment follows existing railroads and/or existing roadways.

County- and City-Designated Scenic Routes

Table 3.1-2 lists county- and city-designated scenic routes within 3 miles of the Proposed Project and the Atwater Station Alternative.

Table 3.1-2. County- and City-Designated Scenic Routes within 3 Miles of the Proposed Project

County or City	Roads
Stanislaus County	None
Ceres and Turlock	None
Merced County	None
Livingston	None
Atwater	Atwater Boulevard
	First Street
	Bellevue Road
	Shaffer Road
	Winton Way
	Broadway from Winton Way to First Street
	Buhach Road

[1] The Altamont Corridor Express (ACE) operates within a ROW and on tracks owned by UPRR, which operates interstate freight rail service in the same ROW and on the same tracks.

[2] An inconsistency with regional or local plans is not necessarily considered a significant impact under CEQA, unless it is related to a physical impact on the environment that is significant in its own right.

County or City	Roads
	Third Street
	Part of Grove Avenue
	All entrances to the city
Merced	North and South Bear Creek Drive within the city limits
	N Street from 16th Street to the Merced County Courthouse
	21st Street from the Merced County Courthouse to Glen Avenue
	M Street from Black Rascal Creek to Bellevue Road
	West 28th Street from M Street to G Street
	R Street (extended) from Black Rascal Creek to Bellevue Road
	Olive Avenue East of McKee Road
	M Street from 18th Street to Bear Creek
	Campus Parkway

3.1.3 Methods of Analysis

Aesthetic resources are all objects (artificial and natural, moving and stationary) and features (e.g., landforms and waterbodies) visible on a landscape. These resources add to or detract from the scenic quality (i.e., the visual appeal) of the landscape. A visual impact is the creation of an intrusion or perceptible contrast that affects the scenic quality of a viewscape. A visual impact can be perceived by an individual or group as either positive or negative, depending on a variety of factors or conditions (e.g., personal experience, time of day, weather, or seasonal conditions).

Identifying a study area's aesthetic resources and conditions involves understanding the visual character of the area's visual features and the regulatory context. Once those parameters are understood, a study area's aesthetic resources are further defined by establishing the area of visual effects (AVE) and documenting the *visual character* of the environmental setting, including the natural and cultural environments. For the purposes of this section's analysis, the study area and AVE are synonymous. The *affected population*, or viewers, are defined by their relationship to the AVE, their visual preferences, and their sensitivity to changes associated with the Proposed Project and the Atwater Station Alternative. Visual preferences, or what viewers like and dislike about the AVE's visual character, define the AVE's *visual quality*. Visual quality serves as the baseline for determining the degree of visual impacts and whether a project's visual impacts would be adverse, beneficial, or neutral.

The impact assessment methodology for aesthetic resources includes the following components.

- Establishing the AVE for aesthetics resources and determining landscape units.
- Inventorying and describing the affected environment, affected viewers, and existing visual quality, and identification of key viewpoints (KVP) and views for visual assessment.
- Assessing visual compatibility and viewer sensitivity and analyzing the project's visual impacts.
- Proposing methods to mitigate significant visual impacts.

These research and analysis methods used to determine the effects discussed in Section 3.1.5, *Impact Analysis*, are described in detail in Appendix H, *Supporting Aesthetics Information*. The

methods for evaluating impacts may include data collection methods and sources, inventory of regional and local conditions, evaluation of analytical context, and qualitative or quantitative data analysis techniques to determine how activities and physical changes associated with the Proposed Project and the Atwater Station Alternative could cause impacts and to consider the context and intensity of these impacts.

The methods for evaluating impacts are intended to satisfy the federal and state requirements, including CEQA and general conformity. In accordance with CEQA requirements, an EIR must include a description of the existing physical environmental conditions in the vicinity of the project. Those conditions, in turn, "will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant" (14 Cal. Code Regs. 15125[a]).

3.1.4 Environmental Setting

This section discusses the environmental setting related to aesthetic resources in the AVE.

3.1.4.1 Ceres to Merced Extension Alignment

Existing Visual Resources

The most important visual resources within the viewshed of the Ceres to Merced Extension Alignment, based on analysis of aerial and satellite mapping, site surveys, and review of policy documents, are as follows.

- **Diablo Range and Sierra Nevada:** The grassy hillsides and distant oak woodlands of the Diablo Range and the conifer forests and snow-capped mountains of the Sierra Nevada are visible from the rail corridor where elevation and breaks in development and vegetation allow for views.
- **Atwater Boulevard, First Street, Shaffer Road, Winton Way, Broadway from Winton Way to First Street, Buhach Road, Third Street, Entrances to Atwater, and M Street from 18th Street to Bear Creek:** City-designated scenic routes with views of the Ceres to Merced Extension Alignment (Appendix H, *Supporting Aesthetics Information*).
- **Summerfaire Park, Broadway Park, Central Park, Shattuck Educational Park:** Parks, trails, and recreational areas that have views of the rail line.
- **Merced River:** Natural river corridor with riparian areas passing under the tracks.

Viewer Groups and Existing Viewer Sensitivity

Viewer groups of the Ceres to Merced Extension Alignment are recreationists using local roadways and recreational areas adjacent to the tracks; roadway users traveling on State Route (SR) 99 and local roadways; and residential, commercial, industrial, and institutional (e.g., schools) viewers bordering the tracks (Appendix H, *Supporting Aesthetics Information*).

Existing Visual Character and Quality

The AVE comprises flat, vegetated open space areas that include orchards, row crops, vineyards, and grassy, vacant parcels that are common to rural areas in the San Joaquin Valley; residential, commercial, industrial, and institutional landscaping and vacant parcels that are common to developed areas in the valley; and intermittent background views of the Diablo Range. Permanent

waterbodies in the AVE are the Upper Lateral Number 2 and a half, Lateral Number 3, and Upper Lateral Number 4, Lateral Number 5, Lateral Number 6, High Fine Canal, Merced River, Hammatt Lateral, Arena Canal, Atwater Canal, Buhach Lateral, Canal Creek, Trindale Drain, El Capitan Canal, and Bear Creek. Atmospheric visibility can range from moderately high to moderate due to weather patterns that can include limited seasonal haze, seasonal rain, and overcast weather conditions. The existing natural setting can range from being more harmonious in rural areas to less harmonious in areas with industrial development, contributing to a natural setting that ranges from *moderately low* to *moderate* in natural harmony.

The cultural environment in the AVE consists of residential, commercial, industrial, and institutional uses that border the tracks in Keyes, Turlock, Delhi, Livingston, Atwater, Fergus, Merced, and smaller rural development. SR 99 is a prominent transportation corridor that parallels the existing tracks. Local roadways, aboveground utility infrastructure (utility poles with lines), fencing, and sound barriers separating residences from the tracks and transportation corridors also contribute to the cultural environment. Residential, commercial, and rural development along the rail corridor is common to the valley cultural landscape. The industrial areas tend to be disjointed and detract from the nearby suburban setting, contributing to a cultural setting that ranges from *moderately low* to *moderate* in cultural order.

The AVE consists of existing single and double track alignments that blend fairly well with the landscape in rural and developed settings, as it parallels SR 99 for most of its length. The AVE is mostly compatible with the natural and cultural environments, resulting in *moderate* site coherence.

The overall visual quality of the Ceres to Merced Extension Alignment site is *moderately low* to *moderate*.

Light and Glare

Daytime light and glare levels associated with the Ceres to Merced Extension Alignment site and vicinity range from *moderately low* to *moderately high* due to the rural and suburbanized and industrial settings. Nighttime light and glare levels associated with the Ceres to Merced Extension Alignment site and vicinity also range from *moderately low* to *moderately high* because of low lighting levels in rural areas and higher lighting levels in suburbanized and industrial. Lighting along the Ceres to Merced Extension Alignment primarily comes from street lighting associated with SR 99 and local roadways, vehicle headlights, and light coming from developed areas.

3.1.4.2 Turlock Station

Existing Visual Resources

The most important visual resources within the viewshed of the Turlock Station based on analysis of aerial and satellite mapping, site surveys, and review of policy documents, are as follows.

- **Diablo Range:** The grassy hillsides and distant oak woodlands of the Diablo Range are slightly visible to the west from the rail corridor, in close proximity to the station, down Fulkerth Road/West Hawkeye Avenue, where the roadway corridor creates a break in development and vegetation to allow for views.
- **Summerfaire Park:** Recreational area that has a view of the Turlock Station.

Viewer Groups and Existing Viewer Sensitivity

Viewer groups of the Turlock Station are recreationists using local roadways and recreational areas near the station; roadway users traveling on local roadways; and residential, commercial, and industrial viewers bordering the tracks and proposed station site (Appendix H, *Supporting Aesthetics Information*).

Existing Visual Character and Quality

The natural environment that comprises the AVE for the Turlock Station includes residential, commercial, and industrial landscaping and grassy, vacant parcels that are common to developed areas in the valley and intermittent background views of the Diablo Range. Atmospheric visibility can range from *moderately high* to *moderate* due to weather patterns that can include limited seasonal haze, seasonal rain, and overcast weather conditions. The natural environment is somewhat harmonious because the AVE is well-vegetated with manicured lawns and mature trees located within nearby parks and roadway medians, surrounding residences and apartments, bordering industrial sites, and lining the UPRR ROW. In addition, the Turlock Transit Center is surrounded by formal landscaping. This all contributes to a natural setting that is *moderate* in natural harmony.

The cultural environment consists of residential, commercial, park, and industrial uses that surround the station site in Turlock and consists of development patterns that are common to the valley cultural landscape. Most of these features are well-maintained. Local roadways, aboveground utility infrastructure (utility poles with lines), and fencing also contribute to the cultural environment. The industrial areas are disjointed and detract slightly from the nearby suburban setting, contributing to a cultural setting that is *moderate* in cultural order.

The Turlock Station would include a station platform within the UPRR ROW and a connection to the Turlock Transit Station via a pedestrian overcrossing that spans Golden State Boulevard and Front Street and provides access to the station platform. Parking for the station would be provided by using up to 50 of the existing paved parking spaces in the Turlock Transit Center parking lot and 261 spaces of street parking would be created along the dirt shoulders of North Front Street, from Golden State Boulevard to East Canal Drive. Trees lining the UPRR ROW near the intersection of West Hawkeye Avenue and Golden State Boulevard provide some screening of the station site during the spring and summer when trees are in leaf. The AVE is mostly compatible with the natural and cultural environments, resulting in *moderate* site coherence.

The overall visual quality of the Turlock Station site is *moderate*.

Light and Glare

Daytime light and glare levels associated with the Turlock Station site and vicinity are *moderate* due to the suburbanized and commercial setting combined with the presence of mature trees. Nighttime light and glare levels associated with Turlock Station site and vicinity are also *moderate* because of higher lighting levels in this developed area. The station site is unlit. Therefore, lighting at the site comes from lighting associated with streetlights and traffic lights along local roadways, vehicle headlights, and light coming from developed areas.

3.1.4.3 Livingston Station

Existing Visual Resources

Based on analysis of aerial and satellite mapping, site surveys, and review of policy documents, there are no sensitive visual resources within the viewshed of the Livingston Station.

Viewer Groups and Existing Viewer Sensitivity

Viewer groups of the Livingston Station are recreationists using local roadways adjacent to the tracks; roadway users traveling on local roadways; and residential and commercial viewers bordering the tracks (Appendix H, *Supporting Aesthetics Information*). Roadway users traveling on SR 99 do not have direct views of the station site because the freeway is depressed and at a lower elevation than the station site and berms and landscaping along the freeway limit views for freeway travelers.

Existing Visual Character and Quality

The natural environment that comprises the AVE for the Livingston Station includes residential and commercial landscaping; grassy, vacant parcels; and landscaping along SR 99. Atmospheric visibility can range from *moderately high* to *moderate* due to weather patterns that can include limited seasonal haze, seasonal rain, and overcast weather conditions. The existing natural setting is somewhat harmonious but lacks cohesive landscaping and vegetative cover contributing to a natural setting that is *moderate* in natural harmony.

The cultural environment consists of residential, commercial, and industrial uses that border the station site in Livingston. SR 99 is a prominent transportation corridor that parallels the existing tracks and station site. Local roadways, aboveground utility infrastructure (utility poles with lines) and fencing also contribute to the cultural environment. Residential and commercial development surrounding the station site is common to the valley cultural landscape. The cultural landscape surrounding the station site is slightly disjointed because commercial and industrial development surrounding the site lacks design cohesion and SR 99 segments development within Livingston, contributing to a cultural setting that is *moderate* in cultural order.

The proposed Livingston Station site is located on a parcel that is comprised of a grassy field that is adjacent to a small warehouse, east of Main Street, between the existing tracks and SR 99. There are no trees on the station site. Commercial uses, a limited number of industrial areas, and a few single-family residences are located adjacent to the site. The AVE is mostly compatible with the natural and cultural environments, resulting in *moderate* site coherence.

The overall visual quality of the Livingston Station site is *moderate*.

Light and Glare

Daytime light and glare levels associated with the Livingston Station site and vicinity are *moderate* due to the developed setting. Nighttime light and glare levels associated with the Livingston Station site and vicinity are also *moderate* because of lighting levels in developed areas. Lighting at the site is limited to security lighting on the warehouse building and lighting at the site primarily comes from street lighting associated with SR 99 and local roadways, vehicle headlights, and light coming from developed areas.

3.1.4.4 Atwater Station Alternative

Existing Visual Resources

The most important visual resources within the viewshed of the Atwater Station Alternative site based on analysis of aerial and satellite mapping, site surveys, and review of policy documents, are as follows.

- **Bloss Home:** The Bloss Home is a State Historic Landmark and is listed on the National Register of Historic Place. The home also serves as a museum. The grounds surrounding the home offer a park-like setting.
- **Bloss Park:** Bloss Park is a City of Atwater park located directly north of the Bloss Home and serves as a visual extension of the Bloss Home and grounds.

Viewer Groups and Existing Viewer Sensitivity

Viewer groups of the Atwater Station Alternative site are recreationists using local roadways adjacent to the station and proposed surface parking lot; roadway users traveling on local roadways; and residential, commercial, industrial, and institutional (e.g., schools) viewers bordering the tracks (Appendix H, *Supporting Aesthetics Information*).

Existing Visual Character and Quality

The natural environment that comprises the AVE for the Atwater Station Alternative includes residential, commercial, industrial, and institutional landscaping, dense vegetation associated with the Bloss Home and Bloss Park, and grassy, vacant parcels that are common to developed areas in the San Joaquin Valley. Atmospheric visibility can range from *moderately high* to *moderate* due to weather patterns that can include limited seasonal haze, seasonal rain, and overcast weather conditions. The existing natural environment ranges from being less harmonious closer to the station site and more harmonious near the proposed parking lot, near the Bloss Home. This contributes to a natural setting that is *moderate* in natural harmony.

The cultural environment consists of residential, commercial, industrial, and institutional uses that border the station site in Atwater. A KFC restaurant, used appliance store, a number of vacant storefronts, several isolated residences, and a small apartment complex are located immediately north of the station site and adjacent to the Main Parking Lot and where the East Parking Lot would be constructed. Land uses gradually transition to more residential land uses the further north of the station site, across from the Bloss Home. The existing rail line borders the station site to the south. SR 99 is a prominent transportation corridor that parallels the existing tracks and proposed station within 800 feet. The Teasdale Foods plant and industrial work yards are located between the existing tracks and SR 99. Local roadways, aboveground utility infrastructure (utility poles with lines), and fencing also contribute to the cultural environment. The commercial, warehouse, and industrial areas tend to be disjointed but these uses smoothly transition to the nearby residential land uses, contributing to a cultural setting that is *moderate* in cultural order.

The proposed Atwater Station Alternative site is located on parcels that are currently developed with commercial uses (auto repair shop, Atwater Feed, and an abandoned gas station and car wash) and the Atwater Transpo bus station, east of Applegate Road, between the existing tracks and Atwater Boulevard. The only existing landscaping is associated with the Atwater Transpo bus

station and is located where the Main Lot would be located. Commercial uses and a few residences border the site. The proposed East Lot is paved and includes an old, concrete building pad. The AVE is compatible with the natural and cultural environments, resulting in *moderate* site coherence.

The overall visual quality of the Atwater Station Alternative site is *moderate*.

Light and Glare

Daytime light and glare levels associated with the Atwater Station Alternative site and vicinity are *moderate* due to the developed setting. Nighttime light and glare levels associated with the Atwater Station Alternative site and vicinity are also *moderate* because of lighting levels in developed areas. Lighting at the station site is limited to security lighting associated with the bus station and other commercial uses at the station site. The site is also lit by street lighting associated with SR 99 and local roadways, vehicle headlights, and light coming from adjacent developed areas.

3.1.4.5 Merced Layover & Maintenance Facility

Existing Visual Resources

The most important visual resources within the viewshed of the Merced Layover & Maintenance Facility based on analysis of aerial and satellite mapping, site surveys, and review of policy documents, are as follows.

- **Diablo Range and Sierra Nevada:** The grassy hillsides and distant oak woodlands of the Diablo Range and the conifer forests and snow-capped mountains of the Sierra Nevada are visible from SR 99, which is adjacent to the layover and maintenance facility, because it bridges over the rail corridor and its elevation allows for views.

Viewer Groups and Existing Viewer Sensitivity

Viewer groups of the Merced Layover & Maintenance Facility are recreationists using local roadways adjacent to the tracks and the proposed layover and maintenance facility; roadway users traveling on SR 99 and local roadways; and residential, commercial, and industrial, and institutional (e.g., places of worship) viewers bordering the tracks and layover and maintenance facility (Appendix H, *Supporting Aesthetics Information*).

Existing Visual Character and Quality

The natural environment that comprises the AVE for the Merced Layover & Maintenance Facility includes residential, commercial, industrial, and institutional landscaping that is sparse and vacant, grassy parcels that are common to developed areas in the San Joaquin Valley and intermittent background views of the Diablo Range. Atmospheric visibility can range from *moderately high* to *moderate* due to weather patterns that can include limited seasonal haze, seasonal rain, and overcast weather conditions. Bear Creek is located to the west of the layover and maintenance facility but is not visible from the site. The existing setting is somewhat disharmonious due to an abrupt transition between residential and industrial land uses, contributing to a natural environment that is *moderately low* in natural harmony.

The cultural environment consists of smaller scale residential and institutional structures and large-scale commercial and industrial structures and land uses that border the layover and maintenance facility. SR 99 is a prominent transportation corridor that roughly parallels and crosses over the

existing tracks near the site. In addition, SR 59 is a busy local roadway that provides access to the western border of Merced and provides access to the layover and maintenance facility. Local roadways, aboveground utility infrastructure (utility poles with lines), and fencing also contribute to the cultural environment. Residential, commercial, and institutional development along the rail corridor surrounding the layover and maintenance facility is common to the valley cultural landscape. The industrial area is disjointed and detracts from the nearby suburban setting, contributing to a cultural setting that is *moderately low* in cultural order.

The Merced Layover & Maintenance Facility is located on the Morning Star Merced site that is north of the UPRR ROW. The site supports a large processing and warehouse facility and is surrounded by industrial and commercial land uses to the north, south, and west, with residential and institutional land uses to the east. Approximately 70 percent of the site is paved and includes paving around the facility and paved storage yards. However, the remainder of the site consists of vacant, grassy lands that border the eastern and western ends of the site along SR 59 and Cooper Avenue, respectively. There is also an existing rail spur that splits from the mainline and parallels SR 59, traveling north, and then curves and travels west between the Morning Star Merced plant and industrial and commercial land uses immediately to the north of the site. An industrial facility and SR 99 border the UPRR ROW to the east, and Bear Creek is located just to the west of the facility. The AVE is mostly compatible with the natural and cultural environments, resulting in *moderate* site coherence.

The overall visual quality of the Merced Layover & Maintenance Facility site is *moderately low*.

Light and Glare

Daytime light and glare levels associated with the Merced Layover & Maintenance Facility site are *moderate* due to the suburbanized and industrial settings. Nighttime light and glare levels associated with the Merced Layover & Maintenance Facility site and vicinity are also *moderate* because of higher lighting levels associated with the suburbanized and industrial land uses.

3.1.4.6 Merced Station

Existing Visual Resources

Based on analysis of aerial and satellite mapping, site surveys, and review of policy documents, there are no sensitive visual resources within the viewshed of the Merced Station.

Viewer Groups and Existing Viewer Sensitivity

Viewer groups of the Merced Station are recreationists using local roadways; roadway users traveling on SR 99 and local roadways; and residential, commercial, and industrial viewers bordering the tracks and station site (Appendix H, *Supporting Aesthetics Information*).

Existing Visual Character and Quality

The natural environment that comprises the AVE for the Merced Station includes residential, commercial, and industrial landscaping and grassy, vacant parcels that are common to developed areas in the San Joaquin Valley. Atmospheric visibility can range from *moderately high* to *moderate* due to weather patterns that can include limited seasonal haze, seasonal rain, and overcast weather conditions. The existing natural setting is not very harmonious because there is little cohesion in

landscaping and vegetative cover, contributing to a natural setting that is *moderately low* in natural harmony.

The cultural environment consists of residential, commercial, warehouse, and industrial uses that border the site and consists of development patterns that are common to the valley cultural landscape. The existing rail line also borders the station site to the north. SR 99 is a prominent transportation corridor that parallels the existing tracks within 800 feet and segments residential land uses to the north and south. Local roadways, aboveground utility infrastructure (utility poles with lines), and fencing also contribute to the cultural environment. The commercial, warehouse, and industrial areas tend to be disjointed and detract from residential land uses, contributing to a cultural setting that is *moderately low* in cultural order.

The current location of the proposed parking lot for the Merced Station contains a Courtesy Rent A Car store and the Merced City School District Food Services and Print Shop Warehouse. There is a grassy, vacant lot located between these two facilities, and both of these facilities support paved parking lots. There is no landscaping associated with the Merced City School District facility, but there is a grassy mow strip and trees along 15th and R Streets associated with the rental car facility and shrubs surrounding the remainder of the perimeter. The AVE is mostly compatible with the natural and cultural environments, resulting in *moderate* site coherence.

The overall visual quality of the Merced Station site is *moderately low*.

Light and Glare

Daytime light and glare levels associated with the Merced Station site and vicinity are *moderate* due to the developed setting. Nighttime light and glare levels associated with the Merced Station site and vicinity are also *moderate* because of lighting levels associated with lighting associated with commercial uses at the site and lighting coming from street lighting associated with SR 99 and local roadways, vehicle headlights, and light coming from adjacent developed areas.

3.1.5 Impact Analysis

This section describes the environmental impacts of the Proposed Project and Atwater Station Alternative on aesthetic resources. It describes the thresholds used to determine whether an impact would be significant and identified impacts applying those thresholds. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts are provided, where appropriate.

3.1.5.1 Thresholds of Significance

The CEQA Guidelines Appendix G (14 Cal. Code Regs. 15000 et seq.) has identified significance criteria to be considered for determining whether a project could have significant impacts on aesthetic resources and visual quality.

An impact would be considered significant if construction or operation of the project would have any of the following consequences.

- Substantially degrade the existing visual character or quality of public views of the site and its surroundings in a non-urbanized area, including scenic vistas.

- Conflict with applicable zoning and other regulations governing scenic quality in an urbanized area, including scenic vistas.
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
- Create a new source of substantial light or glare that would adversely affect day or nighttime views near the project improvements.

3.1.5.2 Impacts and Mitigation Measures

Impact AES-1	Construction of the Proposed Project could substantially degrade the existing visual character or quality of the site and its surroundings, including scenic vistas and scenic highways, and could create a new source of substantial light or glare that would adversely affect day or nighttime views.
Level of Impact	**Potentially significant impact**
Mitigation Measures	AES-1.1: Install visual barriers between construction work areas and sensitive receptors AES-1.2: Limit construction near residences to daylight hours AES-1.3: Minimize fugitive light from portable sources used for construction
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization - Construction

Proposed Project

Visual changes resulting from introducing construction activities and equipment into the viewsheds of all user groups would be temporary. Construction of the Proposed Project would generally occur in a linear fashion along the UPRR corridor. Construction would affect all viewers adjacent to or in the environmental footprint. Impacts would be greater where there are more viewers and where larger portions of the project improvements would be visible. Construction may be visible from some locations with scenic vista views such as from elevated roadways and bridges that cross or parallel the existing rail corridor or adjacent multilevel buildings. The view from elevated roadways and bridges would be fleeting for passing motorists, bicyclists, and pedestrians, and construction would not affect scenic vistas because viewers would be elevated above the rail corridor and construction activities. The view from adjacent multilevel buildings of the surrounding hillsides would not be blocked by construction activities. The following construction impacts would be common to the Ceres to Merced Extension Alignment, the new proposed stations, and the Merced Layover & Maintenance Facility.

Introduce Industrial-Looking Elements into the Viewshed

All viewer groups are likely to be accustomed to seeing machinery, trucks, and vehicles within the environmental footprint because roadway improvement projects, development projects, agriculture and ranching, and rail maintenance activities require the use of such equipment. Construction activities would introduce heavy equipment and associated vehicles such as dozers, graders, scrapers, and trucks into the viewshed. Depending on location, viewers could see staging areas, worker parking, and equipment and materials storage areas, which would add industrial-looking

elements to viewsheds. Such features would be less pronounced in urban and suburban areas but more pronounced in rural areas.

Increase Fugitive Dust and Noise in the Viewshed

Construction activities involving heavy equipment use, soil and material transport, and land clearing in the ROW, along public roadways, and at construction staging areas would create fugitive dust and would introduce noise. The aesthetic disruptions would be less pronounced in urban areas but more pronounced in rural areas.

Invade Privacy of Residential Viewers

Residential viewers could have construction activities occurring adjacent to their homes, or nearby, which may evoke a sense of invaded privacy.

Remove and Trim Vegetation

Vegetation clearance within the existing rail corridor is a current and ongoing activity conducted for the physical safety of passing trains. While evidence of construction activity would be noticeable to area residents and others in the vicinity, such visual disruptions would be short term and are a common and accepted feature of the urban environment. Several of the project stations would require vegetation removal to accommodate construction of station facilities and parking.

Lighting and Glare

Construction activities would temporarily increase daytime glare from reflections off construction vehicle windows. However, such reflections are already common in all segments due to the presence of existing roadway traffic. Construction glare would be nominal compared to existing conditions and would not increase glare near the project improvements. If nighttime construction activities occur, lighting equipment could create light and glare that might affect sensitive viewers adjacent to the ROW.

Summary of Construction Impacts

Visual changes resulting from introducing construction activities and equipment into the viewsheds of all user groups would be temporary. Construction activities would introduce heavy equipment and associated vehicles such as dozers, graders, scrapers, and trucks into the viewshed. Depending on location, viewers could see staging areas, worker parking, and equipment and materials storage areas, which would add industrial-looking elements into viewsheds. Construction activities involving heavy equipment use, soil and material transport, and land clearing in the ROW, along public roadways, and at construction staging areas would create fugitive dust. Dust clouds could hinder views, including affecting views from scenic vista points and scenic roadways, and would result in a potentially significant impact. Residential viewers could have construction activities occurring adjacent to their homes, or nearby, which may evoke a sense of invaded privacy and would result in a potentially significant impact.

Atwater Station Alternative

Construction of the Atwater Station Alternative would result in the same visual impacts as described above for the Proposed Project. Residential viewers could have construction activities occurring adjacent to their homes, or nearby, which may evoke a sense of invaded privacy and would result in a potentially significant impact.

Mitigation Measures

Mitigation Measures AES-1.1 through AES-1.3 would apply to the Proposed Project and the Atwater Station Alternative for aesthetic impacts during construction.

Mitigation Measure AES-1.1: Install visual barriers between construction work areas and sensitive receptors

The San Joaquin Regional Rail Commission (SJRRC) or its contractor(s) will install visual barriers between stationary construction work areas and sensitive receptors (e.g. residents and recreational areas) to reduce the impact on sensitive receptors from invasions of privacy and the change in existing visual quality. Barriers will be placed to obscure views of stationary work areas (e.g., staging areas or areas of fixed construction) where construction activity and equipment would be disruptive and lower the existing visual quality. These efforts will include the following actions and performance standards.

- SJRRC or its contractors(s) will install visual barriers to minimize sensitive receptor (i.e., residents and recreational areas) views of construction work areas.
- The visual barriers will be placed to protect residents and recreational areas that are located within 500 feet of a construction site where the residences or recreationists would have an unobstructed view of the construction area.
- The visual barrier may be chain link fencing with privacy slats, fencing with windscreen material, wood barrier, or other similar barrier.
- The visual barrier will be a minimum of 6 feet high to help to maintain the privacy of residents and block ground-level views toward stationary construction activities.

While the visual barriers would introduce a visual intrusion, they would greatly reduce the visual effects associated with visible construction activities, and screening construction activities would protect privacy. The visual barriers are an effective means of reducing the visibility of active construction work areas, thereby minimizing the impact on existing localized visual quality.

Mitigation Measure AES-1.2: Limit construction near residences to daylight hours

Construction activities scheduled to occur between 7 a.m. and 6 p.m. will not take place before or past daylight hours (which vary according to season) in locations where residences are located within 500 feet of construction activities. This will reduce the amount of construction experienced by viewer groups because most construction activities would be occurring during business hours (when most viewer groups are likely to be at work) and eliminate the need to introduce high-wattage lighting sources to operate in the dark near residences.

Mitigation Measure AES-1.3: Minimize fugitive light from portable sources used for construction

At a minimum, the construction contractor will minimize Project-related light and glare to the maximum extent feasible, given safety considerations. Color-corrected halide lights will be used. Portable lights will be operated at the lowest allowable wattage and height and will be raised to a height no greater than 20 feet. All lights will be screened and directed downward toward work activities and away from the night sky and nearby residential areas to the maximum extent possible. The number of nighttime lights used will be minimized to the greatest extent possible.

Significance with Application of Mitigation

Implementation of Mitigation Measures AES-1.1, AES-1.2, and AES-1.3 would reduce construction impacts associated with the Proposed Project to a less-than-significant level by installing visual barriers between construction and sensitive receptors, limiting work to daylight hours adjacent to sensitive receptors, limiting construction lighting near sensitive receptors, and limiting fugitive dust.

For the same reasons as the Proposed Project, implementation of Mitigation Measures AES-1.1, AES-1.2, and AES-1.3 would reduce construction impacts associated with the Atwater Station Alternative to a less-than-significant level

Comparison of the Proposed Livingston Station and Atwater Station Alternative

Construction of the Atwater Station Alternative would result in similar visual impacts as described for the Proposed Project (including the proposed Livingston Station). However, construction of the Atwater Station Alternative would occur in an area where there is a higher concentration of sensitive viewers than the proposed Livingston Station. Nonetheless, the Atwater Station Alternative and the proposed Livingston Station would both result in a less than significant impact after mitigation.

Impact AES-2	Proposed Project operations could conflict with applicable zoning and other regulations governing scenic quality in an urbanized area, including scenic vistas.
Level of Impact	**Potentially significant impact** <u>Proposed Project</u> Ceres to Merced Extension Alignment (in urbanized areas) Merced Layover & Maintenance Facility Turlock Station Livingston Station Merced Station <u>Alternative Analyzed at an Equal Level of Detail</u> Atwater Station Alternative **No Impact** <u>Proposed Project</u> Ceres to Merced Extension Alignment (in non-urbanized areas)
Mitigation Measures	AES-2.1: Landscape parking facilities AES-2.2: Apply aesthetic design treatments to pedestrian bridges over tracks and bridges with visibility to residents and recreationists AES-2.3: Underground new utilities AES-2.4: Apply aesthetic surface treatments to fencing and pedestrian bridge safety barriers AES-2.5: Replace disturbed vegetation along landscaped freeways
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization - Operations

Portions of the Proposed Project would be located within the urbanized areas of Ceres, Keyes, Turlock, Delhi, Livingston, Atwater, Fergus and the Atwater Station Alternative would be located within the urbanized area of Atwater. The impacts on scenic quality in these urbanized areas is discussed in this section. Portions of the Ceres to Merced Extension Alignment are located within non-urbanized areas. These portions of the Ceres to Merced Extension Alignment would have no impact on the scenic quality of urbanized areas. The impacts on the scenic quality of these non-urbanized areas are discussed in Impact AES-3. In addition, The Ceres to Merced Extension Alignment within Atwater and the Atwater Station Alternative would fall within view of scenic corridors that are protected by city regulations. Impacts associated with scenic corridors are discussed in detail under Impact AES-4. Impacts associated with lighting are discussed under Impact AES-5.

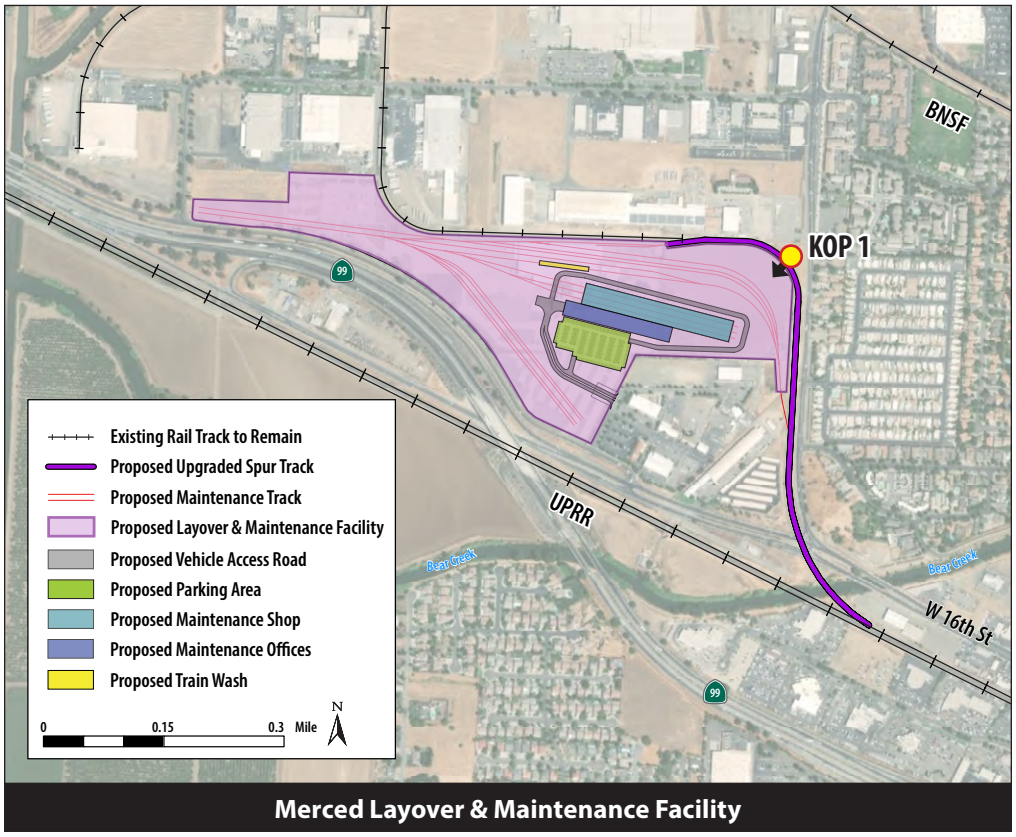
The proposed Merced Layover & Maintenance Facility, Turlock Station, Livingston Station, Merced Station, and the Atwater Station Alternative are located wholly within individual cities and are discussed under the appropriate general plan for the city within which they are located. The general plans policies discussed in this section are contained in Appendix G, *Regional Plans and Local General Plans*. KOPs that are representative of the visual character of the Proposed Project and Atwater Station Alternative within urban areas are identified in Figures 3.1-1a to 3.1-1c. Figures 3.1-2 through 3.1-6 show the KOPs and their associated simulations.

Proposed Project

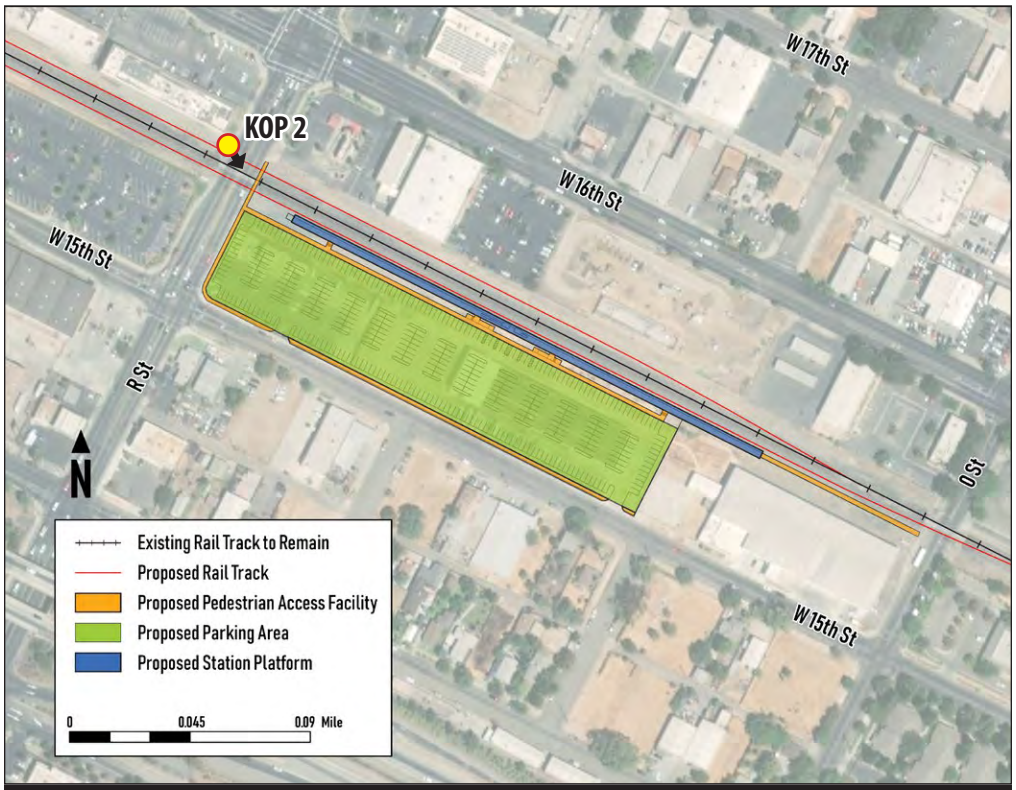
Landscaped Freeways

As identified in Table 3.1-1, there are several California Department of Transportation (Caltrans)-designated landscaped freeways within view of the Proposed Project in urbanized areas. Table H-3.1 in Appendix H, *Supporting Aesthetics Information,* includes a preliminary screening of the Proposed Project features within 3 miles of landscaped freeways to determine if the proposed alignment, stations, and layover and maintenance facility require further analysis. The Proposed Project would not introduce billboards or signs along segments of landscaped freeways. Therefore, a component of the Proposed Project would need to directly affect vegetation along a landscaped freeway segment in order to affect its designation. Facilities that would not directly affect vegetation along landscaped freeway segments have been excluded from the analysis and are identified in Appendix H, *Supporting Aesthetics Information*.

Landscaped freeway segments are located in close proximity to the Ceres to Merced Extension Alignment, but as shown in the screening analysis, many would not be affected by the alignment. However, the Ceres to Merced Extension Alignment passes by directly adjacent to landscaped freeway segments of SR 99 in Ceres (PM 11.24–11.90) and Keyes (PM 7.86–8.69). There would be some potential that some trees or shrubs could be affected during construction along both of these segments because the shrubs are located so close to the alignment. Similarly, the Ceres to Merced Extension Alignment would impact small portions of trees and shrubs along the landscaped freeway segment of SR 99 (PM 28.84–30.57) in Livingston, along both sides of the freeway, to bridge the freeway. If trees or shrubs are damaged or removed along these three segments in Ceres, Keyes, and Livingston, the removals could affect the classification of each segment as a landscaped freeway and result in potentially significant impacts.



Merced Layover & Maintenance Facility

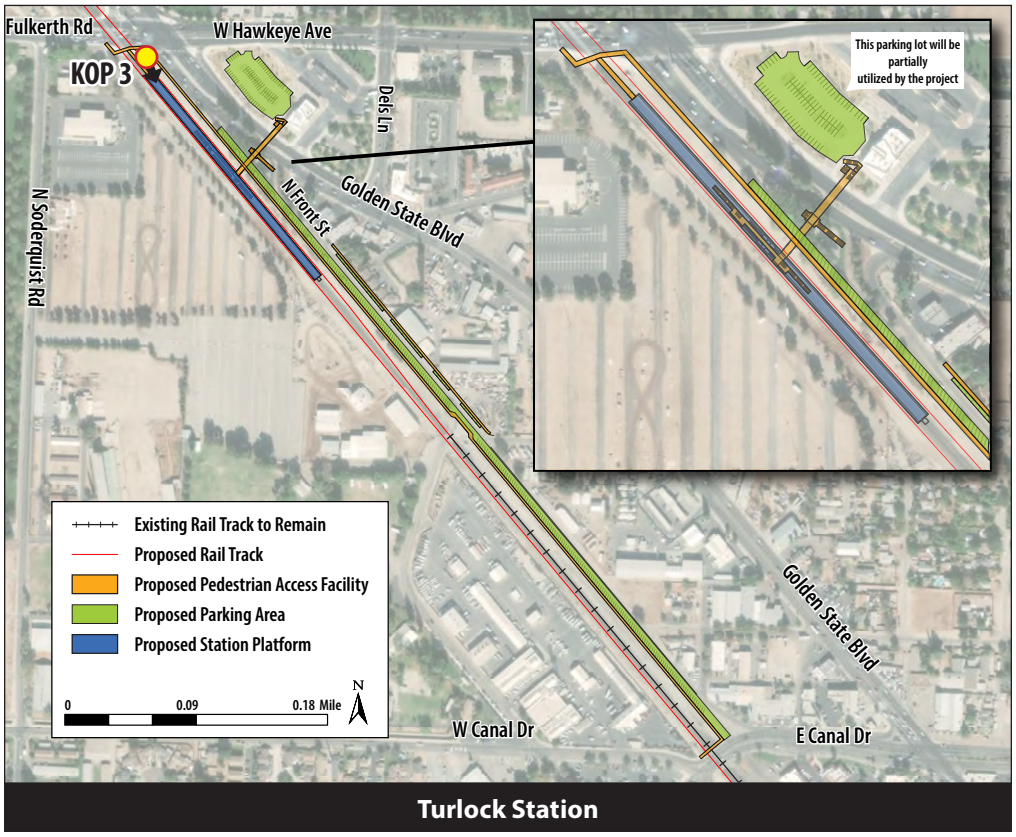


Merced Station

Key Observation Point (KOP)

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Figure 3.1-1a
Key Observation Point Location Maps
ACE Ceres-Merced Extension Project



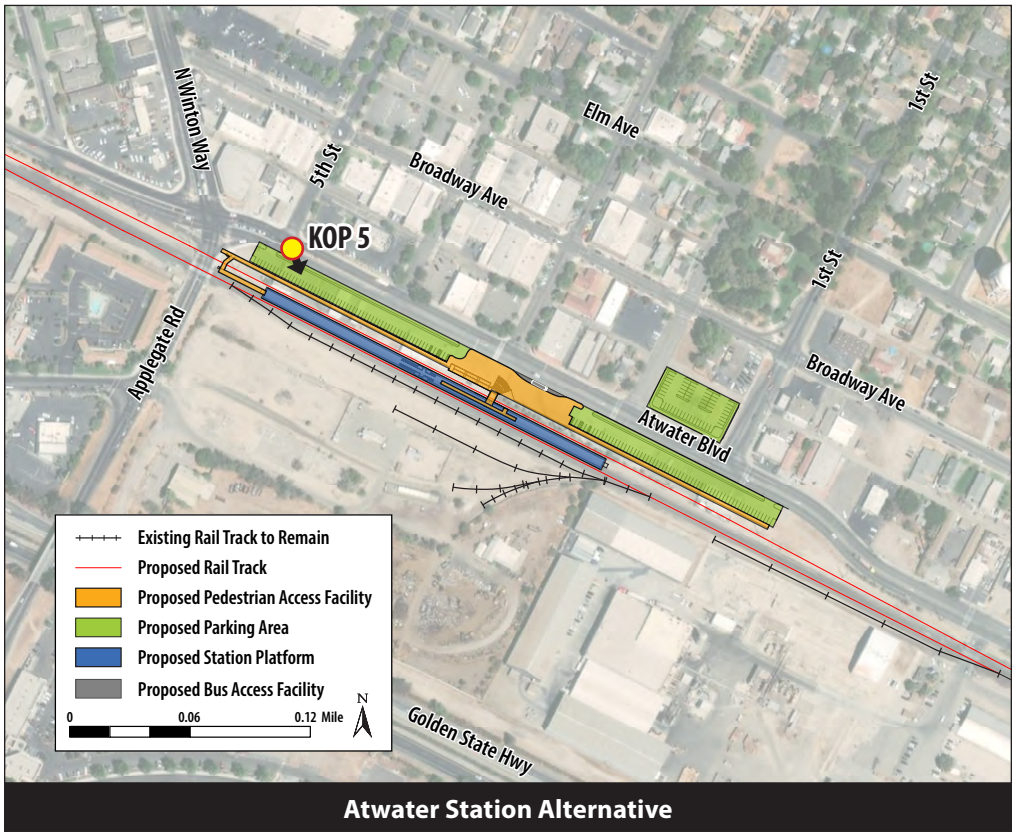


Key Observation Point (KOP)

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ACE ALTAMONT CORRIDOR EXPRESS

Figure 3.1-1b
Key Observation Point Location Maps
ACE Ceres-Merced Extension Project



Atwater Station Alternative

Key Observation Point (KOP)

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ACE ALTAMONT CORRIDOR EXPRESS

Figure 3.1-1c
Key Observation Point Location Maps
ACE Ceres-Merced Extension Project

KOP 1 – Merced Layover Facility

KOP 1 - Before Project



KOP 1 - After Project



Assumptions for Key Observation Point (KOP)

- View from North State Highway 59 looking Southwest toward Maintenance Facility.



Visual Impact Assessment

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ACE ALTAMONT CORRIDOR EXPRESS

Figure 3.1-2
Existing View and Merced Layover & Maintenance Facility Simulated Conditions
ACE Ceres-Merced Extension Project

KOP 2 – Merced Station

KOP 2 - Before Project



KOP 2 - After Project



Assumptions for Key Observation Point (KOP)

- View from R Street looking Southeast toward station.



Visual Impact Assessment

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ACE ALTAMONT CORRIDOR EXPRESS

Figure 3.1-3
Existing View and Merced Station Simulated Conditions
ACE Ceres-Merced Extension Project

KOP 3 – Turlock Station

KOP 3 - Before Project



KOP 3 - After Project



Assumptions for Key Observation Point (KOP)

- View from North Golden State Boulevard looking Southeast toward pedestrian bridge connection to station.



Visual Impact Assessment

Graphics 60144.20 (215F21) AB

ACE ALTAMONT CORRIDOR EXPRESS

Figure 3.1-4
Existing View and Turlock Station Simulated Conditions
ACE Ceres-Merced Extension Project

KOP 4 – Livingston Station

KOP 4 - Before Project

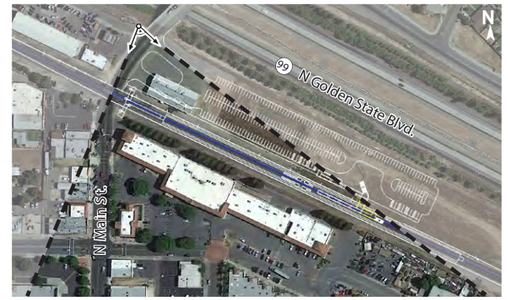


KOP 4 - After Project



Assumptions for Key Observation Point (KOP)

- View from North Main Street looking South toward station.



Visual Impact Assessment

Graphics 00144.20 (2015Z1) AB

ACE ALTAMONT CORRIDOR EXPRESS

Figure 3.1-5
Existing View and Livingston Station Simulated Conditions
ACE Ceres-Merced Extension Project

KOP 5 – Atwater Station Alternative

KOP 5 - Before Project

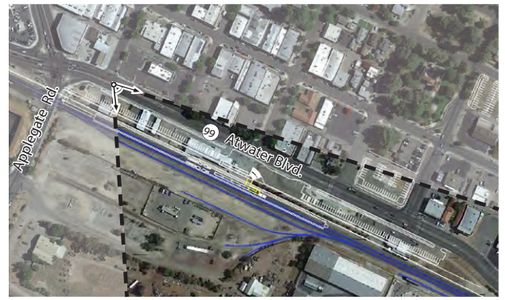


KOP 5 - After Project



Assumptions for Key Observation Point (KOP)

- View from Atwater Boulevard looking Southeast toward station.



Visual Impact Assessment

Graphics (00144.20) (015021).AB

ACE ALTAMONT CORRIDOR EXPRESS

Figure 3.1-6
Existing View and Atwater Station Alternative Simulated Conditions
ACE Ceres-Merced Extension Project

Stanislaus County General Plan

Keyes is located in Stanislaus County and is covered by the Stanislaus County General Plan, which contains policies that encourage the visual enhancement of areas visible from SR 99 to improve city and county community gateways and the overall visual quality of views associated with the highway and areas adjacent to the highway; the protection and preservation of natural and scenic areas in the county; improvement of the visual appearance of Keyes; reduction of walled development in Keyes; and encourages development to occur in already developed areas to preserve agricultural land, open space, and natural resources (County of Stanislaus 2015; Stanislaus Council of Governments 2018).

The Ceres to Merced Extension Alignment would be built alongside an existing rail corridor that passes through a flat landscape in Keyes. This would be a minor visual expansion of existing conditions and would generally not alter the existing visual landscape or affect the existing visual quality. Similarly, ancillary features associated with the proposed alignment (e.g., relocated railroad signals, safety gates, signal houses, power poles, relocated railroad crossings, and stop bar pavement markings) would not affect visual resources or the existing visual quality, because these are existing visual elements associated with the rail corridor that would be shifted slightly in or incrementally added to in the landscape. Therefore, the Proposed Project would preserve existing views, would not detract from existing views in Keyes, and would be consistent with policies governing scenic resources in the county. Therefore, the Proposed Project would not conflict with the Stanislaus County General Plan, and impacts would be less than significant.

Merced County General Plan

Delhi and Fergus are located in Merced County and are covered by the Merced County General Plan and county municipal code, which contain policies that encourage the preservation and enhancement of the visual and historic character and quality of life in its urban communities; showcase communities' natural features; streetscapes improve visual character and quality; minimize visual impacts resulting from industrial and commercial development; protect vegetation, scenic resources, and vistas; utilize design strategies to take advantage of scenic resources and minimize visual impacts; minimize lighting impacts; and encourage the planting and preservation of trees (County of Merced 2013; Merced County Association of Governments 2018). In addition, the Delhi Community Plan seeks to enhance views of Delhi from SR 99, ensure that fence and wall designs are compatible with the surrounding community, and that trees are planted within the community (County of Merced 2006).

The Ceres to Merced Extension Alignment would be built alongside an existing rail corridor that passes through a flat landscape in Delhi and Fergus. This would be a minor visual expansion of existing conditions and would generally not affect vegetation along the alignment, alter the existing visual landscape, or affect the existing visual quality. Similarly, ancillary features associated with the proposed alignment (e.g., relocated railroad signals, safety gates, signal houses, power poles, relocated railroad crossings, and stop bar pavement markings) would not affect visual resources or the existing visual quality, because these are existing visual elements associated with the rail corridor that would be shifted slightly in or incrementally added to in the landscape. Therefore, the Proposed Project would preserve existing views, would not detract from existing views in Delhi and Fergus, and would be consistent with policies governing scenic resources in the county. Therefore, the Proposed Project would not conflict with the Merced County General Plan, and impacts would be less than significant.

Merced General Plan

A portion of the Ceres to Merced Extension Alignment, the Merced Layover and Maintenance Facility, and the Merced Station are located in Merced and would be covered by the Merced General Plan and city municipal code, which contain policies to ensure that industrial developments along SR 99 are designed in a high-quality manner (e.g., architectural styles, site features, and landscaping); city gateways are enhanced; impacts associated with transportation corridors are minimized; scenic routes are protected and enhanced; open space areas are preserved (note, the city suggests that railroad rights-of-way should be used as an open space resource); and street trees are preserved. The general plan identifies that the area immediately east of the Merced Layover & Maintenance Facility is within the Gateways Redevelopment Project, a priority of which is that it strives to "improve the physical image of the Gateways arterials and areas" in Merced (City of Merced 2012).

The Ceres to Merced Extension Alignment would be built alongside an existing rail corridor that passes through a flat landscape in Merced. This would be a minor visual expansion of existing conditions and would generally not affect vegetation along the alignment, alter the existing visual landscape, or affect the existing visual quality. Similarly, ancillary features associated with the proposed alignment (e.g., relocated railroad signals, safety gates, signal houses, power poles, relocated railroad crossings, and stop bar pavement markings) would not affect visual resources or the existing visual quality because these are existing visual elements associated with the rail corridor that would be shifted slightly in or incrementally added to in the landscape. The proposed bridge over the Bear Creek would be installed mostly within the UPRR ROW and adjacent to existing rail bridge. This would slightly increase the presence of bridges in the landscape as seen by recreationists on the creek, and the bridges would be more noticeable to motorists compared to the new track. However, the existing bridge lacks aesthetic design treatments and has a substantial amount of graffiti, contributing to a degraded visual quality associated with the existing bridge. The new bridge over the Bear Creek would be built alongside the existing rail bridge and would be visually similar to the adjacent and existing single-track bridge and would not negatively affect the current aesthetics at the site. Therefore, this would be a minor visual expansion of existing conditions and would generally not alter the existing visual landscape or affect the existing visual quality. Therefore, the Proposed Project would preserve existing views, would not detract from existing views in Merced, and would be consistent with policies governing scenic resources in the city. Therefore, the Proposed Project would not conflict with the Merced General Plan, and impacts would be less than significant.

As shown in the "After Project" view of KOP 1 in Figure 3.1-2, the Merced Layover & Maintenance Facility would be built on industrial lands, north of the existing UPRR ROW and connected to it by an existing rail spur, in a flat landscape. The site is currently grassy or paved and partially developed with industrial development; therefore, no trees or shrubs would be removed. This component would create a large-scale, warehouse looking facility that covers much of the site where none presently exists. The visual quality of KOP 1 would be reduced from *moderate* to *moderate low* (refer to Simulation Rating Forms in Appendix H, *Supporting Aesthetics Information*). The City of Merced has a goal of maintaining attractive industrial and business park areas by requiring high quality architectural, site (signs, lights, walls, etc.), and landscape designs for industrial development along SR 99 and to provide an attractive gateway and sense of arrival into the city. The Merced Layover & Maintenance Facility would utilize an agricultural field (used to produce hay) and would be utilitarian looking. Because the Merced Layover & Maintenance Facility site is located across from a portion of the Gateway Redevelopment Project area, the facility may not meet the City of Merced's goal of maintaining attractive industrial and business park areas and providing an attractive

gateway and sense of arrival into the city. Therefore, impacts on scenic quality due to conflicts with policies in the Merced General Plan would be potentially significant due to implementation of the Merced Layover & Maintenance Facility in the city of Merced.

The area surrounding the Merced Station includes new commercial development, but across the street is a vacant lot, a boarded-up building, an automotive repair shop, and a surface parking lot. As shown in the "After Project" view of KOP 2 in Figure 3.1-3, the Merced Station would be built on parcels with existing commercial uses with few trees or shrubs. Building removal would occur to construct the parking facilities and station platforms for the station and would remove disjointed commercial uses. As seen in the simulation, station platforms would not be a prominent visual feature associated with the station, and landscaping would improve the visual quality of the area. This would create a view that is more visually cohesive compared to existing conditions and that integrates the rail corridor to the surrounding landscape. In addition, the new parking lot would not be out of character with this block where surface parking is located on the east side of West 16th Street. The station would also require fence installation for safety. If fencing is light gray, the color would act to limit views. Coloring the barrier in a dark color improves visibility through the barrier compared with a standard gray metal surface. The visual quality of KOP 2 would be improved from *moderate low* to *moderate* (refer to Simulation Rating Forms in Appendix H, *Supporting Aesthetics Information*). However, other views associated with the station could be affected if structures at the station and ancillary station features (e.g., fencing, railings) do not blend in views and may not meet the City of Merced's goals to ensure that impacts associated with transportation corridors are minimized. Therefore, impacts on scenic quality due to conflicts with policies in the Merced General Plan would be potentially significant due to implementation of the Merced Station in the city of Merced.

Turlock General Plan

A portion of the Ceres to Merced Extension Alignment and the Turlock Station would be located in Turlock and would be covered by the Turlock General Plan, Northwest Triangle Specific Plan, and city municipal code, which contains policies that industrial developments minimize impacts on the community; landscaping use native vegetation; preserve trees; minimize light impacts; promote orderly and attractive development; screen parking areas; create attractive streetscapes and street fronts; and buffer incompatible uses (City of Turlock 1995, 2012).

The Ceres to Merced Extension Alignment would be built alongside an existing rail corridor that passes through a flat landscape in Turlock. This would be a minor visual expansion of existing conditions and would generally not affect vegetation along the alignment, alter the existing visual landscape, or affect the existing visual quality. Similarly, ancillary features associated with the proposed alignment (e.g., relocated railroad signals, safety gates, signal houses, power poles, relocated railroad crossings, and stop bar pavement markings) would not affect visual resources or the existing visual quality because these are existing visual elements associated with the rail corridor that would be shifted slightly in or incrementally added to in the landscape. Therefore, the Proposed Project would preserve existing views, would not detract from existing views in Turlock, and would be consistent with policies governing scenic resources in the city. Therefore, the Proposed Project would not conflict with the Turlock General Plan, and impacts would be less than significant.

The Turlock Station would construct a large-scale pedestrian overcrossing that spans Golden State Boulevard and Front Street to connect the Turlock Transit Station to the proposed station platform,

as shown in the "After Project" view of KOP 3 in Figure 3.1-4. The pedestrian overpass and light standards associated with the station would create lighter-colored vertical features that would be very noticeable to viewers. The large-scale pedestrian overcrossing, with associated elevators and stairways, would be taller than the surrounding development, creating a new, vertical visual intrusions into the viewshed, and would not blend with existing architectural styles. The Turlock Station would use existing paved parking spaces in the Turlock Transit Center parking lot and not affect resources at that site. In addition, street parking would be created along the dirt shoulders of North Front Street, from Golden State Boulevard to East Canal Drive, which would increase the area of paved surfaces along North Front Street. Trees lining the UPRR ROW between the tracks and North Front Street and Golden State Boulevard would need to be removed to accommodate construction of the station platform and pedestrian overpass. However, no buildings would need to be removed to construct the proposed station. The station would also require fence installation for safety. If fencing is light gray, the color would act to limit views. Coloring the barrier in a dark color improves visibility through the barrier compared with a standard gray metal surface. The visual quality of KOP 3 would be reduced from *moderate* to *moderate low* (refer to Simulation Rating Forms in Appendix H, *Supporting Aesthetics Information*). In addition, other views associated with the station could be affected if structures at the station and ancillary station features (e.g., fencing, railings) do not blend in views and may not meet the City of Turlock's goals to minimize impacts to the community and promote orderly and attractive development. Therefore, impacts on scenic quality due to conflicts with policies in the Turlock General Plan and Northwest Triangle Specific Plan would be potentially significant due to implementation of the Turlock Station in the city of Turlock.

Livingston General Plan

A portion of the Ceres to Merced Extension Alignment and the Livingston Station would be located in Livingston and would be covered by the Livingston General Plan and municipal code, which contain policies that ensure that light pollution is minimized; visual impacts from industrial development are minimized; city entrances are enhanced through the use of building design and setbacks, pavement patterns, street furniture, and landscaping; streetscapes and visual clutter along streets are improved; street trees are planted; new development complements existing development; landscaping be an integral part of new development and site design; and trees are protected (City of Livingston 1999).

The Ceres to Merced Extension Alignment would be built alongside an existing rail corridor that passes through a flat landscape in Livingston. This would be a minor visual expansion of existing conditions and would generally not affect vegetation along the alignment, alter the existing visual landscape, or affect the existing visual quality. Similarly, ancillary features associated with the proposed alignment (e.g., relocated railroad signals, safety gates, signal houses, power poles, relocated railroad crossings, and stop bar pavement markings) would not affect visual resources or the existing visual quality, because these are existing visual elements associated with the rail corridor that would be shifted slightly in or incrementally added to in the landscape. The proposed bridge over the Merced River would be installed mostly within the UPRR ROW and adjacent to existing rail bridge. This would slightly increase the presence of bridges in the landscape as seen by recreationists on the river, and the bridges would be more noticeable to motorists compared to the new track. However, the existing bridge lacks aesthetic design treatments and has a substantial amount of graffiti, contributing to a degraded visual quality associated with the existing bridge. The new bridge over the Merced River would be built alongside the existing rail bridge and would be visually similar to the adjacent and existing single-track bridge and would not negatively affect the

current aesthetics at the site. Therefore, this would be a minor visual expansion of existing conditions and would generally not alter the existing visual landscape or affect the existing visual quality. Therefore, the Proposed Project would preserve existing views, would not detract from existing views in Livingston, and would be consistent with policies governing scenic resources in the city. Therefore, the Proposed Project would not conflict with the Livingston General Plan, and impacts would be less than significant.

The Livingston Station would be built on a parcel with a small warehouse, the A.V. Thomas Produce building, and a grassy field. Signage on the warehouse indicates that the business has moved, and the building is vacant. As shown in the "After Project" view of KOP 4 in Figure 3.1-5, the warehouse would be removed to construct the parking facilities and station platform for the station and would remove disjointed commercial uses and ensure that the site does not become blighted as the building would deteriorate over time. As seen in the simulation, station platforms would not be a prominent visual feature associated with the station and landscaping would increase the natural harmony of the area. This would create a view that is more visually cohesive compared to existing conditions and that integrates the rail corridor to the surrounding landscape. The station would also require fence installation for safety. If fencing is light gray, the color would act to limit views. Coloring the barrier in a dark color improves visibility through the barrier compared with a standard gray metal surface. The visual quality of KOP 4 would remain *moderate* (refer to Simulation Rating Forms in Appendix H, *Supporting Aesthetics Information*). However, other views associated with the station could be affected if structures at the station and ancillary station features (e.g., fencing, railings) do not blend in views and may not meet the City of Livingston's goals to ensure that streetscapes are improved. Therefore, impacts on scenic quality due to conflicts with policies in the Livingston General Plan would be potentially significant due to implementation of the Livingston Station in the city of Livingston.

Atwater General Plan

A portion of the Ceres to Merced Extension Alignment would travel through Atwater and would be covered by the Atwater General Plan and municipal code, which contain policies that encourage that city gateways and views from SR 99 are enhanced and landscaped; scenic resources and scenic routes are protected and enhanced; landscaping is used to beautify streetscapes and city gateways; prominent circulation routes do not become degraded; lighting is minimized in business parks; and street trees are preserved (City of Atwater 2000).

The Ceres to Merced Extension Alignment would be built alongside an existing rail corridor that passes through a flat landscape in Atwater. This would be a minor visual expansion of existing conditions and would generally not affect vegetation along the alignment, alter the existing visual landscape, or affect the existing visual quality. Similarly, ancillary features associated with the proposed alignment (e.g., relocated railroad signals, safety gates, signal houses, power poles, relocated railroad crossings, and stop bar pavement markings) would not affect visual resources or the existing visual quality, because these are existing visual elements associated with the rail corridor that would be shifted slightly in or incrementally added to in the landscape. Therefore, the Proposed Project would not affect views from SR 99, degrade prominent circulation routes, or negatively affect scenic routes; would not detract from existing views in Atwater; and would be consistent with policies governing scenic resources in the city. Therefore, the Proposed Project would not conflict with the Atwater General Plan, and impacts would be less than significant.

Atwater Station Alternative

The Atwater Station Alternative is located in Atwater and would be covered by the Atwater General Plan and municipal code, which contain policies that encourage that city gateways and views from SR 99 are enhanced and landscaped; scenic resources and scenic routes are protected and enhanced; landscaping is used to beautify streetscapes and city gateways; prominent circulation routes do not become degraded; lighting is minimized in business parks; and street trees are preserved (City of Atwater 2000).

The Atwater Station Alternative would be built on parcels that are currently developed with commercial uses (auto repair shop, Atwater Feed, and an abandoned gas station and car wash) and the Atwater Transpo bus station. The only landscaping at the station and Main Parking Lot site is associated with the Atwater Transpo bus station, which would need to be removed to construct the station and associated parking. Similarly, the East Parking Lot is paved and includes an old, concrete building pad that would need to be removed to construct the parking lot. As shown in the "After Project" view of KOP 5 in Figure 3.1-6, the existing structures would be removed to construct the parking facilities and station platform for the station and would remove disjointed commercial uses and ensure that the site does not become blighted as the abandoned uses would deteriorate over time. As seen in the simulation, station platforms would not be a prominent visual feature associated with the station and landscaping would replace removed trees and increase the natural harmony of the area. This would create a view that is more visually cohesive compared to existing conditions and that integrates the rail corridor to the surrounding landscape. The station would also require fence installation for safety. If fencing is light gray, the color would act to limit views. Coloring the barrier in a dark color improves visibility through the barrier compared with a standard gray metal surface. The visual quality of KOP 5 would remain *moderate* (refer to Simulation Rating Forms in Appendix H, *Supporting Aesthetics Information*). However, other views associated with the station could be affected if structures at the station and ancillary station features (e.g., fencing, railings) do not blend in views and may not meet the City of Atwater's goals to ensure that views associated with SR 99, prominent circulation routes, and scenic routes are not negatively affected. Therefore, impacts on scenic quality due to conflicts with policies in the Atwater General Plan would be potentially significant due to implementation of the Atwater Station in the city of Atwater.

Mitigation Measures

Mitigation Measure AES-2.1 would apply to the Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, Merced Station, and Atwater Station Alternative to minimize impacts associated with vegetation removal and to improve visual quality associated with the facilities. Mitigation Measure AES-2.2 would apply to the Turlock Station and Merced Layover & Maintenance Facility to ensure that the pedestrian bridge and layover and maintenance facility are designed to be complementary to surrounding environments. Mitigation Measure AES-2.3 would apply to the Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, Merced Station, and Atwater Station Alternative to reduce visual impacts related to new overhead utilities. Mitigation Measure AES-2.4 would apply to the Turlock Station, Livingston Station, Merced Station, and Atwater Station Alternative to ensure that fencing and pedestrian bridge safety barriers are designed to be complementary to surrounding environments. Mitigation Measure AES-2.5 would apply to the Ceres to Merced Extension Alignment to replace removed vegetation along Caltrans-designated landscaped freeway segments.

Mitigation Measure AES-2.1: Landscape parking facilities and the Merced Layover & Maintenance Facility

Surface parking lots will be planted with trees and groundcovers to improve project aesthetics and to provide shade. If space allows, street trees will also be planted in association with surface parking lots, parking structures, or along major public streets associated with the Merced Layover & Maintenance Facility. Shrubs may also be used if space allows. All landscaping will be designed to ensure passenger safety (e.g., ensuring that security cameras and safety lighting are not obscured). No invasive plant species will be used under any circumstances. In addition, plant palettes will utilize drought-tolerant plant species and should have a strong emphasis on California native plant species that are appropriate for the given site. An irrigation and maintenance program will be implemented during the plant establishment period and carried on, as needed, to ensure plant survival. However, design of the landscaping plan will maximize the use of planting zones that are water efficient. Landscaped areas will be irrigated with a smart watering system that evaluates the existing site conditions and plant material against weather conditions to avoid overwatering of such areas. To avoid undue water flows, the irrigation system will be managed in such a manner that any broken spray heads, pipes, or other components are fixed within 1 to 2 days, or the zone or system will be shut down until it can be repaired.

Mitigation Measure AES-2.2: Apply aesthetic design treatments to pedestrian bridges over tracks, bridges with visibility to residents and recreationists, and to the Merced Layover & Maintenance Facility

The Project will implement an aesthetic design treatment for new pedestrian bridges over tracks, bridges with high visibility, and to the Merced Layover & Maintenance Facility buildings. Choosing earth-toned colors for the surfaces will be less distracting to viewers than light or brightly colored surfaces. In general, light buff/tan or light gray colors stand out more than darker colors such as darker browns, red-browns, and warm grays that have the ability to complement the surrounding vegetation. The design motif applied to structures will reflect a combination of naturally colored surfaces and surfaces that are textured to appear as natural materials (e.g., rock or cobble) or that incorporates a design theme (e.g., wildlife and plants of local, native oak woodlands; traditional architectural elements such as inset panels; or other design reflecting local heritage or environment) using form liners. This will reduce visual monotony, soften verticality, reduce glare, and be more visually pleasing to viewers than plain surfaces for exterior facing barriers and girders on bridges that will be visible to traffic or recreational viewers passing under the overcrossing, decking, abutments and side supports, and columns. Nearby examples of such treatments include the I-5/French Camp interchange in Stockton and the SR 99/Sheldon Road overcrossing in Elk Grove. Non-local examples include Maryland 216 in Prince Georges County, Maryland; US 54/East Kellogg Drive and South Oliver Street interchange in Wichita, Kansas; and Roberts Road Bridge in Los Gatos, California. Roughened surfaces would soften the verticality of the surfaces by providing visual texture and reducing the amount of smooth surface that can reflect light. Designing the Merced Layover & Maintenance Facility to recede into views would reduce the overall apparent scale of the facility so that it blends better in views.

Mitigation Measure AES-2.3: Underground new utilities

Where feasible, SJRRC will underground new utilities to minimize their visual intrusion upon the landscape. Undergrounding new utilities will not be used where implementation would constitute an adverse impact on sensitive habitats or sensitive species that would outweigh the reduction of visual effects. In such cases, the Project engineer will identify site-specific location adjustments to avoid mature trees and to strategically locate new transmission lines along designated scenic routes in a manner that reduces the visual impacts on scenic resources and views along those routes. Implementation of this measure will minimize the effects on existing visual quality and character that would result from removal and pruning of mature vegetation along proposed new transmission lines. This measure will reduce the number of trees and shrubs that will be removed because of the installation of transmission lines and development of access roads.

Mitigation Measure AES-2.4: Apply aesthetic surface treatments to fencing and pedestrian bridge safety barriers

New fencing and pedestrian bridge safety barriers will be colored or painted a shade that is two to three shades darker than the general surrounding area. Colors will be chosen from the U.S. Department of the Interior, Bureau of Land Management Standard Environmental Colors Chart CC-001: June 2008. Because color selection will vary by location, the facility designer will employ the use of color panels evaluated from key observation points during common lighting conditions (front light versus backlighting) to aid in the appropriate color selection. Color selection will be made for the coloring of the most prevalent season. Panels will be a minimum of 3 feet by 2 feet in dimension and will be evaluated from various distances within 1,000 feet to ensure the best possible color selection.

All paints used for the color panels and structures will be color matched directly from the physical color chart, rather than from any digital or color-reproduced versions of the color chart. Paints will be of a dull, flat, or satin finish to reduce potential for glare, and the use of glossy paints for surfaces will be avoided. Appropriate paint type will be selected for the finished structures to ensure longer durability of the painted surfaces. The appropriate operating agency or organization will maintain the paint color over time.

Mitigation Measure AES-2.5: Replace disturbed vegetation along landscaped freeways

SJRRC or its contractor(s) will work with the appropriate Caltrans district landscape architect to determine if disturbed portions of landscaped freeways require replanting and to what extent. At a minimum, trees and shrubs will be replaced at a 1:1 ratio. Container sizes and species will be determined in coordination with the appropriate Caltrans district landscape architect. Disturbed groundcovers will be replanted to match existing groundcovers unless the Caltrans district landscape architect specifies otherwise. Irrigation of replacement plants will also be coordinated with the appropriate Caltrans district landscape architect as watering may occur with existing irrigation systems or irrigation may need to be installed. Any irrigation lines that are damaged within the state ROW as a result of construction will also be replaced per Caltrans standards and in coordination with the appropriate Caltrans district landscape architect. No invasive plant species will be planted under any circumstances.

Significance with Application of Mitigation

Mitigation Measure AES-2.1 would reduce impacts associated with vegetation removal and the appearance of paved lots for the Proposed Project by ensuring that parking facilities and streets are landscaped and blend with the surrounding environment. Mitigation Measure AES-2.2 would apply aesthetic design treatments to the pedestrian bridge for the Turlock Station and buildings associated with the Merced Layover & Maintenance Facility to ensure that visual conditions are improved. Mitigation Measure AES-2.3 would ensure that new overhead utilities are placed underground for new stations and would reduce visual impacts related to new overhead utilities. Mitigation Measure AES-2.4 would apply aesthetic surface treatments to fencing and pedestrian bridge safety barriers associated with the Proposed Project and would ensure that fencing and safety barriers blend with the surrounding environment. Mitigation Measure AES-2.5 would replace any vegetation damaged by the Ceres to Merced Extension Alignment along the Caltrans-designated landscaped freeway segment of SR 99. Implementation of Mitigation Measures AES-2.1 through AES-2.5 would minimize impacts of the Proposed Project on the scenic quality of urbanized areas and conflicts with applicable zoning and regulations to a less than significant level.

For the same reasons as the Proposed Project, implementation of Mitigation Measures AES-2.1, AES-2.3, and AES-2.4 would minimize impacts of the Atwater Station Alternative on the scenic quality of urbanized areas and conflicts with applicable zoning and regulations to a less than significant level.

Comparison of the Proposed Livingston Station and the Atwater Station Alternative

Construction of the Atwater Station Alternative would occur in an area where there is a higher concentration of sensitive viewers compared to the proposed Livingston Station. Residential viewers could have operational activities occurring adjacent to their homes, or nearby, which may evoke a negative response due to the proposed visual changes. Nonetheless, the Atwater Station Alternative and the proposed Livingston Station would both result in a less than significant impact after mitigation.

Impact AES-3	Proposed Project operations would not substantially degrade the existing visual character or quality of public views the site and its surroundings in a non-urbanized area, including scenic vistas.
Level of Impact	**Less than significant impact** Proposed Project Ceres to Merced Extension Alignment (in non-urbanized areas) **No impact** Proposed Project Ceres to Merced Extension Alignment (in urbanized areas) Merced Layover & Maintenance Facility Turlock Station Livingston Station Merced Station Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative

Impact Characterization and Significance Conclusion

Proposed Project

Portions of the Proposed Project would be located within urbanized areas of Ceres, Keyes, Turlock, Delhi, Livingston, Atwater, Fergus, and Merced. Thus, these portions of the Ceres to Merced Extension Alignment, the proposed stations (Turlock Station, Livingston Station, and Merced Station), and the Merced Layover & Maintenance Facility would have no visual impact on non-urbanized areas. There are no stations proposed in non-urbanized areas. However, much of the Proposed Project (Ceres to Merced Extension Alignment) falls within non-urbanized areas.

As identified in Table 3.1-1, there are several Caltrans-designated landscaped freeways within view of the Proposed Project. Appendix H, *Supporting Aesthetics Information*, includes a preliminary screening of landscaped freeways within 3 miles of the environmental footprint to determine the components requiring further analysis. As identified in this table, there are no segments of the Ceres to Merced Extension Alignment that would affect landscaped freeways in non-urbanized areas.

Visual changes resulting from operation of the Proposed Project within non-urbanized areas would affect residential viewers, roadway travelers, and recreationists adjacent to the Proposed Project. The intensity of the impact would vary depending on number of viewers present, proximity of viewers to the alternative, degree of physical change in the landscape, visibility of the physical change and alternative, volume of train traffic, and required maintenance.

The Ceres to Merced Extension Alignment would be adjacent to rural residential and rural commercial uses that border the tracks in non-urbanized areas. SR 99 is a prominent transportation corridor that parallels the existing tracks for much of the length. Local roadways, aboveground utility infrastructure (utility poles with lines), and fencing contribute to the cultural environment. Rural development along the rail corridor is common to the valley cultural landscape. The Ceres to Merced Extension Alignment would be mostly at-grade (except for waterbody crossings) within the UPRR ROW adjacent to SR 99. Thus, the tracks themselves would be consistent with and would not adversely change the existing visual character of the UPRR ROW and would not change the visual character of adjacent areas.

The Ceres to Merced Extension Alignment would require modification of a number of at-grade crossings, existing overhead structures, and installation of new single-track bridge structures over waterbodies. Because the new track would be at the same grade as the existing track, the top elevation of modified overhead structures would not be higher than existing overhead structures. New bridges would also be constructed for the Ceres to Merced Extension Alignment, including bridges in non-urbanized areas over the Merced River, Canal Creek, Weber Canal, and Irrigation Canal. The existing bridges lack aesthetic design treatments and have a substantial amount of graffiti. The new bridges would be visually similar to the adjacent and existing single-track bridge, located mostly in between SR 99 and frontage roads, and would not negatively affect the current aesthetics at the site.

Relocated railroad signals, safety gates, and power poles would not affect visual resources or the existing visual quality in non-urbanized areas, because these are existing visual elements that would be shifted slightly in the landscape. Relocating railroad crossing and stop bar pavement markings would shift existing pavement markings and would not affect visual resources or visual quality in non-urbanized areas. Installing concrete crossing panels adjacent to existing concrete crossing panels in the roadway surface would be consistent with the existing roadway conditions and would

not alter visual resources or affect visual quality in non-urbanized areas. No signal houses are proposed to be built or relocated in non-urbanized areas.

The Proposed Project would require routine vegetation maintenance in the UPRR ROW, along the environmental footprint. Viewers may see vegetation-clearing activities. Because farming, rail, and road maintenance are prevalent in the AVE, these activities and equipment within the UPRR ROW would not likely constitute a visual impact.

Overall, operations of the Proposed Project (due to Ceres to Merced Extension Alignment) would result in visual changes that would have little effect on adjacent rural residential viewers, roadway travelers, and recreationists. These visual changes would be in keeping with the existing visual landscape and would be a less-than-significant impact.

Atwater Station Alternative

The Atwater Station Alternative would be located within the urbanized area of Atwater. Thus, the Atwater Station Alternative would have no visual impact on non-urbanized areas. There would be no difference in impacts between the Atwater Station Alternative and the proposed Livingston Station (both would result in no impact).

Impact AES-4	Proposed Project operations could substantially damage scenic resources within a state scenic highway.
Level of Impact	**Potentially significant impact** Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative **Less than significant impact** Proposed Project Ceres to Merced Extension Alignment in Atwater **No impact** Proposed Project Ceres to Merced Extension Alignment outside of Atwater Merced Layover & Maintenance Facility Turlock Station Livingston Station Merced Station
Mitigation Measures	AES-2.1: Landscape parking facilities AES-2.3: Underground new utilities AES-2.4: Apply aesthetic surface treatments to fencing and pedestrian bridge safety barriers
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization and Significance Conclusion

There are no officially designated and eligible State Scenic Highways within 3 miles of the environmental footprint. In addition to State Scenic Highways, county- and city-designated scenic roadways are considered in this analysis. There are no county-designated scenic roadways within view of the Proposed Project; however, there are city-designated scenic roadways in the cities of

Atwater and Merced. Appendix H, *Supporting Aesthetics Information*, lists the city-designated scenic routes within 3 miles of the Proposed Project and identifies the routes that have been screened for analysis.

Proposed Project

Ceres to Merced Extension Alignment (in Merced), Merced Layover & Maintenance Facility, Turlock Station, Livingston Station, and Merced Station

As identified in Appendix H, *Supporting Aesthetics Information*, city-designated scenic routes are only located in Atwater and Merced. As indicated by the screening analysis, the Ceres to Merced Extension Alignment, Merced Layover & Maintenance Facility, and Merced Station are located away from and would not have views of city-designated scenic routes within Merced; therefore, these proposed facilities would have no impact on scenic routes in Merced. The Turlock Station and Livingston Station are not located in Atwater or Merced and would, therefore, have no impact on scenic routes.

Ceres to Merced Extension Alignment (in Atwater)

As identified in Appendix H, *Supporting Aesthetics Information*, the Ceres to Merced Extension Alignment in Atwater would cross, parallel, or pass near and would be visible from the following city-designated scenic roadways: Atwater Boulevard, First Street, Shaffer Road, Winton Way, Broadway from Winton Way to First Street, Buhach Road, Third Street, and entrances to the city of Atwater. As described under Impact AES-2, the Ceres to Merced Extension Alignment in Atwater would all be built along existing rail segments, alongside an existing rail corridor that passes through a flat, urbanized landscape. This would be a minor visual expansion of existing conditions and would generally not alter the existing visual landscape or affect the existing visual quality associated with associated scenic roadways in Atwater. The impacts on scenic highways from the Ceres to Merced Extension Alignment in Atwater would be less than significant.

Overall, the impact on scenic highways from the Proposed Project would be less than significant.

Atwater Station Alternative

As identified in Appendix H, *Supporting Aesthetics Information*, the Atwater Station Alternative would be visible from the following city-designated scenic roadways: Atwater Boulevard, First Street, Winton Way, Broadway from Winton Way to First Street, Third Street, and entrances to the City in Atwater near the station. The Atwater Station Alternative would all be built along the existing rail segment, on parcels that are currently developed with commercial uses and the Atwater Transpo bus station. As shown in the "After Project" view of KOP 5 in Figure 3.1-6, the existing structures would be removed to construct the parking facilities and station platform for the station and would remove disjointed commercial uses and ensure that the site does not become blighted as the abandoned uses would deteriorate over time. As seen in the simulation, station platforms would not be a prominent visual feature associated with the station, and landscaping would replace removed trees and increase the natural harmony of the area. This would create a view that is more visually cohesive compared to existing conditions and that integrates the rail corridor to the surrounding landscape. The station would also require fence installation for safety. If fencing is light gray, the color would act to limit views. Coloring the barrier in a dark color improves visibility through the barrier compared with a standard gray metal surface. The visual quality of KOP 5 would remain *moderate* (refer to Simulation Rating Forms in Appendix H). However, other views

associated with the station could be affected if structures at the station and ancillary station features (e.g., fencing, railings) do not blend in views and may affect views from the scenic routes. Therefore, impacts on scenic highways from the Atwater Station Alternative would be potentially significant.

Mitigation Measures

Mitigation Measure AES-2.1 would apply to the Atwater Station Alternative to minimize impacts associated with vegetation removal and to improve visual quality associated with the facilities. Mitigation Measure AES-2.3 would apply to the Atwater Station Alternative to reduce visual impacts related to new overhead utilities. Mitigation Measure AES-2.4 would apply to the Atwater Station Alternative to ensure that fencing is designed to be complementary to surrounding environments.

Mitigation Measure AES-2.1: Landscape parking facilities and the Merced Layover & Maintenance Facility

Refer to measure description under Impact AES-2.

Mitigation Measure AES-2.3: Underground new utilities

Refer to measure description under Impact AES-2.

Mitigation Measure AES-2.4: Apply aesthetic surface treatments to fencing and pedestrian bridge safety barriers

Refer to measure description under Impact AES-2.

Significance with Application of Mitigation

Implementation of Mitigation Measure AES-2.1 would reduce impacts associated with vegetation removal and the appearance of paved lots for the Atwater Station Alternative by ensuring that parking facilities and streets are landscaped, blend with the surrounding environment, and improve views from scenic routes. Implementation of Mitigation Measure AES-2.3 would ensure that new overhead utilities are placed underground for the Atwater Station Alternative and would reduce visual impacts related to new overhead utilities. Implementation of Mitigation Measure AES-2.4 would apply aesthetic surface treatments to fencing and pedestrian bridge safety barriers associated with Atwater Station Alternative and would reduce impacts by ensuring that fencing and safety barriers blend with the surrounding environment. Implementation of Mitigation Measures AES-2.1, AES-2.3, and AES-2.4 would minimize impacts of the Atwater Station Alternative on scenic routes to a less than significant level.

Comparison of the Proposed Livingston Station and Atwater Station Alternative

The proposed Livingston Station is not located near any scenic routes. Therefore, the Atwater Station Alternative is the station most likely to impact scenic routes. The Atwater Station Alternative is expected to result in a less than significant impact after mitigation on scenic routes, compared to the proposed Livingston Station, which would have no impact on scenic routes.

Impact AES-5	Proposed Project operations could create a new source of substantial light or glare that would adversely affect day or nighttime views.
Level of Impact	**Potentially significant impact** Proposed Project Merced Layover & Maintenance Facility Turlock Station Livingston Station Merced Station Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative **Less than significant impact** Proposed Project Ceres to Merced Extension Alignment
Mitigation Measures	AES-2.1: Landscape parking facilities AES-2.2: Apply aesthetic design treatments to pedestrian bridges over tracks and bridges with visibility to residents and recreationists AES-5.1: Apply minimum lighting standards
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Proposed Project

Ceres to Merced Extension Alignment

No nighttime lighting is proposed along the Ceres to Merced Extension Alignment. Incremental increases in glare would occur along areas where trees and shrubs are removed to accommodate construction of the Ceres to Merced Extension Alignment. However, these changes would not substantially increase glare because vegetation outside the UPRR ROW would remain to shade the corridor. The new bridge structures would create new surfaces to reflect light. The new bridge structures would be made of steel and concrete, which would not substantially increase glare due to the nature of the material. The bridges would remain visible, but they would also create a source of shade over waterways (e.g., Merced River), which would result in a slight reduction in glare coming from the waterway's surface. Safety lighting at at-grade crossings would only be used when trains are passing and would not result in a notable increase in lighting in the area during the short activation time. The Ceres to Merced Extension Alignment would introduce a small source of light from the train headlights when traveling at night. Train headlights are a pre-existing condition along the existing tracks and train headlights from the Proposed Project would constitute a nominal increase in passing trains and would not increase light in any one location for more than a few moments as the trains pass. In addition, the trains would move through the AVE at a high speed and would not introduce a fixed source of new lighting that would affect sensitive viewer groups. Therefore, light and glare impacts resulting from the Ceres to Merced Extension Alignment would be less than significant.

Merced Layover & Maintenance Facility

Nighttime lighting could occur at the Merced Layover & Maintenance Facility and could include standard lighting or LED lighting for security purposes that could affect sensitive receptors if not properly designed. Such lighting could result in significant impacts if the lighting spilled outside the site boundaries, creating a new source of nuisance lighting or glare for adjacent sensitive viewers. LED lights can negatively affect humans by increasing nuisance light and glare, in addition to increasing ambient light glow, if proper shielding is not provided and blue-rich white light lamps (BRWL) are used (American Medical Association 2016; International Dark-Sky Association 2010a, 2010b, 2015). Studies have found that a 4000 Kelvin (K) white LED light causes approximately 2.5 times more pollution than high pressure sodium lighting with the same lumen output, which would affect sensitive receptors, and more than double the perceived brightness of the night sky (Aubé et al. 2013; Falchi et al. 2011, 2016). Therefore, the use of BRWL LED lighting would amplify impacts and result in a substantial source of nighttime light and glare that could negatively impact nighttime views in the area. Such lighting could spill outside the site boundaries, creating a new source of nuisance lighting or glare for adjacent sensitive viewers. Lighting associated with the Merced Layover & Maintenance Facility, including from access roads and outdoor standard lighting would result in potentially significant increases in nighttime lighting if not properly designed, creating light spill and a new source of nuisance lighting and glare for adjacent sensitive viewers. BRWL LED lighting would amplify impacts and result in potentially significant impacts.

Turlock Station, Livingston Station, and Merced Station

The Turlock Station, Livingston Station, and Merced Station would include new station platforms and new parking areas where none presently exist. As shown on simulations for KOPs 2 through 4, Figures 3.1-3 through 3.1-5, new lights would be installed to light the stations and associated facilities. None of these stations would include new station terminals or buildings; therefore, there would be no new interior building lighting associated with the stations. Parking lot, access road, platform, and pedestrian overcrossing lighting could include standard lighting or LED lighting for security purposes that could affect sensitive receptors if not properly designed. As described above for the Merced Layover & Maintenance Facility, BRWL LED lighting can negatively affect humans by increasing nuisance light and glare, in addition to increasing ambient light glow and more than doubling the perceived brightness of the night sky, if proper shielding is not provided. Therefore, the use of BRWL LED lighting would amplify impacts and result in a substantial source of nighttime light and glare that could negatively impact nighttime views in the area. This would result in light and glare impacts that would be potentially significant.

Atwater Station Alternative

Similar to the Livingston Station, the Atwater Station Alternative would include new station platforms and new parking areas where none presently exist. As shown on the simulation for KOP 5, Figure 3.1-6, new lights would be installed to light the station and associated facilities. A new station terminal or building would not be constructed; therefore, there would be no new interior building lighting associated with the station. Parking lot, access road, and platform lighting could include standard lighting or LED lighting for security purposes that could affect sensitive receptors if not properly designed. As described above for the Merced Layover & Maintenance Facility, BRWL LED lighting can negatively affect humans by increasing nuisance light and glare, in addition to increasing ambient light glow and more than doubling the perceived brightness of the night sky, if proper shielding is not provided. Therefore, the use of BRWL LED lighting would amplify impacts

and result in a substantial source of nighttime light and glare that could negatively impact nighttime views in the area. This would result in light and glare impacts that would be potentially significant.

Mitigation Measures

Mitigation Measure AES-2.1 would apply to the Turlock Station, Livingston Station, Merced Station, Merced Layover & Maintenance Facility, and Atwater Station Alternative to minimize light and glare impacts associated with vegetation removal and to provide new sources of light screening and shade. Mitigation Measure AES-2.2 would apply to the Turlock Station to ensure that bridges are designed to be complementary to surrounding environments and would not result in light and glare impacts. Mitigation Measure AES-5.1 would apply to the Turlock Station, Livingston Station, Merced Station, Merced Layover & Maintenance Facility, and Atwater Station Alternative to ensure that changes to nighttime light and glare would be nominal compared to existing conditions with these facilities.

Mitigation Measure AES-2.1: Landscape parking facilities and the Merced Layover & Maintenance Facility

Refer to measure description under Impact AES-2.

Mitigation Measure AES-2.2: Apply aesthetic design treatments to pedestrian bridges over tracks and bridges with visibility to residents and recreationists

Refer to measure description under Impact AES-2.

Mitigation Measure AES-5.1: Apply minimum lighting standards

All artificial outdoor lighting will be limited to safety and security requirements, designed using Illuminating Engineering Society's design guidelines and in compliance with International Dark-Sky Association approved fixtures. All lighting is designed to have minimum impact on the surrounding environment and will use downcast, cut-off type fixtures that direct the light only towards objects requiring illumination. Shielding will be utilized, where needed, to ensure light pollution is minimized. Therefore, lights will be installed at the lowest allowable height and cast low-angle illumination while minimizing incidental light spill onto adjacent properties, open spaces, or backscatter into the nighttime sky. The lowest allowable illuminance level will be used for all lighted areas, and the number of nighttime lights needed to light an area will be minimized to the highest degree possible. Light fixtures will have non-glare finishes that will not cause reflective daytime glare. Lighting will be designed for energy efficiency and have daylight sensors or be timed with an on/off program. Lights will provide good color rendering with natural light qualities with the minimum intensity feasible for security, safety, and personnel access. Lighting, including light color rendering and fixture types, will be designed to be aesthetically pleasing.

All LED lighting will avoid the use of BRWL lamps and use a correlated color temperature that is no higher than 3,000 Kelvin (International Dark-Sky Association 2010a, 2010b, 2015). Wherever possible and pragmatic, SJRRC or its contractor(s) will use fixtures and lighting control systems that conform to the International Dark-Sky Association's Fixture Seal of Approval program. In addition, LED lights will use shielding to ensure nuisance glare and light spill do not affect sensitive residential viewers.

Luminaires will be chosen for the ability to provide horizontal and vertical beam control for better control in directing what is illuminated. Luminaires will also incorporate photometric reflector systems that are designed to reduce light pollution. Lights in parking lots and along pathways and station platforms will employ shielding to minimize offsite light spill, ambient light glow, and glare and be screened and directed away from residences and adjacent uses to the highest degree possible. The number of nighttime lights used will be minimized to ensure that spaces are not unnecessarily over-lit, while still maintaining minimum adequate lighting to provide necessary visibility for security. For example, the amount of light can be reduced by limiting the amount of ornamental light posts to higher-use areas and by using bollard lighting on travel way portions of pathways.

Technologies to reduce light pollution evolve over time and design measures that are currently available may help but may not be the most effective means of controlling light pollution once the Project is designed. Therefore, all design measures used to reduce light pollution will employ the technologies available at the time of Project design to allow for the highest potential reduction in light pollution.

Significance with Application of Mitigation

Mitigation Measure AES-5.1 would ensure that the change to existing nighttime light and glare levels relative to parking lots, access roads, and platform lighting at the Turlock Station, Livingston Station, and Merced Station are nominal. Mitigation Measure AES-5.1 would also ensure that the change to existing nighttime light and glare levels relative to lighting at the Merced Layover & Maintenance Facility are nominal. Implementation of Mitigation Measure AES-2.1 would ensure that trees are planted to provide a source of shade to reduce glare and to filter nighttime lighting and reduce impacts from the Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station. Implementation of Mitigation Measure AES-2.2 would ensure that aesthetic treatments are applied to the visible pedestrian bridge structure and building facades and would decrease glare and reduce impacts from the Turlock Station and the Merced Layover & Maintenance Facility. Implementation of Mitigation Measures AES-2.1, AES-2.2, and AES-5.1 would minimize impacts from light and glare to a less than significant level.

For the same reasons as the Proposed Project, implementation of Mitigation Measures AES-2.1 and AES-5.1 would minimize impacts of the Atwater Station Alternative from light and glare to a less than significant level.

Comparison of the Proposed Livingston Station and Atwater Station Alternative

Construction of the Atwater Station Alternative would result in the same light and glare impacts as described for the proposed Livingston Station. However, the Atwater Station Alternative would be located in an area where there is a higher concentration of sensitive viewers. Residential viewers would be exposed to nuisance light and glare spill emanating from station and parking lot lighting, which could result in a substantial increase in nighttime light and glare. Nonetheless, both the proposed Livingston Station and the Atwater Station would result in a less than significant impact after implementation of mitigation.

3.1.5.3 Overall Comparison of the Proposed Livingston Station and Atwater Station Alternative

Because the Atwater Station Alternative would occur in an area with a higher concentration of sensitive viewers than the proposed Livingston Station, the Atwater Station Alternative would have a slightly greater impact on aesthetics, including temporary construction impacts, permanent impacts on scenic quality due to implementation of the Project, and light and glare impacts. In addition, because the Atwater Station Alternative would be located near city-designated scenic roadways and the proposed Livingston Station would not be located near any scenic roadways, the Atwater Station Alternative would have a slightly greater impact on aesthetics due to impacts on scenic resources.

Overall, both the Atwater Station Alternative and the proposed Livingston Station would have a moderate negative impact[3] on aesthetics resources; however, the Atwater Station Alternative would have a slightly greater impact on aesthetic resources compared to the proposed Livingston Station.

[3] The comparison between the Atwater Station Alternative and the proposed Livingston Station is summarized in Table 5-2 in Chapter 5, *Alternatives*. Aesthetics impacts are compared using a scale. Both the Atwater Station Alternative and the proposed Livingston Station were identified to have a Scale 4 impact (moderate negative impact).

3.2 Agricultural Resources

3.2.1 Introduction

This section describes the regulatory and environmental setting for agricultural resources in the vicinity of the Proposed Project and the Atwater Station Alternative. It also describes the impacts on agricultural resources that would result from implementation of the Proposed Project and the Atwater Station Alternative and mitigation measures that would reduce significant impacts, where feasible and appropriate. Appendix I, *Supporting Agricultural Resources Information*, contains additional technical information for this section.

Cumulative impacts on agricultural resources, in combination with planned, approved, and reasonably foreseeable projects, are discussed in Chapter 5, *Other CEQA-Required Analysis*.

3.2.2 Regulatory Setting

This section summarizes the federal, state, regional, and local regulations related to agricultural resources and applicable to the Proposed Project.

3.2.2.1 Federal

There are no federal regulations related to agricultural resources relevant to this analysis.

3.2.2.2 State

California Land Conservation Act (Williamson Act)

The California Land Conservation Act, also known as the Williamson Act, was adopted in 1965 to encourage the preservation of the state's agricultural lands and prevent their premature conversion to urban uses. The Williamson Act established an agricultural preserve contract program by which any county or city within the state may tax a landowner at a lower rate, using a scale that is based on the actual use of the land for agricultural purposes, as opposed to its unrestricted market value. In return for a reduced tax rate, the owner guarantees that the property remains under agricultural production for a 10-year period. The contract is automatically renewed on an annual basis until the property owner indicates a desire to terminate the contract. Enrollment in the program is voluntary.

The California Department of Conservation has oversight responsibility for Williamson Act Program administration and compliance. However, the local government is authorized to adopt rules to govern the administration of agricultural preserves. Each county's rules for administering their agricultural preserves under the Williamson Act Program are discussed under Impact AG-3 in Section 3.2.4, *Impact Analysis*.

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 (California Government Code [Cal. Gov. Code] 51290–51295).

- Federal, state, or local public improvements and improvements of public utilities, and the acquisition of land, should not be located in agricultural preserves.

- Public improvements that are in agricultural preserves should be located on land other than land under Williamson Act contract.
- 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 of the value to the public of land, particularly prime agricultural land, in an agricultural preserve.

In 1998, the state passed the Farmland Security Zone (FSZ) Act, sometimes known as the Super Williamson Act. Under the law, farmers can receive an additional 35 percent reduction in the land's value for property tax purposes. To earn the additional tax reduction, farmers must agree to keep their land in the conservation program for 20 years, twice as long as required by the Williamson Act. Stanislaus and Merced Counties do not participate in the FSZ program.

Farmland Mapping and Monitoring Program

The California Department of Conservation administers the Farmland Mapping and Monitoring Program (FMMP), which evaluates the quality of farmlands throughout the state. The suitability of local soil resources plays a crucial part in FMMP's farmland classifications. FMMP uses U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) soil survey information, land inventories, and monitoring criteria to classify most of the state's agricultural regions into five agricultural and three nonagricultural land types. Every 2 years, FMMP publishes this information in its Important Farmland map series. The five agricultural land classifications are as follows.

- **Prime Farmland—**Lands with the best combination of physical and chemical features that are able to sustain long-term production of agricultural crops. The land must be cropped and supported by a developed irrigation water supply that is dependable and of adequate quality during the growing season. Land must have been used for production of irrigated crops at some time during the two update cycles prior to the mapping date.
- **Farmland of Statewide Importance**—Lands that are similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. These lands have the same reliable sources of adequate-quality irrigation water available during the growing season. Land must have been used for production of irrigated crops at some time during the two update cycles prior to the mapping date.
- **Unique Farmland**—Lower-quality soils that are used for the production of the state's leading agricultural crops. These lands are usually irrigated but may include non-irrigated orchards or vineyards, as found in some climatic zones of California. Land must have produced crops at some time during the two update cycles prior to the mapping date.
- **Farmland of Local Importance**—Land of importance to the local agricultural economy, as determined by each county's board of supervisors and local advisory committees. These lands can cover a broad range of agricultural uses, which are identified by a local advisory committee convened in each county by FMMP, in cooperation with NRCS, and the county board of supervisors. This category of lands may include confined animal agriculture facilities, at the discretion of each county.
- **Grazing Lands**—Lands of at least 40 acres on which the existing vegetation is suited to the grazing of livestock.

The first three categories (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) are considered *Important Farmland* and also meet the definition of Farmland land under California Environmental Quality Act (CEQA) Section 21060.1. While CEQA does not define Farmland of Local Importance as Important Farmland or require impacts on this farmland type to be analyzed, the analysis in this environmental document considers Farmland of Local Importance to be Important Farmland, consistent with the FMMP categorization. This analysis follows the definition under FMMP in order to provide a more conservative analysis.

California Farmland Conservancy Program Act

The California Farmland Conservancy Program (California Public Resources Code [Cal. Public Res. Code] 10200–10277.) 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 landowner retains all farmland use authority, but the farmland is restricted in its ability to be subdivided or used for nonagricultural purposes, such as urban uses.

Sustainable Communities and Climate Protection Act of 2008

Senate Bill (SB) 375, the Sustainable Communities and Climate Protection Act of 2008 (Chapter 728, Statutes of 2008), provides a new planning process to coordinate community development and land use planning with regional transportation plans (RTP) in an effort to reduce sprawling land use patterns and dependence on private vehicles, and thereby reduce vehicle miles traveled and greenhouse gas (GHG) emissions associated with vehicle miles traveled. SB 375 is one major tool being used to meet the goals in Assembly Bill 32, the Global Warming Solutions Acts (Chapter 488, Statutes of 2006). Under SB 375, the California Air Resources Board (ARB) sets GHG emission reduction targets for 2020 and 2035 for the metropolitan planning organizations (MPO) in the state. The 2020 reduction target for the Stanislaus Council of Governments is a 12 percent reduction in per capita GHG emissions; the 2035 target is a 16 percent reduction. The 2020 reduction target for the Merced County Association of Governments is a 10 percent reduction in per capita GHG emissions; the 2035 target is a 14 percent reduction. Each MPO must then prepare a *sustainable communities strategy* as part of its RTP that meets the GHG emission reduction targets set by ARB. If the RTP cannot meet the targets, then the MPO must adopt a separate *alternative planning strategy* instead of the sustainable communities strategy. The alternative planning strategy is adopted separately from the RTP and does not need to reflect the fiscal constraints that otherwise apply to the transportation investments identified in the RTP.

Urban sprawl is one of the greatest pressures on agricultural land conversion to urban uses. One of the objectives of the Sustainable Communities and Climate Protection Act of 2008 is to help curb urban sprawl and keep agricultural lands in agricultural use.

3.2.2.3 Regional and Local

The San Joaquin Regional Rail Commission (SJRRC), a state joint powers agency, proposes improvements inside and outside of the Union Pacific Railroad (UPRR) right-of-way (ROW). The

Interstate Commerce Commission Termination Act (ICCTA) affords railroads engaged in interstate commerce considerable flexibility in making necessary improvements and modifications to rail infrastructure, subject to the requirements of the Surface Transportation Board.[1] ICCTA broadly preempts state and local regulation of railroads, and this preemption extends to the construction and operation of rail lines. As such, activities within the UPRR ROW are clearly exempt from local building and zoning codes and other land use ordinances. However, facilities located outside of the UPRR ROW, including proposed stations, the proposed Merced Layover & Maintenance Facility, and the Atwater Station Alternative would be subject to regional and local plans and regulations. Though ICCTA does broadly preempt state and local regulation of railroads, SJRRC intends to obtain local agency permits for construction of facilities that fall outside of the UPRR ROW even though SJRRC has not determined that such permits are legally necessary and such permits may not be required.

Appendix G of this EIR, *Regional Plans and Local General Plans*, provides a list of applicable goals, policies, and objectives from regional and local plans of the jurisdictions in which the Proposed Project improvements would be located. Section 15125(d) of the CEQA Guidelines requires an environmental impact report (EIR) to discuss "any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans." These plans were considered during the preparation of this analysis and were reviewed to assess whether the Proposed Project would be consistent with the plans of relevant jurisdictions.[2] The Proposed Project would be generally consistent with the applicable goals, policies, and objectives related to agricultural resources identified in Appendix G.

3.2.3 Environmental Setting

This section describes the environmental setting related to agricultural resources for the Proposed Project. The Atwater Station Alternative would be located in an urban area and would not affect agricultural resources; therefore, this environmental setting description does not discuss this alternative. For the purposes of this analysis, the study area for agricultural resources is defined as follows.

- Direct: The direct study area for agricultural resources includes the environmental footprint.
- Indirect: The indirect study area for agricultural resources includes adjacent parcels that would be affected by the Proposed Project.

Figures 3.2-1 through 3.2-3 depict the Important Farmlands in the environmental footprint.

This section begins with a general discussion of regional agriculture, agricultural productivity by county, farmland conversion and protection by county, and farmland infrastructure and processes. Following this discussion, a detailed description of the agricultural resources in the study area is presented and includes information regarding the occurrence of farmlands and confined animal facilities in the vicinity of the Proposed Project.

[1] ACE operates within a ROW and on tracks owned by the UPRR, which operates interstate freight rail service in the same ROW and on the same tracks.

[2] An inconsistency with regional or local plans is not necessarily considered a significant impact under CEQA, unless it is related to a physical impact on the environment that is significant in its own right.

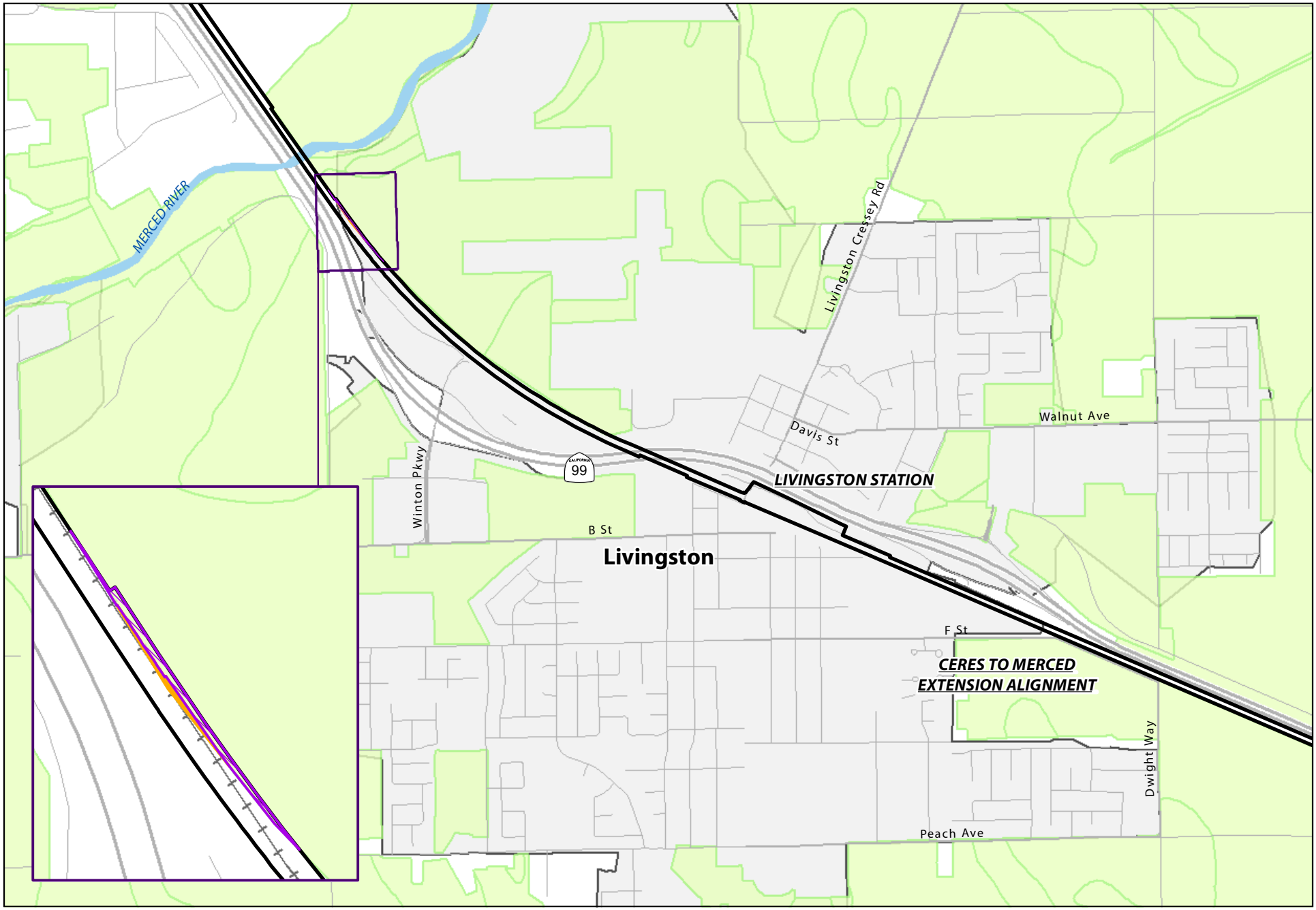


Figure 3.2-1
Important Farmlands
ACE Ceres-Merced Extension Project

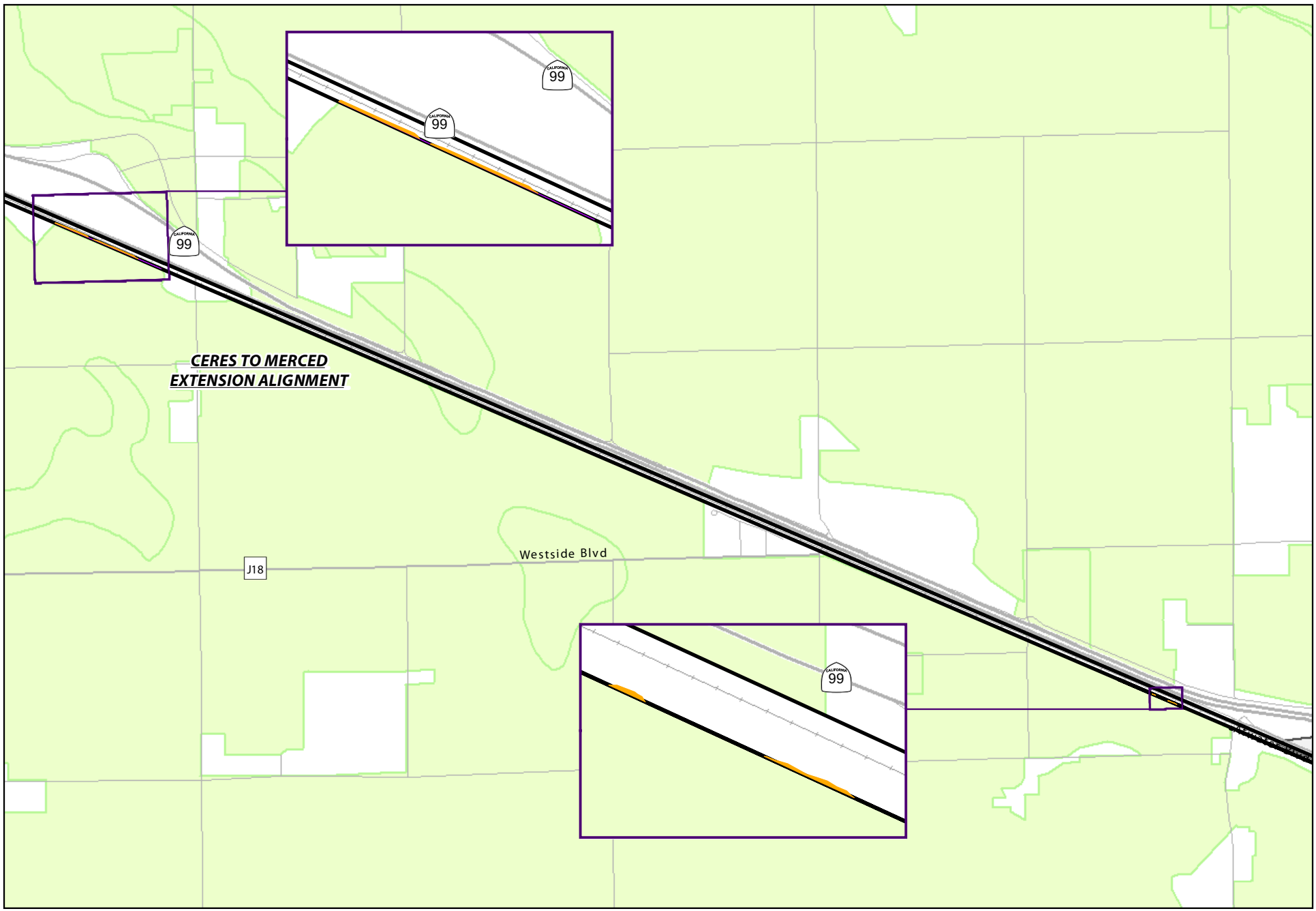


Figure 3.2-2
Important Farmlands
ACE Ceres-Merced Extension Project

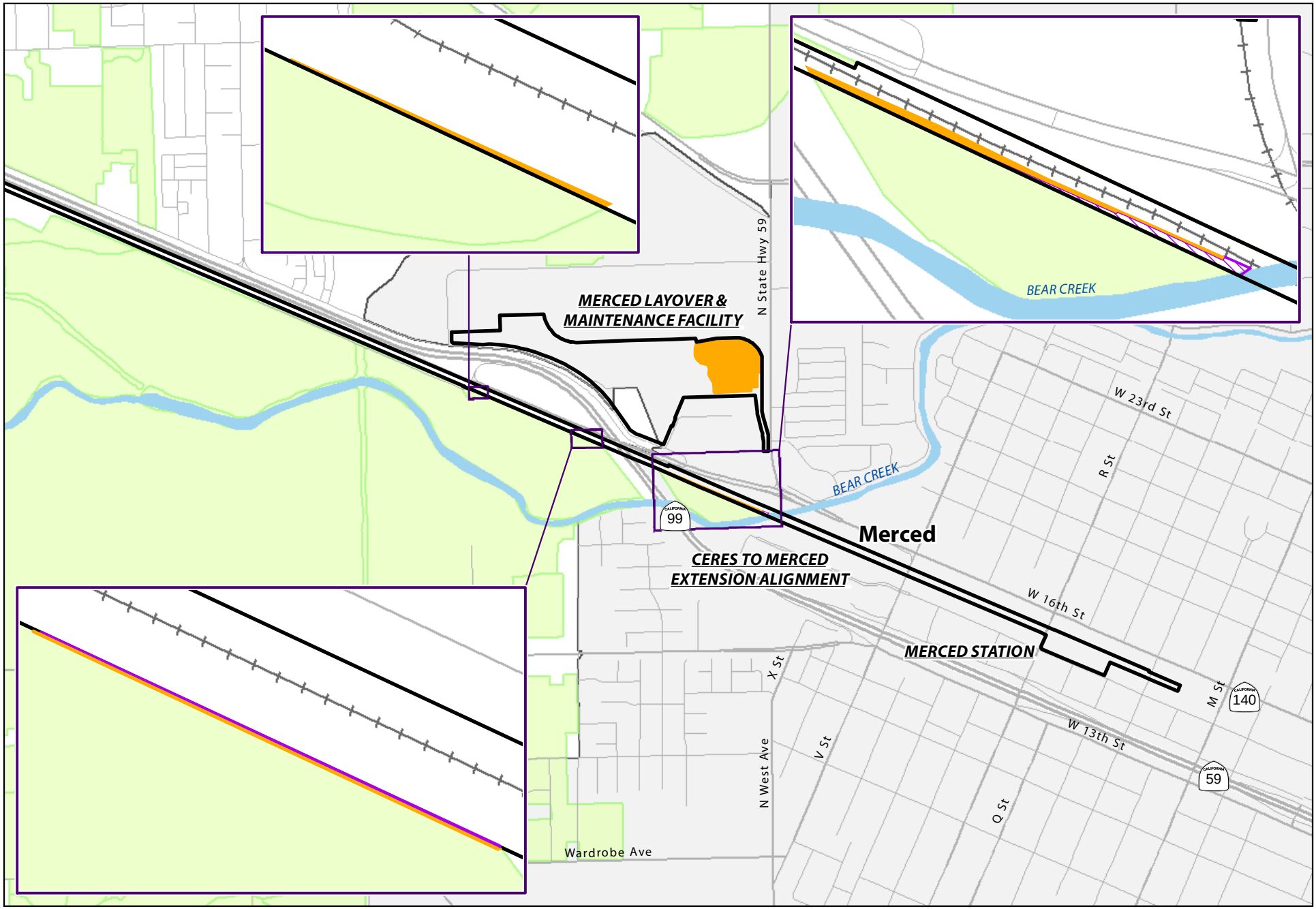


Figure 3.2-3
Important Farmlands
ACE Ceres-Merced Extension Project

The information presented in this section was obtained from the following sources.

- Location of Important Farmlands: California Department of Conservation 2020a, 2020b.
- Location of farmlands in protected status under Williamson Act or FSZ: county assessor's offices (County of Stanislaus 2020, County of Merced 2020). The location of farmlands in protected status under Williamson Act or FSZ was identified by verifying with the Stanislaus and Merced County assessor's offices in 2020 that the data available had not been changed. Merced County verified that no lands have been added to the program since 2009 and Stanislaus County identified that the latest data was from 2015 and did not identify any changes to that data.
- Location of land under agricultural conservation easement: California Conservation Easement Database (CCED) (California Conservation Easement Database 2020), National Conservation Easement Database (NCED) (National Conservation Easement Database 2020).
- Location of confined animal facilities and associated wastewater disposal land data: Central Valley Regional Water Quality Control Board (Central Valley Water Board), Confined Animal Facility Program (Central Valley Regional Water Quality Control Board 2018).
- Agricultural productivity based on county farm bureau data: County annual agriculture reports (Merced County Department of Agriculture 2019, Stanislaus County Agricultural Commissioner 2019).
- RTPs/Sustainable Community Strategies (Stanislaus Council of Governments 2018, Merced County Association of Governments 2018)
- Local jurisdiction general plans: (City of Atwater 2000; City of Ceres 2018; City of Livingston 1999; City of Merced 2012; City of Turlock 2012; Merced County 2013a, 2013b; Stanislaus County 2016a, 2016b).
- Agricultural census data: U.S. Census Bureau (U.S. Department of Agriculture 2017).
- Trends in conversion of agricultural land in the Central Valley: FMMP conversion reports and summaries (California Department of Conservation 2016a, 2016b, 2018), General Plan agriculture elements (County of Stanislaus 2016b, County of Merced 2013b); and reports by American Farmland Trust (Freedgood et al. 2020, American Farmland Trust 2007 and 2013).

3.2.3.1 Regional Agriculture

The Proposed Project is located within Stanislaus and Merced Counties. The study area has an agricultural heritage and California, in general, has a history of substantial agricultural productivity. The study area is an important place in producing agricultural products for California, the United States, and for export.

The San Joaquin Valley is the state's largest agricultural area. Many of the state's most agriculturally productive counties, including Stanislaus and Merced Counties, are in the San Joaquin Valley. Agricultural products produced in these three counties include almonds, grapes, tomatoes, several types of stone fruit (such as nectarines and peaches), milk, eggs, and cattle/calves (Merced County Department of Agriculture 2018; Stanislaus County Agricultural Commissioner 2019). Almonds are a key regional crop; 80 percent of the world's almonds come from California, primarily from the San Joaquin Valley (Almond Board of California 2013). Approximately 1.6 million bee colonies pollinate the Central Valley's almonds during the 2- to 4-week pollination period. California currently has approximately 1,500 dairies (California Department of Food and Agriculture 2015), although the

trend has been toward fewer and smaller dairies over the past several years (California Department of Food and Agriculture 2019). More than 400 of these dairies are in Stanislaus and Merced Counties.

According to FMMP data, more than 1,600,000 acres of Important Farmland as defined by FMMP are in Stanislaus and Merced Counties combined (California Department of Conservation 2020a, 2020b).[3] In addition, approximately 1,500,000 acres of Grazing Land and 40,000 acres of Confined Animal Agriculture are within the two counties.[4] FMMP defines Grazing Land as land that has existing vegetation suitable for the grazing of livestock (California Department of Conservation 2019); it does not qualify as Important Farmland. In both counties, common practice is to fence grazing areas to prevent livestock from crossing major transportation corridors. Confined Animal Agriculture also does not qualify as Important Farmland, although some counties include animal facilities within the definition of Farmland of Local Importance.

There is a long-standing trend of conversion of agricultural land to nonagricultural purposes across California, including in the Central Valley (Freedgood et al. 2020; American Farmland Trust 2013, 2007). Conservation of agricultural land to prevent conversion to nonagricultural uses is a priority for many Central Valley counties. For example, both Stanislaus County and Merced County use agricultural mitigation required by local ordinance, Williamson Act contracts (and Farmland Security Zone contracts in Stanislaus County), and farmland conservation programs managed by noncounty agencies that acquire and hold conservation easements (County of Stanislaus 2016b, County of Merced 2013b).

The following sections discuss agricultural resources and productivity, preservation of agricultural resources, and farm infrastructure and processes by county.

Stanislaus County

Agricultural Resources

Stanislaus County is substantially agricultural but is in many areas undergoing rapid urbanization (California Department of Conservation 2016a, County of Stanislaus 2016b, Freedgood et al. 2020, American Farmland Trust 2013). Table 3.2-1 presents the Important Farmland and Grazing Land acreage in the county for 1996, 2006, and 2016, showing the overall change in agricultural lands in the county over this period.

Table 3.2-1. Stanislaus County—Important Farmland and Grazing Land (acres)[a]

Type of Agricultural Land	1996	2006	2016	2018
Prime Farmland	170,048	256,605	249,967	250,420
Farmland of Statewide Importance	27,832	29,925	33,172	33,042
Unique Farmland	49,042	75,444	116,210	121,930
Farmland of Local Importance	38,140	33,706	26,029	23,058

[3] FMMP defines Important Farmland as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance.

[4] Confined Animal Agriculture is not recognized as a separate category in all counties; some counties consider confined animal agriculture as falling within an Important Farmland or other category.

Type of Agricultural Land	1996	2006	2016	2018
Total Important Farmland	**285,062**	**395,680**	**425,378**	**428,450**
Grazing Land	116,640	441,436	404,405	400,541

Sources: California Department of Conservation 2018.
[a] Data from the most recently available year is from 2018.

Near the study area in Stanislaus County, the land is dominated by Important Farmland outside the urban centers of Ceres, Keyes, and Turlock. Much of the Important Farmland in the county is Prime Farmland. Pockets of Unique Farmland also occur in the county (California Department of Conservation 2018).

Agricultural Productivity

In 2017, 3,621 farms occupied 722,546 acres in Stanislaus County, with an average farm size of 200 acres and a median size of 21 acres (U.S. Department of Agriculture 2017). Approximately 56 percent of farmland was devoted to crops and approximately 34 percent was orchard. Other uses, including animal husbandry, accounted for approximately 10 percent of total farmland. According to the *2018 Stanislaus County Agricultural Report*, in order of sales value, the most important agricultural commodities in Stanislaus County in 2018 were almonds, milk, chicken, cattle and calves, nursery fruit and nut trees and vines, silage (all), walnuts, almond pollination (bees), turkeys, and peaches (Stanislaus County Agricultural Commissioner 2019). The land use development policies of the county and its cities encourage new development within the cities rather than on unincorporated agricultural lands. Although the overall amount of agricultural land has increased (Table 3.2-1), conversion still occurs within and adjacent to the county's urbanized areas.

Agricultural Preservation

As discussed in Section 3.2.2.2, *State*, the Williamson Act provides a mechanism to keep agricultural land in productive agricultural use by providing tax incentives. Table 3.2-2 presents the acreage of farmland protected under Williamson Act contracts in Stanislaus County.

Table 3.2-2. Stanislaus County—Land under Williamson Act and Farmland Security Zone Contracts (acres)[a]

Type of Contract	Renewal	Non-renewal
Williamson Act	649,472	2,969
Farmland Security Zone[b]	n/a	n/a
Total	**649,472**	**2,969**

Source: County of Stanislaus 2020.
[a] Data from the most recently available year is from 2015.
[b] Stanislaus County does not participate in the Farmland Security Zone Program.

In addition, agricultural conservation easements are lands that have been dedicated to agricultural use under the California Farmland Conservancy Program Act (Cal. Public Res. Code §§ 10200–10277). The term *agricultural conservation easement* means an interest in land, less than fee simple, that represents the right to prevent the development or improvement of the land for any purpose other than agricultural production. The easement is granted for the California Farmland Conservancy Program by the owner of a fee simple interest in land to a local government, nonprofit organization, resource conservation district, or a regional park or open-space district or regional

park or open-space authority that has the conservation of farmland among its stated purposes or as expressed in the entity's locally adopted policies.[5] It is granted in perpetuity and runs with the land.

No agricultural conservation easements exist in the study area in Stanislaus County (California Conservation Easement Database 2020; National Conservation Easement Database 2020).

Farm Infrastructure and Processes

Farm infrastructure typically includes irrigation and drainage systems, field access roads, power distribution systems, storage structures (e.g., silos and barns), and residences. Many of the croplands in the study area rely on irrigation canals present in the area. In the San Joaquin Valley, a grid of roads provides access to parcels throughout the valley. Agricultural productivity relies on each of these infrastructure elements to be able to perform its function reliably. If the irrigation system, for instance, is disrupted, access is cut off; if utilities are interrupted, productivity can fall.

Confined animal agriculture properties, such as dairies and heifer ranches, include areas for forage crop production (e.g., corn). The forage crop areas associated with confined animal agriculture receive dairy waste in accordance with a nutrient management plan to dispose of solid and liquid waste in a manner that protects water quality. The requirements of the nutrient management plan include nutrient balance, manure containment, and application of the waste at an appropriate agronomic rate and under permit from the Central Valley Water Board. Herd size and the soil type of the receiving area tend to drive the amount of forage area needed to manage the nutrients from a dairy.

Although weather conditions such as temperature and wind affect crop production, farmers schedule agricultural management and operations to help maximize yields. For example, farmers apply chemicals to extend blooms of bee-pollinated trees to increase the pollination potential. Depending on the crop and the application, ground-level spray rigs and crop dusters are used to apply pesticides and other chemicals. In accordance with Federal Aviation Regulations 137, Agricultural Aircraft Operations, and the California Code of Regulations (Cal. Code Regs.), Division 6, Pesticides and Pest Control Operations, aircraft apply some pesticides when the wind speed and direction are favorable to avoid dispersing chemicals beyond the target area.

Merced County

Agricultural Resources

Merced County is substantially agricultural but, in many areas, is undergoing rapid urbanization (California Department of Agriculture 2016b, County of Merced 2013b, Freedgood et al. 2020, American Farmland Trust 2013). Important Farmland and Grazing Land acreage in 1996, 2006, and 2016 is presented in Table 3.2-3, showing the overall change in agricultural lands in the county over this period.

[5] A fee simple interest in land is a permanent and absolute tenure in an estate of land with freedom to possess it, to use it, and dispose of it at will.

Table 3.2-3. Merced County—Important Farmland and Grazing Land (acres) [a]

Type of Agricultural Land	1996	2006	2016
Prime Farmland	288,415	272,095	269,243
Farmland of Statewide Importance	159,788	153,249	154,209
Unique Farmland	93,580	104,418	115,235
Farmland of Local Importance	51,241	59,851	61,671
Total Important Farmland	**593,024**	**589,613**	**600,358**
Grazing Land	583,709	569,829	552,632

Source: California Department of Conservation 2016a

[a] Data from the most recently available year is from 2016.

Near the study area in Merced County, the land is dominated by Important Farmland outside the urban centers of Delhi, Livingston, Atwater, and Merced. The eastern and western parts of the county are natural vegetation. In the agricultural center of the county, Farmland of Statewide Importance is predominant in the north around Delhi and Livingston; Prime Farmland is predominant around Atwater; and Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance all occur around Merced (California Department of Conservation 2016a).

Agricultural Productivity

In 2017, 2,337 farms occupied 946,386 acres in Merced County, with an average farm size of 405 acres and a median size of 40 acres (U.S. Department of Agriculture 2017). Approximately 57 percent of farmland was devoted to crops and 19 percent to orchards. Other uses, including animal husbandry, accounted for approximately 24 percent of total farmland. According to the *Merced County 2018 Report on Agriculture*, in order of sales value, the most important agricultural commodities in Merced County in 2016 were milk, almonds, cattle and calves, sweet potatoes, tomatoes, silage (corn), hay, eggs and chicken, turkeys, and all nursery products. (Merced County Department of Agriculture 2019).

Agricultural Preservation

As discussed in Section 3.2.2, the Williamson Act provides a mechanism to keep agricultural land in productive agricultural use by providing tax incentives. Table 3.2-4 presents the acreage of farmland protected under Williamson Act contracts in Merced County.

Table 3.2-4. Merced County—Land under Williamson Act and Farmland Security Zone Contracts (acres)[a, b]

Type of Contract	Renewal	Non-renewal
Williamson Act	443,067	1,765
Farmland Security Zone	n/a	n/a
Total	**443,067**	**1,765**

Source: County of Merced 2020.

n/a = not applicable

[a] Merced County does not participate in the Farmland Security Zone Program.

[b] Data from the most recently available year is from 2009.

As discussed in Section 3.2.2.2, *State*, under *California Farmland Conservancy Program Act*, agricultural conservation easements are lands that have been dedicated to agricultural use.

One agricultural conservation easement overlaps with the study area in Merced County: Humboldt Ranch (California Conservation Easement Database 2020; National Conservation Easement Database 2020). The easement is held by the Central Valley Farmland Trust. Other agricultural conservation easements near the study area (less than 0.5 mile) in Merced County are located within Cole Farm, Flora/Graser Farm, and Cochrane Farm, and are also held by the Central Valley Farmland Trust.

Farm Infrastructure and Processes

The same farm infrastructure and processes described for Stanislaus County are also applicable to Merced County.

3.2.3.2 Agriculture in the Environmental Footprint

The Proposed Project is located in Stanislaus and Merced Counties in an area that has historically strong agricultural roots. The Proposed Project passes through Urban and Built-Up Land around Keyes, Turlock, Delhi, Livingston, Atwater, and Merced, but between these urban centers, the Proposed Project passes through agricultural lands.

As shown in Figures 3.2-1 through 3.2-3, portions of the Proposed Project environmental footprint (Ceres to Merced Extension Alignment and the Merced Layover & Maintenance Facility) are located in areas identified as Important Farmlands. Portions of the Ceres to Merced Extension Alignment would be located on land mapped as Williamson Act land and adjacent to an agricultural easement (Humboldt Ranch); however, please refer to Impact AG-2, which explains why the Proposed Project would not affect these agricultural lands. In addition, there are seven parcels containing permitted confined animal facilities located within 2,500 feet of the Ceres to Merced Extension Alignment.

3.2.4 Impact Analysis

This section describes the environmental impacts of the Proposed Project and the Atwater Station Alternative on agricultural resources. This section also describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. Measures to mitigate significant impacts are provided, where appropriate.

3.2.4.1 Methods for Analysis

Methods

The methods used to evaluate impacts on agricultural resources are described below.

- Temporary and permanent impacts, related to temporary use and conversion of Important Farmland during construction and operations, were evaluated quantitatively.
- Impacts on agricultural lands protected through land protection mechanisms (Williamson Act Lands) were analyzed quantitatively.
- Noise and vibration impacts and impacts on capital improvements at confined animal facilities were evaluated through a mixed quantitative and qualitative approach. The Central Valley Water Board provided partial data for permitted wastewater disposal lands for confined animal

facilities in its jurisdiction. The dataset, however, was still in development at the time of this document's writing and was thus incomplete. Accordingly, project analysts relied on interpretation of color aerial photos to identify confined animal facilities as well as wastewater disposal lands. Specifically, analysts assumed that where there are discrete parcels that are dark green in color (indicating the application of high nitrogen fertilizer such as cattle wastes) adjoining an identified confined animal facility, those dark green parcels are wastewater disposal lands. Because this determination is based on an assumption, the method is an approximation.

- Impacts associated with the potential conversion of agricultural to nonagricultural use due to parcel severance were analyzed quantitatively to identify remnant parcels of Important Farmland that were potentially unviable for continued agricultural use. Potentially unviable remnant parcels were defined as those remnants less than 20 acres. In addition, these potentially unviable remnant parcels were analyzed qualitatively to determine whether they were actually viable for continued agricultural use because of adjacency to other Important Farmland parcels or whether they do not qualify as unviable remnants because either (1) the existing parcels are within the UPRR ROW and not used for agricultural productivity or (2) the existing parcels are already smaller than 20 acres.
- Impacts on utilities, utility access roads to agricultural fields, power supply infrastructure, and irrigation distribution canals supporting agricultural uses were analyzed qualitatively.

Principle Sources

Principle sources consulted for the impact analysis are listed below.

- Analysis of Important Farmland temporary use and permanent conversion used FMMP 2020 County GIS data (to identify Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance) (California Department of Conservation 2020a, 2020b).[6]
- Analysis of impacts on lands protected under Williamson Act and FSZ contracts used data provided from County assessor's records (Willmon pers. comm.).
- Analysis of impacts on lands protected under agricultural conservation easement, including California Farmland Conservancy Program easements and California Conservancy Program easements, used data provided by CCED (2020).
- Analysis of impacts related to confined animal facility and wastewater disposal lands used data from the Central Valley Water Board (Central Valley Regional Water Quality Control Board 2018).
- Analysis of partial parcel acquisitions used Geographic information system (GIS) aerial maps, assessor's parcel maps, and ROW data.

Important Farmland Mapped Within the UPRR ROW

The environmental footprint for the Ceres to Merced Extension Alignment is located within the UPRR ROW. Although agricultural activities would not be expected to occur within the UPRR ROW,

[6] The GIS data for Important Farmland was downloaded in 2020 based on the most recent available data. The Important Farmland data for Stanislaus County was compiled in 2018 and the Important Farmland data for Merced County was compiled in 2016.

the mapping of Important Farmland from the California Department of Conservation includes areas mapped as Important Farmland within the UPRR ROW. The following methodology was used to assess the impacts on Important Farmland from the Ceres to Merced Extension Alignment:

- ICF environmental staff identified the areas mapped as Important Farmland by the California Department of Conservation that overlapped with the environmental footprint of the Ceres to Merced Extension Alignment.
- Using aerial imagery, ICF environmental staff evaluated the areas mapped as Important Farmland to identify the following areas:
  - *Areas mapped as Important Farmland within the environmental footprint that are actually areas with existing UPRR railroad tracks and ballast*. Because these areas would not meet the definition of Important Farmland (see Section 3.2.2.2), this analysis excluded these areas when calculating impacts to Important Farmlands.
  - *Areas mapped as Important Farmland within the environmental footprint that are located next to areas where two railroad tracks currently exist*. In these areas, construction would be limited to work within the existing tracks and ballast. As identified above, areas with existing tracks and ballast would not meet the definition of Important Farmland. As such, areas mapped as Important Farmland within the environmental footprint that are located next to areas where two railroad tracks currently exist, would not impact Important Farmland. As such, this analysis excluded these areas when calculating impacts to Important Farmlands.
  - *Other areas not meeting the definition of Important Farmland.* ICF environmental staff reviewed aerial imagery, including historical aerial imagery for the remaining areas mapped as Important Farmland within the environmental footprint. Based on this review, several of these areas have not been used for production of irrigated crops in recent years and are characteristic of railroad shoulders or roadway shoulders. These areas would not meet the definition of Important Farmland. As such, this analysis excluded any of these areas that did not meet the definition of Important Farmland when calculating impacts to Important Farmlands.

3.2.4.2 Thresholds of Significance

The CEQA Guidelines Appendix G (14 Cal. Code Regs. 15000 et seq.) has identified significance criteria to be considered for determining whether a project could have significant impacts on agricultural resources.

An impact would be considered significant if construction or operation of the project would have any of the following consequences.

- Convert Important Farmland, as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use.
- Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract.

- Convert farmland to nonagricultural use as a result of noise and vibration impacts on confined farm animals.[7]
- Create unviable remnant or severed farmland parcels.[8]
- Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use.

3.2.4.3 Impacts and Mitigation Measures

Impact AG-1	Construction and operation of the Proposed Project could convert Important Farmlands to nonagricultural use.
Level of Impact	**Potentially significant impact** Proposed Project Ceres to Merced Extension Alignment Merced Layover & Maintenance Facility **No impact** Proposed Project Turlock Station Livingston Station Merced Station Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative
Mitigation Measures	AG-1.1: Avoid Important Farmlands and Restore Important Farmlands used for temporary staging areas AG-1.2: Conserve Important Farmlands (Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance)
Level of Impact After Mitigation	**Significant and unavoidable impact**

[7] The discussion of impacts related to conversion of farmland as a result of noise and vibration impacts has been included in this section as an individual topic area. Noise and vibration at excessive levels can result in loss of productivity amongst confined animals (e.g., feedlot, dairy). Animals can become startled or frightened, or simply annoyed, by the noise and vibration associated with passing trains.

[8] The discussion of impacts related to creation of remnant parcels/severed parcels has been included in this section as an individual topic area. The acquisition of ROWs can reduce the size of or split existing parcels of land. This can indirectly result in the permanent conversion of the remnant parcels from agricultural use when the remnant parcels are too small by themselves to farm economically and area located where they cannot be readily accessed by an adjacent farmer. The latter precludes an adjacent farmer from purchasing or leasing the remnant as an addition to their existing agricultural operation.

Impact Characterization

Construction of the Proposed Project would require the temporary use of Important Farmlands. Land that has been identified for temporary use would be leased from the landowner (through a temporary conservation easement) and temporarily removed from agricultural use for the duration of construction. In addition, permanent conversion of Important Farmlands to nonagricultural use would potentially occur where the Proposed Project is located on Important Farmlands currently being used for agricultural purposes. Both temporary use of agricultural lands and permanent conversion of agricultural land to nonagricultural uses would result in no impact for some Proposed Project facilities and a potentially significant impact for other Proposed Project facilities.

Impact Details and Conclusions

Proposed Project

Turlock Station, Livingston Station, and Merced Station

The Turlock Station, Livingston Station, and Merced Station are not located on lands identified as Important Farmlands and no Important Farmland would be used for construction or permanently converted to nonagricultural uses. Thus, no impact would result from the Turlock Station, Livingston Station, and Merced Station.

Ceres to Merced Extension Alignment

As described in Section 3.2.4.1, *Methods for Analysis*, there are areas mapped as Important Farmland within the environmental footprint of the Ceres to Merced Extension Alignment, but some of these lands are actually used for railroad purposes and/or have not been used as farmland in recent years and thus would not meet the definition of Important Farmland. Nonetheless, there are certain areas located within the environmental footprint of the Ceres to Merced Extension Alignment that are being used for agricultural purposes (see Tables 1 and 4 of Appendix I). To be conservative, this EIR considers the potential impacts on agricultural resources to these areas.

Table 3.2-5 identifies the acreage and type of Important Farmland that would be temporarily removed from agricultural use for the duration of construction of the Ceres to Merced Extension Alignment. As shown in Table 3.2-5, construction of the Ceres to Merced Extension Alignment would require the temporary use of Important Farmland. If temporary staging areas are not immediately restored to former agricultural use (preconstruction condition) after construction, disruption in agricultural use may become permanent. Important Farmlands that are temporarily converted to nonagricultural uses through construction would be degraded for agricultural purposes and would be vulnerable to permanent conversion to nonagricultural uses, which is a potentially significant impact.

Table 3.2-5 also identifies the acreage and type of Important Farmland that would be permanently converted to nonagricultural use by the Ceres to Merced Extension Alignment. The numbers provided in Table 3.2-5 are a conservative estimate based on the review of aerial imagery to confirm that areas that would be permanently affected by the Proposed Project would meet the definition of Important Farmlands. Where mitigation may be identified for certain impacts requiring compensatory mitigation, the calculation will be based on subsequent estimates of actual impacts based on subsequent final design and may be less than estimated herein. Based on the analysis in

this EIR, the permanent conversion of Important Farmlands to nonagricultural use is a potentially significant impact.

Table 3.2-5. Important Farmland Temporarily Used During Construction and Potentially Permanently Converted to Nonagricultural Use by the Ceres to Merced Extension Alignment

	Important Farmland (acres)				
Impact Type	**Prime Farmland**	**Farmland of Statewide Importance**	**Unique Farmland**	**Farmland of Local Importance**	**Total**
Temporary	0.01	0.44	--	0.43	**0.9**
Permanent	0.32	0.10	--	0.57	**1.0**

Merced Layover & Maintenance Facility

Table 3.2-6 identifies the acreage and type of Important Farmland that would be permanently converted to nonagricultural use by the Merced Layover & Maintenance Facility. Appendix I provides the list of parcels containing Important Farmland that could potentially be affected permanently by the Merced Layover & Maintenance Facility. The impact from the Merced Layover & Maintenance Facility would be limited to the permanent impact in Table 3.2-6. There would be no temporary impacts associated with the Merced Layover & Maintenance Facility. The permanent conversion of Important Farmlands to nonagricultural use is a potentially significant impact.

Table 3.2-6. Important Farmland Potentially Permanently Converted to Nonagricultural Use by the Merced Layover & Maintenance Facility

	Important Farmland (acres)				
Impact Type	**Prime Farmland**	**Farmland of Statewide Importance**	**Unique Farmland**	**Farmland of Local Importance**	**Total**
Permanent	--	--	--	11.1	**11.1**

Atwater Station Alternative

The Atwater Station Alternative is not located on lands identified as Important Farmlands. Accordingly, no Important Farmland would be temporarily used for construction or permanently converted to nonagricultural uses. No impact would result from the Atwater Station Alternative. In addition, there is no difference between the proposed Livingston Station and the Atwater Station Alternative in terms of temporary use or permanent conversion of Important Farmland (both would result in no impact).

Mitigation Measures

Mitigation Measure AG-1.1 would apply to the Ceres to Merced Extension Alignment. Mitigation Measure AG-1.2 would apply to the Ceres to Merced Extension Alignment and Merced Layover & Maintenance Facility.

Mitigation Measure AG-1.1: Avoid Important Farmlands and Restore Important Farmlands used for temporary staging areas

Prior to any ground-disturbing activities, a qualified agricultural resources specialist will perform a field survey and evaluate that the areas identified in Table 1 of Appendix I, and confirm whether these areas would meet the definition of Important Farmland.

To the extent practical, SJRRC and its contractor(s) will avoid staging in areas that are actively being used for agricultural purposes. If areas with active agricultural uses cannot be avoided, then the following would be implemented. Prior to any ground-disturbing activities at the site of a temporary construction staging area located on Important Farmland, the contractor will prepare a restoration plan addressing specific actions, sequence of implementation, parties responsible for implementation and successful achievement of restoration for temporary impacts. Actions will include removing and stockpiling the top 18 inches of soil for replacement onsite during restoration activities. Before beginning construction use of sites on Important Farmland, the contractor will submit the restoration plan to the SJRRC for review and obtain approval and, if applicable, obtain landowner approval. The restoration plan will include time-stamped photo-documentation of the preconstruction conditions of all temporary staging areas.

All construction access, mobilization, material laydown, and staging areas on Important Farmlands will be returned to a condition equal to the preconstruction staging condition. This requirement is included in the design-build construction contract requirements.

Mitigation Measure AG-1.2: Conserve Important Farmlands (Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance)

Prior to any ground-disturbing activities, a qualified agricultural resources specialist will perform a field survey and evaluate that the areas identified in Table 4 of Appendix I, and confirm whether these areas would meet the definition of Important Farmland.

SJRRC will enter into an agreement with the Department of Conservation and its California Farmland Conservancy Program to implement agricultural land mitigation. SJRRC will fund the California Farmland Conservancy Program's work to identify suitable agricultural land for mitigation of impacts and to fund the purchase of agricultural conservation easements from willing sellers. The performance standards for this measure are to preserve Important Farmland in an amount commensurate with the quantity and quality of the converted farmlands, within the same agricultural regions as the impacts occur, at a replacement ratio of not less than 1:1 for Important Farmlands that are permanently converted to nonagricultural use by the Proposed Project.

SJRRC will document implementation of Mitigation Measure AG-1.2 through issuance of a compliance memorandum.

Significance with Application of Mitigation

Implementation of Mitigation Measures AG-1.1 and AG-1.2 would reduce impacts from temporary use or permanent conversion of Important Farmlands due to the Ceres to Merced Extension Alignment and Merced Layover & Maintenance Facility. Mitigation Measure AG-1.1 requires that Important Farmlands subject to temporary use during construction be avoided to the extent practical and if avoidance is not possible, to be restored to agricultural use after construction. For temporarily occupied lands, disruption of agricultural use would last only from the time land is leased from the landowner until restoration is complete. Mitigation Measure AG-1.2 would ensure that the overall permanent conversion of Important Farmlands to a nonagricultural use is minimized by requiring the preservation of Important Farmlands within the same agricultural regions as the impacts occur, in an amount commensurate with the quantity and quality of the converted farmlands.

Mitigation Measure AG-1.2 would reduce impacts from permanent conversion of Important Farmland as a result of direct use of the land by requiring purchase of agricultural conservation easements at a ratio of 1:1 for direct use of Important Farmland. This mitigation measure would be effective in minimizing the overall permanent conversion of Important Farmland to a nonagricultural use because it would preserve Important Farmland in an amount commensurate with the quantity and quality of the converted farmlands and within the same agricultural regions where the impacts would occur. However, because mitigation would not prevent conversion of Important Farmland, the impact from the Proposed Project would be significant and unavoidable.

Impact AG-2	Construction and operation of the Proposed Project would not conflict with a Williamson Act contract or other agricultural lands protection mechanism.
Level of Impact	**Less than significant impact**

Impact Characterization and Significance Conclusions

Proposed Project

Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station

The Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station are not located on parcels under Williamson Act contract. In addition, these proposed facilities are not located on parcels under agricultural conservation easement contract. No impact would occur from these proposed facilities.

Ceres to Merced Extension Alignment

There are six areas that are mapped as Williamson Act lands that are located within the footprint of the Ceres to Merced Extension Alignment. Based on review of aerial imagery, it was determined that these six mapped areas were (1) not being used for agricultural purposes and were characteristic of the shoulder of an active railroad track and/or (2) were located in areas where two railroad tracks currently exist and where construction would be limited to the existing tracks and ballast. As such, the Ceres to Merced Extension Alignment would not conflict with a Williamson Act contract and the impact would be less than significant. Please refer to Appendix I, which includes a list of these parcels.

In addition, a portion of the Ceres to Merced Extension Alignment is located on an area mapped as the Humboldt Ranch agricultural conservation easement. For the stretch of the Ceres to Merced Extension Alignment located next to the Humboldt Ranch agricultural conservation easement, two railroad tracks currently exist within the UPRR ROW. In these areas, construction would be limited to work within the existing tracks and ballast. As such, the Proposed Project would result in no impact on any agricultural uses associated with the Humboldt Ranch agricultural conservation easement.

In summary, the Proposed Project would have a less-than-significant impact on land under Williamson Act contract and no impact on land under agricultural conservation easement contract.

Atwater Station Alternative

The Atwater Station Alternative is not located on lands under Williamson Act or agricultural conservation easement contract. Accordingly, there would be no risk of affecting a contract established to preserve agricultural land. There would be no impact due to the Atwater Station Alternative. In addition, there would be no difference in impact between the proposed Livingston Station and the Atwater Station Alternative (both would result in no impact).

Impact AG-3	Construction and operation of the Proposed Project would not result in conversion of farmland through noise and vibration impacts on confined farm animals.
Level of Impact	**Less than significant impact** Proposed Project Ceres to Merced Extension Alignment **No impact** Proposed Project Turlock Station Livingston Station Merced Station Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative

Impact Characterization

Construction of the Proposed Project would generate noise and vibration from use of construction equipment and vehicles. Confined animals that are unable to walk away from the noise source would experience increased exposure to noise. Operation of the Proposed Project would also increase noise exposure through increased frequency of trains passing by confined animal facilities.

Noise and vibration can affect farm animal behavior and productivity and induce behavioral changes. Background levels in cattle barns range from 61 to 90 decibels (dB). The noise threshold expected to cause a behavioral response by cattle is 85 to 90 dB. Noises greater than threshold have provoked retreat, freezing, or strong startle response. Thresholds for discomfort for cattle has been noted at 90 to 100 dB, with physical damage to the ear occurring at 110 dB (Broucek 2014). Since background levels can range as high as 90 dB and the threshold for discomfort is 90 dB, if the Proposed Project would result in construction noise or new train operational noise levels greater

than 90 dB in areas that do not already experience train operations today, a significant impact is considered possible.

Impact Details and Conclusions

Proposed Project

Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station

The Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station are not located on lands that contain confined animal facilities; therefore, no confined animal facilities would be affected by construction or operations. No impact would occur from these proposed facilities.

Ceres to Merced Extension Alignment

There are seven parcels containing permitted confined animal facilities located within 2,500 feet of the Ceres to Merced Extension Alignment. As shown in Table 3.2-7, construction noise is not expected to exceed 90 dB at any of the animal holding facilities adjacent to the Ceres to Merced Extension Alignment. Operational noise is expected to be less than 70 dB at any of the animal holding facilities adjacent to the proposed UPRR ROW in this segment. Both construction and operational noise are below levels likely to cause substantial disruption to animals at these facilities.

Table 3.2-7. Confined Animal Facilities with Animal Holding Areas within 2,500 Feet of the Ceres to Merced Extension Alignment

Proposed Project	Facility Location	Distance from Track Centerline[a]	Approximate Noise Level at Holding Area[b, c]
Ceres to Merced Extension Alignment	North Washington Road, west of Fresno Subdivision (northwest of Turlock)	75 feet	Construction: <82 dB Operations: <68 dB
	Merced Avenue, west of Fresno Subdivision (southeast of Turlock)	1,500 feet	Construction: <60 dB Operations: <60 dB
	Collier Road, east of Fresno Subdivision (southeast of Delhi)	1,300 feet	Construction: <60 dB Operations: <60 dB
	Peach Avenue, west of Fresno Subdivision (southeast of Livingston)	120 feet	Construction: <76 dB Operations: <64 dB
	Gurr Road, east of Fresno Subdivision (southeast of Atwater)	540 feet	Construction: <64 dB Operations: <60 dB
	Franklin Road, west of Fresno Subdivision (northwest of Atwater)	155 feet	Construction: <76 dB Operations: <62 dB
	Griffith road, 1,000 feet west of Fresno Subdivision (Turlock)	850 feet	Construction: <61 dB Operations: <60 dB

[a] Some of these facilities utilize agricultural fields for disposal of animal waste that may be closer to the Proposed Project; impacts on such disposal fields is discussed under Impact AG-5.

[b] No pile driving would be necessary within close proximity to any of the confined facilities found near the Proposed Project construction location.

[c] Operational noise based on noise intervals in Section 3.12, *Noise and Vibration*.

Since the animal holding areas associated with confined animal facilities in proximity to the Ceres to Merced Extension Alignment are not in an area in which construction or operational noise would be expected to substantially alter confined animal health or behavior, impacts would be less than significant. Thus, the Ceres to Merced Extension Alignment would have a less-than-significant impact on confined animal facilities due to construction and operations noise.

Atwater Station Alternative

The Atwater Station Alternative is not located on or near lands that contain confined animal facilities; therefore, no confined animal facilities would be affected by project construction or operations. There would be no impact due to the Atwater Station Alternative. In addition, there would be no difference in impact between the proposed Livingston Station and the Atwater Station Alternative (both would result in no impact).

Impact AG-4	Construction of the Proposed Project would not create unviable remnant or severed parcels of Important Farmland.
Level of Impact	**Less than significant impact** Proposed Project Ceres to Merced Extension Alignment **No impact** Proposed Project Turlock Station Livingston Station Merced Layover & Maintenance Facility Merced Station Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative

Impact Characterization

Implementation of the Proposed Project could result in the creation of remnant parcels on Important Farmland due to severance from the original parcel. Some parcels could be severed from a larger parcel if the improvement bisects the parcel, and some parcels could be severed if roadway access would be restricted or eliminated, making them inaccessible to farm equipment. As discussed in Section 3.2.4.1, *Methods for Analysis*, remnant parcels smaller than 20 acres have the potential to be unfarmable because of lack of access, size, shape, location, or other hardship.

Impact Details and Conclusions

Proposed Project

Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station

The Turlock Station, Livingston Station, and Merced Station are not located on lands identified as Important Farmlands, and no remnant parcels of Important Farmland would be created. No impact would occur from these proposed facilities. The Merced Layover & Maintenance Facility is located

on Important Farmland. However, it would not result in the creation of remnant parcels of Important Farmland. No impact would occur from this proposed facility.

Ceres to Merced Extension Alignment

Table 3.2-8 presents the total acreage of remnant parcels smaller than 20 acres created by the Ceres to Merced Extension Alignment.

Table 3.2-8. Potential Important Farmland Parcel Severance (< 20 acres) as a Result of Construction of the Ceres to Merced Extension Alignment

	Severed Parcels		
Proposed Facility	**Acres**	**No. of Parcels**	**Create unviable parcels?**
Ceres to Merced Extension Alignment	104.2	27	No, (1) some remnant parcels are adjacent to larger farmable parcels; (2) some remnant parcels are in the UPRR ROW and not being used for agricultural purposes; and/or (3) all of the existing parcels are already smaller than 20 acres

As shown in Table 3.2-8, the Ceres to Merced Extension Alignment could result in the creation of remnant parcels of Important Farmland. The Ceres to Merced Extension Alignment could result in three different type of impacts. First, remnant parcels created by the Ceres to Merced Extension Alignment would be adjacent to larger farmable parcels and could still be viably farmed. Because the remnant parcels could still be viably farmed, this impact would be less than significant. Second, remnant parcels created by the Ceres to Merced Extension Alignment are located within the existing UPRR ROW and are currently being used for railroad operation and not for agricultural use. Impacts on these agricultural parcels would not affect the agricultural viability of a parcel because the parcel is not being used for agricultural purposes, and this impact would be less than significant. Third, some parcels that have been identified as being severed by the Ceres to Merced Extension Alignment are already smaller than 20 acres. Additional impacts on these parcels would not create unviable remnant parcels because they are already considered unviable, and this impact would be less than significant. Thus, overall, the Ceres to Merced Extension Alignment is not expected to result in additional loss of Important Farmland due to the severing of parcels and impacts would be less than significant.

Appendix I provides a list of parcels showing property-specific permanent impacts, including severed parcels. Because the impacts were found to be less than significant, these parcels were not identified in the figures prepared for this Agricultural Resources section.

Atwater Station Alternative

The Atwater Station Alternative is not located on lands identified as Important Farmlands. Accordingly, the Atwater Station Alternative would not result in remnant or severed parcels of Important Farmland. No impact would result from the Atwater Station Alternative. In addition, there would be no difference in impact between the proposed Livingston Station and the Atwater Station Alternative (both would result in no impact).

Impact AG-5	Construction and operation of the Proposed Project could involve other changes in the existing environment that, due to their location or nature, could result in conversion of farmland to nonagricultural use.
Level of Impact	**Potentially significant impact** Proposed Project Ceres to Merced Extension Alignment **No impact** Proposed Project Turlock Station Livingston Station Merced Station Merced Layover & Maintenance Facility Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative
Mitigation Measure	AG-5.1: Relocate irrigation facilities AG-5.2: Coordinate with utility providers
Level of Significance After Mitigation	**Less than significant impact**

Impact Characterization

Construction of the Proposed Project may temporarily disrupt utilities, utility access roads, and power supply infrastructure supporting existing agricultural uses if utilities must be relocated to accommodate construction activities. Further, construction of the Proposed Project may disrupt access to irrigation infrastructure supporting existing agricultural uses.

Impact Details and Conclusions

Proposed Project

Turlock Station, Livingston Station, and Merced Station

The Turlock Station, Livingston Station, and Merced Station are not located on lands identified as Important Farmlands and have no potential to disrupt agricultural infrastructure. In addition, no confined animal facilities are located at the Turlock Station, Livingston Station, and Merced Station. No impact would result from these proposed facilities.

Ceres to Merced Extension Alignment

The Ceres to Merced Extension Alignment is located on lands identified as Important Farmland. The acreage of Important Farmland is provided above in Table 3.2-5. Therefore, there is potential for these improvements to disrupt agricultural infrastructure onsite.

In addition, construction of the Ceres to Merced Extension Alignment could displace or sever confined animal facilities, resulting in displacement of capital improvements in confined animal facilities such as wastewater treatment ponds, milking facilities, feedlots, and associated conversion

of the land on which they are located; or in conversion of wastewater disposal croplands. Confined animal agriculture facilities consist of two types of lands: confined animal facilities where the confined animals are housed and fed and their wastewater processed, and the wastewater disposal croplands where wastewater is disposed of. Both types of facilities must be permitted by the Central Valley Water Board. The relocation or reconfiguration of capital improvements associated with confined animal agriculture operations could require undergoing a time-consuming process to obtain water quality permits to replace the lost facility. Precluding access to croplands that receive dairy wastewater would require modification of the affected dairy's waste management and nutrient management plans and could require farmers to pay for offsite waste disposal or reduce their herd sizes. Financial hardship as a result of modifying wastewater disposal permits or reducing herd size could jeopardize the commercial viability of a confined animal agriculture facility. Both types of effect could lead to temporary or long-term decreased agricultural production, dairy closure, and potential conversion of agricultural land to nonagricultural use.

There are seven parcels containing permitted confined animal facilities located within 2,500 feet of the Ceres to Merced Extension Alignment. Table 3.2-9 identifies confined animal facilities potentially affected by the Ceres to Merced Extension Alignment. At the facility southeast of Delhi, the potential encroachment area is 0.04 acre of a field potentially used for wastewater disposal of the total 155-acre field. The encroachment area does not contain noticeable capital improvements for the facility.

Table 3.2-9. Ceres to Merced Extension Alignment—Confined Animal Facilities Potentially Affected

Proposed Project	Facility Location	Distance from Track Centerline (feet)	Effect of Proposed Project on Facility
Ceres to Merced Extension Alignment	North Washington Road, west of Fresno Subdivision (northwest of Turlock)	75	No encroachment; Ceres to Merced Extension Alignment is on opposite side of Fresno Subdivision
	Merced Avenue, west of Fresno Subdivision (southeast of Turlock)	1,500	No encroachment; Ceres to Merced Extension Alignment is on opposite site of SR 99
	Collier Road, east of Fresno Subdivision (southeast of Delhi)	1,300	Possible 0.04-acre encroachment in fields used for wastewater treatment (out of 155 acres)
	Peach Avenue, west of Fresno Subdivision (southeast of Livingston)	120	No encroachment; Ceres to Merced Extension Alignment is on opposite side of Fresno Subdivision from Peach Avenue
	Gurr Road, east of Fresno Subdivision (southeast of Atwater)	540	No encroachment; Ceres to Merced Extension Alignment is on opposite side of SR 99
	Franklin Road, west of Fresno Subdivision (northwest of Atwater)	155	No encroachment; Ceres to Merced Extension Alignment is on opposite side of Fresno Subdivision
	Griffith road, 1,000 feet west of Fresno Subdivision (Turlock)	850	No encroachment; Ceres to Merced Extension Alignment is on opposite side of Fresno Subdivision

SR = State Route.

[a] No pile driving would be necessary within close proximity to any of the confined facilities found near the Proposed Project construction location.

Given the amount of acreage available at these facilities, the loss of only 0.04 acre and no loss of capital improvements is not expected to substantially affect the viability of the facilities, and the impact on these facilities would be less than significant.

Merced Layover & Maintenance Facility

A portion of the Merced Layover & Maintenance Facility is located on lands identified as Important Farmland (Farmland of Local Importance). This land appears to have been used to produce hay in recent years, does not appear to be irrigated, and is not used as confined animal facility. This land would be converted due to the Proposed Project and this impact is already covered under Impact AG-1 above. As such, there are no additional impacts beyond those disclosed in Impact AG-1 above.

Atwater Station Alternative

The Atwater Station Alternative is not located on lands identified as Important Farmlands and have no potential to disrupt agricultural infrastructure. In addition, no animal facilities are located at the Atwater Station Alternative and would therefore not affect confined animal facilities. No impact would result from the Atwater Station Alternative. There would be no difference in impact between the proposed Livingston Station and the Atwater Station Alternative (both would result in no impact).

Mitigation Measures

Mitigation Measures AG-5.1 and AG-5.2 would apply to the Ceres to Merced Extension Alignment for impacts related to disruption of irrigation facilities or utilities supporting existing agricultural uses.

Mitigation Measure AG-5.1: Relocate irrigation facilities

Where relocating an irrigation facility is necessary, the contractor will verify the new facility is operational prior to disconnecting the original facility, where feasible. Irrigation facility relocation preferences are included in the design-build contract and reduce unnecessary impacts on continued operation of irrigation facilities. The contractor will document all relocations in a memorandum for SJRRC review and approval.

Mitigation Measure AG-5.2: Coordinate with utility providers

Prior to construction, the contractor will prepare a technical memorandum documenting how construction activities will be coordinated with service providers to minimize or avoid interruptions. The technical memorandum will be provided to SJRRC for review and approval.

Significance with Application of Mitigation

Mitigation Measure AG-5.1 would require new irrigation facilities be installed and fully operational before existing facilities are disconnected, avoiding temporary disruption to agricultural operations. Mitigation Measure AG-5.2 would require construction activities be coordinated with service providers to minimize or avoid service interruptions to agricultural operations. With implementation of these mitigation measures, impacts on farmland due to disruption of irrigation facilities or utilities associated with the Proposed Project (due to the Ceres to Merced Extension Alignment) would be less than significant.

3.2.4.4 Overall Comparison of the Proposed Livingston Station and Atwater Station Alternative

Overall, there would be no difference in impacts to agricultural resources between implementation of the Atwater Station Alternative or the proposed Livingston Station (neither would impact agricultural resources).

3.3 Air Quality

3.3.1 Introduction

This section describes the regulatory and environmental setting for air quality in the vicinity of the Proposed Project and the Atwater Station Alternative. This section also describes the impacts on air quality that would result from implementation of the Proposed Project and the Atwater Station Alternative, and mitigation measures that would reduce significant impacts, where feasible and appropriate. Appendix J, *Air Quality, Greenhouse Gas, and Health Risk Assessment Supporting Documentation*, contains additional technical information for this section.

This section analyzes air quality impacts of the Proposed Project and the Atwater Station Alternative due to the proposed extension of Altamont Corridor Express (ACE) service from Ceres to Merced. Construction would be limited to the geographic area of Ceres to Merced; therefore, construction emissions are only analyzed for the geographic area of Ceres to Merced. Since the Proposed Project and the Atwater Station Alternative include no changes to the number of trains in the rest of the ACE system, the operational analysis in the San Francisco Bay Area (Bay Area) is limited to (1) the increased vehicle shuttle emissions at the Pleasanton and Great America Stations, and (2) the reduction in driving in the Bay Area due to increased ACE ridership from the extended service. In the San Joaquin Valley, the operational analysis considered the net emissions of increased locomotive emissions in conjunction with the emissions reductions from reduced vehicle travel.

Greenhouse gas (GHG) emissions are discussed separately in Section 3.8, *Greenhouse Gas Emissions*. Cumulative impacts on air quality, in combination with planned, approved, and reasonably foreseeable projects, are discussed in Chapter 4, *Other CEQA-Required Analysis*.

3.3.2 Regulatory Setting

Relevant regulatory agencies for criteria pollutant emissions include the U.S. Environmental Protection Agency (USEPA), California Air Resources Board (CARB), Bay Area Air Quality Management District (BAAQMD),[1] and San Joaquin Valley Air Pollution Control District (SJVAPCD). USEPA has established federal air quality standards for which CARB, BAAQMD, and SJVAPCD have primary implementation responsibility. CARB has established state air quality standards and CARB, BAAQMD, and SJVAPCD are responsible for ensuring that state air quality standards are met.

This section summarizes federal, state, regional, and local regulations related to air quality and applicable to the Proposed Project and the Atwater Station Alternative.

[1] The existing ACE route passes through Santa Clara and Alameda Counties, which are located within San Francisco Bay Area Air Basin (SFBAAB) and under the local air quality jurisdiction of the BAAQMD. Although no physical improvements are proposed in the SFBAAB as part of the Proposed Project and Atwater Station Alternative, ACE would continue to operate in the SFBAAB and the added ridership resulting from the extension would have system-wide effects throughout the SFBAAB. As such, BAAQMD regulations are included in this section.

3.3.2.1 Federal

Clean Air Act and Ambient Air Quality Standards

The federal Clean Air Act (CAA), promulgated in 1963 and amended several times thereafter, including the 1990 CAA amendments, establishes the framework for modern air pollution control in the United States. CAA directs USEPA to establish federal air quality standards, known as national ambient air quality standards (NAAQS), and specifies future dates for achieving compliance. USEPA has set NAAQS for six "criteria" pollutants: ozone, carbon monoxide (CO), particulate matter (PM) of 10 microns in diameter and smaller (PM10) and 2.5 microns in diameter and smaller (PM2.5), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb). NAAQS are divided into primary and secondary standards; the former are set to protect human health with an adequate margin of safety, the latter to protect environmental values, such as plant and animal life. Table 3.3-1 summarizes NAAQS currently in effect for each criteria pollutant. The California ambient air quality standards (CAAQS) (discussed in Section 3.3.2.2, *State*) are also provided for reference.

CAA also mandates that the state submit and implement a state implementation plan (SIP) for local areas not meeting those standards. The SIP must include pollution control measures that demonstrate how the standards will be met by the dates specified in CAA.

Corporate Average Fuel Economy Standards

The National Highway Traffic Safety Administration (NHTSA) sets corporate average fuel economy (CAFE) standards for passenger cars and for light trucks (collectively, light-duty vehicles), and separately sets fuel consumption standards for medium- and heavy-duty trucks and engines. The U.S. Department of Transportation (USDOT) and USEPA Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule took effect on June 29, 2020. The SAFE Vehicles Rule amends the existing NHTSA CAFE standards and the existing USEPA tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026. The final rules retain the model year 2020 standards for both programs through model year 2026. The rule has been legally challenged by the state of California, other states, and other entities. Because the rule would increase on-road vehicle emissions, it has been taken into account in the construction analysis as a worst-case analysis if the rule prevails in court. The rule has not been taken into account in the operations analysis because taking it into account would result in a higher air quality benefit given that on road vehicles would have higher emissions with the new rules compared to the former rule; this is a worst-case analysis if the rule does not prevail in court. In January 2021, The Biden Administration announced plans to propose replacement or revision of the SAFE rule later in 2021.

Locomotive Emissions Standards

In March 2008, USEPA adopted a three-part emissions standard program that will reduce emissions from diesel locomotives. The regulation tightens emission standards for existing, remanufactured locomotives, and sets exhaust emission standards for newly built locomotives of model years 2011–2014 (Tier 3) and 2015 and beyond (Tier 4). The regulation is expected to reduce PM emissions from locomotive engines by as much as 90 percent and nitrogen oxide (NO_X) emissions by as much as 80 percent when fully implemented.

Table 3.3-1. Federal and State Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	California Standards	National Standards[a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None[b]	None[b]
	8-hour	0.070 ppm	0.070 ppm	0.070 ppm
Particulate Matter (PM10)	24-hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
	Annual mean	20 μg/m^3	None	None
Fine Particulate Matter (PM2.5)	24-hour	None	35 μg/m^3	35 μg/m^3
	Annual mean	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3
Carbon Monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
	8-hour (Lake Tahoe)	6 ppm	None	None
Nitrogen Dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur Dioxide	Annual mean	None	0.030 ppm[c]	None
	24-hour	0.04 ppm	0.14 ppm[c]	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day average	1.5 μg/m^3	None	None
	Calendar quarter	None	1.5 μg/m^3	1.5 μg/m^3
	3-month average	None	0.15 μg/m^3	0.15 μg/m^3
Sulfates	24-hour	25 μg/m^3	None	None
Visibility Reducing Particles	8-hour	–[d]	None	None
Hydrogen Sulfide	1-hour	0.03 ppm	None	None
Vinyl Chloride	24-hour	0.01 ppm	None	None

Source: California Air Resources Board 2016.

μg/m^3 = micrograms per cubic meter.

ppm = parts per million.

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The federal 1-hour standard of 12 parts per 100 million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for state implementation plans.

[c] The annual and 24-hour National Ambient Air Quality Standards (NAAQS) for sulfur dioxide apply only for 1 year after designation of the new 1-hour standard to those areas that were previously nonattainment for 24-hour and annual NAAQS.

[d] California Ambient Air Quality Standards for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more due to particles when relative humidity is less than 70%.

3.3.2.2 State

California Clean Air Act and Ambient Air Quality Standards

In 1988, the California Legislature adopted the California CAA, which established a statewide air pollution control program. The California CAA requires all air districts in the state to endeavor to meet CAAQS by the earliest practical date. Unlike the federal CAA, the California CAA does not set precise attainment deadlines. Instead, the California CAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride. CAAQS and NAAQS are listed together in Table 3.3-1.

CARB and local air districts bear responsibility for achieving California's air quality standards, which are to be achieved through district-level air quality management plans to be incorporated into the SIP. In California, USEPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The California CAA substantially adds to the authority and responsibilities of air districts. The California CAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The California CAA also emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. An indirect source is a facility or land use that attracts or generates motor vehicle traffic. The California CAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution and to establish traffic control measures.

State Tailpipe Emission Standards

CARB established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and harbor craft. Construction equipment used for the Proposed Project and the Atwater Station Alternative, including heavy-duty trucks and off-road construction equipment, will be required to comply with the standards applicable to the model year of manufacture.

CARB has established emissions standards for on-road vehicles as well and is responsible for the certification and production audit of new passenger vehicles and heavy-duty vehicles. Vehicles are not legal for sale in California until CARB-certified. Violation of the requirement for certification can subject the vehicle manufacturers and/or selling dealers to enforcement actions including a fine of up to $37,500 per vehicle.

Carl Moyer Memorial Air Quality Standards Attainment Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The program is a partnership between CARB and the local air districts throughout the state to reduce air pollution emissions from heavy-duty engines. Locally, the air districts administer the Carl Moyer Program.

Toxic Air Contaminant Regulation

California regulates toxic air contaminants (TACs) primarily through the Toxic Air Contaminant Identification and Control Act (Tanner Act) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Hot Spots Act). In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Tanner Act created California's program to reduce exposure to air toxics. The Hot Spots Act supplements the Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

In August 1998, CARB identified diesel particulate matter (DPM) from diesel-fueled engines as TACs. In September 2000, CARB approved a comprehensive diesel risk reduction plan to reduce emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce DPM (respirable particulate matter) emissions and the associated health risk by 75 percent in 2010 and by 85 percent by 2020. The plan identifies 14 measures that CARB will implement over the next several years.

3.3.2.3 Regional and Local

Bay Area Air Quality Management District

BAAQMD has local air quality jurisdiction in the San Francisco Bay Area Air Basin (SFBAAB), including Santa Clara and Alameda Counties, but does not have land use jurisdiction or jurisdiction over mobile sources. Responsibilities of the air district include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality monitoring stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by the California Environmental Quality Act (CEQA). BAAQMD is also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

BAAQMD has adopted advisory emission thresholds to assist CEQA lead agencies in determining the level of significance of a project's emissions, which are outlined in its *California Environmental Quality Act Air Quality Guidelines* (Bay Area Air Quality Management District 2017a). BAAQMD has also adopted air quality plans to improve air quality, protect public health, and protect the climate. The *Revised San Francisco Bay Area 2001 Ozone Attainment Plan for the 1-Hour National Ozone Standard* was adopted to reduce ozone and achieve the NAAQS ozone standard; and the *2017 Bay Area Clean Air Plan* provides a regional strategy to attain state and federal ambient air quality standards, eliminate health risk disparities among Bay Area communities, and reduce GHG emissions.

San Joaquin Valley Air Pollution Control District

SJVAPCD has local air quality jurisdiction in the San Joaquin Valley Air Basin (SJVAB), including San Joaquin, Stanislaus, and Merced Counties, but does not have land use jurisdiction or jurisdiction over mobile sources. The air district shares the same responsibilities in SJVAB as described above for BAAQMD. SJVAPCD prepared the *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) to assist lead agencies and project applicants in evaluating the potential air quality impacts of projects in SJVAB (San Joaquin Valley Air Pollution Control District 2015). GAMAQI provides SJVAPCD-

recommended procedures for evaluating potential air quality impacts during the CEQA environmental review process.

SJVAPCD has adopted several attainment plans in an attempt to achieve state and federal air quality standards. The *2004 Extreme Ozone Attainment Demonstration Plan for 1-Hour Ozone* was adopted on October 8, 2004, and submitted to USEPA on November 15, 2004, and the *Clarifications Regarding the 2004 Extreme Ozone Attainment Demonstration Plan for 1-Hour Ozone* was adopted on August 21, 2008. USEPA proposed approval and partial disapproval of the *2004 Extreme Ozone Attainment Demonstration Plan for 1-Hour Ozone* on June 30, 2009. In September 2013, SJVAPCD adopted the *2013 Plan for the Revoked 1-Hour Ozone Standard*. The *2007 Ozone Plan* for 8-hour ozone was adopted on April 30, 2007. SJVAPCD recently adopted the *2016 Plan for the 2008 8-Hour Ozone Standard* to address the 75 parts per billion (ppb) ozone standard. The *2016 Ozone Plan* contains a comprehensive list of regulatory and incentive-based measures to reduce reactive organic gases (ROG) and nitrogen oxides (NO_X) emissions. In particular, the plan proposes a 60 percent reduction in NO_X by 2031.

The *2007 PM10 Maintenance Plan and Request for Redesignation* was approved by CARB on October 25, 2007, and no PM10 plans are under development. The *2015 Plan for the 1997 PM2.5 Standard* was adopted on April 16, 2015, and the *2016 Moderate Area Plan for the 2012 PM2.5 Standard* was adopted on September 15, 2016. SJVAPCD adopted an updated PM2.5 plan on November 18, 2018. The *2018 Plan for the 1997, 2006, and 2012 PM2.5 Standards* addresses the USEPA federal 1997 annual PM2.5 standard of 15 micrograms per cubic meter ($\mu g/m^3$) and 24-hour PM2.5 standard of 65 $\mu g/m^3$; the 2006 24-hour PM2.5 standard of 35 $\mu g/m^3$; and the 2012 annual PM2.5 standard of 12 $\mu g/m^3$. This plan demonstrates attainment of the federal PM2.5 standards as expeditiously as practicable. The *CO Attainment Plan* was last updated in 2004 by CARB, and it is not planned to be updated in the future unless violations of the CO NAAQS or CAAQS occur.

The Proposed Project and the Atwater Station Alternative may be subject to the following district rules. This list of rules may not be complete as additional SJVAPCD rules may apply as specific components are identified.

- **Rule 2010 (Permits Required)**. This rule requires any person constructing, altering, replacing, or operating any source operation that emits, may emit, or may reduce emissions to obtain an Authority to Construct or a Permit to Operate.
- **Rule 2201 (New and Modified Stationary Source Review).** This rule requires that sources not increase emissions above the specified thresholds.
- **Rule 2280 (Portable Equipment Registration)**. This rule requires portable equipment used at project sites for less than 6 consecutive months be registered with SJVAPCD.
- **Rule 2303 (Mobile Source Emission Reduction Credits)**. This rule encourages joint business ventures and establishes procedures by which emission reduction credits from mobile sources may be certified.
- **Rule 4201 and Rule 4202 (Particulate Matter Concentration and Emission Rates)**. These rules provide PM emission limits for sources operating within the district.
- **Rule 4102 (Nuisance)**. This rule protects the health and safety of the public by prohibiting discharge of air contaminants that cause injury, detriment, nuisance or annoyance to any considerable number of persons.

- Rule 9410 (Employer Based Trip Reduction). This rule outlines requirements for employers in the San Joaquin Valley Air Basin that have at least 100 eligible employees at a worksite for at least 16 consecutive weeks during the first fiscal year of operation. Employers subject to this rule are required to implement an Employer Trip Reduction Implementation Plan. Some trip reduction strategies that can be implemented include hosting a rideshare event, offering guaranteed ride home services, and providing showers and/or lockers on-site. The Merced Layover & Maintenance Facility would have approximately 80-100 employees. As such, the Proposed Project would not be subject to Rule 9410, but it would be possible if the number of employees ends up exceeding 100.
- **Rule 9510 (Indirect Source Review)**. This rule outlines mitigation requirements for construction and operational emissions that exceed certain thresholds. The rule applies to any transportation project in which construction emissions equal or exceed 2 tons of NO_X or PM10 per year.
- **Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations)**. This rule limits VOC emissions by restricting the application and manufacturing of certain types of asphalt for paving and maintenance operations.
- **Regulation VIII (Fugitive PM10 Prohibitions)**. This set of rules outlines requirements for implementation of control measures for fugitive dust emission sources.

Metropolitan Transportation Commission

The Metropolitan Transportation Commission (MTC) serves as both the state-designated regional transportation agency and as the federally designated metropolitan planning organization for the Bay Area. Thus, it is responsible for regularly updating the regional transportation plan (RTP), a comprehensive blueprint for the development of mass transit, highway, airport, seaport, railroad, bicycle and pedestrian elements. The MTC also screens requests from local agencies for state and federal grants for transportation projects to determine their compatibility with the plan.

Association of Bay Area Governments

The Association of Bay Area Governments (ABAG) serves as a regional planning body for the Bay Area. ABAG, MTC, and BAAQMD work closely to develop long-range plans that improve the environment and standard of living through a series of measures that link land use, transportation, and air quality. ABAG is responsible for maintaining the state-mandated sustainable communities strategies (SCS), which link land use, transportation planning, and state funding. ABAG also develops demographic, economic, and project analyses for the region.

Merced County Association of Governments

The Merced County Association of Governments (MCAG) is a joint-powers authority composed of Merced County and the Cities of Atwater, Dos Palos, Merced, Los Banos, Livingston, and Gustine. MCAG responsibilities include solving regional problems, such as those related to transportation, solid waste, and air quality (Merced County Association of Governments no date).

Stanislaus County Council of Governments

Similar to MCAG, the Stanislaus County Council of Governments (StanCOG) is a joint-powers authority that was created to address transportation issues in the region. StanCOG is comprised of

the County of Stanislaus and the Cities of Ceres, Hughson, Modesto, Newman, Oakdale, Patterson, Riverbank, Turlock, and Waterford. As a metropolitan planning organization, the primary role of StanCOG is regional transportation planning. The objectives of StanCOG include improving mobility, reducing congestion, and improving air quality (Stanislaus County Council of Governments 2015).

County and City General Plans

The San Joaquin Regional Rail Commission (SJRRC), a state joint powers agency, proposes improvements inside and outside of the Union Pacific Railroad (UPRR) right-of-way (ROW). The Interstate Commerce Commission Termination Act (ICCTA) affords railroads engaged in interstate commerce considerable flexibility in making necessary improvements and modifications to rail infrastructure, subject to the requirements of the Surface Transportation Board.[2] ICCTA broadly preempts state and local regulation of railroads and this preemption extends to the construction and operation of rail lines. As such, activities within the UPRR ROW are clearly exempt from local building and zoning codes and other land use ordinances. However, facilities located outside of the UPRR ROW, including proposed stations, the proposed Merced Layover & Maintenance Facility, and the Atwater Station Alternative would be subject to regional and local plans and regulations. Though ICCTA does broadly preempt state and local regulation of railroads, SJRRC intends to obtain local agency permits for construction of facilities that fall outside of the UPRR ROW even though SJRRC has not determined that such permits are legally necessary or be required.

Appendix G of this environmental impact report (EIR), *Regional Plans and Local General Plans*, provides a list of applicable goals, policies, and objectives from regional and local plans of the jurisdictions in which the Proposed Project and Atwater Station Alternative would be located. Section 15125(d) of the CEQA Guidelines requires an EIR to discuss "any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans." These plans were considered during the preparation of this analysis and were reviewed to assess whether the Proposed Project and Atwater Station Alternative would be consistent with the plans of relevant jurisdictions.[3]

The Proposed Project traverses and is located in the jurisdiction of two counties and five incorporated cities. The Atwater Station Alternative is located in the City of Atwater. Table 3.3-2 provides a summary of the county and city general plans that have been identified, reviewed, and considered for the preparation of this analysis. Although ACE locomotives would increase emissions in the jurisdictions the alignment traverses, the Proposed Project and the Atwater Station Alternative is expected to result in a transportation mode shift (i.e., attract passengers who otherwise would have driven cars). This shift would reduce travel by highway vehicles, reducing mobile source emissions and congestion. Accordingly, emissions associated with operation of the Proposed Project and the Atwater Station Alternative would not be inconsistent with regional and local air quality plans. Appendix G contains a list of applicable air quality goals, policies, and objectives from the plans listed in Table 3.3-2.

[2] ACE operates within a ROW and on tracks owned by the UPRR, which operates interstate freight rail service in the same ROW and on the same tracks.

[3] An inconsistency with regional or local plans is not necessarily considered a significant impact under CEQA unless it is related to a physical impact on the environment that is significant in its own right.

Table 3.3-2. List of Local Plans Regarding Air Quality

Title	Summary
County General Plans	
Stanislaus County General Plan (County of Stanislaus 2015)	The *Conservation/Open Space Element* of the general plan includes discussion of protecting the county's air quality. Goal Six of the General Plan seeks to improve air quality and includes policies to improve coordination among agencies to develop air quality programs, determine mitigation measures to reduce potential impacts of proposed projects on the local and regional air quality; reducing vehicle trips and vehicles miles traveled; and increasing public awareness of air quality problems and solutions.
2030 Merced County General Plan (County of Merced 2013)	The *Air Quality Element* of the general plan outlines the policies established to achieve the County's vision for air quality. The policies focus on regulating point-source pollution, directing development to existing urban areas, and transportation congestion management.
City General Plans	
Ceres General Plan 2035 (City of Ceres 2018)	The *Agricultural and Natural Resources Element* of the general plan includes Goal 4.G to protect and improve air quality in the Ceres area, and to protect residents from harmful effects of air pollution. Policies 4.G.1 through 4.G.15 support this goal by cooperating with other agencies to meet regional air quality goals; implementing strategies to reduce VMT and roadway dust; and implementing mitigation measure to minimize dust and air emission impacts from construction.
Turlock General Plan (City of Turlock 2012)	The *Air Quality and Greenhouse Gases Element* of the general plan includes policies and implementation measures to reduce air pollutants from mobile sources; develop land use plans that support shorter vehicle trips and alternative modes of transportation; reduce dust particulates; and plant and maintain trees in area parks.
City of Livingston 2025 General Plan (City of Livingston 1999)	The *Open Space, Conservation and Recreation Element* of the general Plan includes policies to reduce potential air quality impacts, such as improving the transportation infrastructure and providing alternate modes of transport; relieve traffic congestion points; adhere to all state, federal, and regional standards and plans; and coordinate among agencies.
City of Atwater General Plan (City of Atwater 2000)	The *Open Space and Conservation Element* of the general plan includes a discussion of current air quality issues and identifies Goal CO-3 reduce air emissions to obtain goals set in local and regional plans. Policies CO-3.1 through CO-3.3 encourage mixed-use and pedestrian-oriented land use development projects; cooperating with the San Joaquin Valley Air Pollution Control District in implementation of the air quality plan; and alternate modes of transportation.
Merced Vision 2030 General Plan (City of Merced 2012)	The *Sustainable Development Element* of the general plan identifies Goal Area SD-1 to minimize particulate content and toxic substances; create or improve transportation infrastructure; and coordinate among agencies. Policies SD-1.1 through SD-1.8 supports this goal by educating the public; coordinating among agencies; and integrate land use and transportation planning.

3.3.3 Environmental Setting

This section describes the environmental setting related to air quality for the Proposed Project and the Atwater Station Alternative. For the purposes of this analysis, the study area includes the SFBAAB and SJVAB;[4] the environmental footprint of the Proposed Project and the Atwater Station Alternative plus 500 feet along the rail line and 1,000 feet around stations; and all affected intersections near the proposed stations.

3.3.3.1 Local Meteorological Conditions

California is divided into 15 air basins based on geographic features that create distinctive regional climates. Ambient air quality in each air basin is affected by these climatological conditions as well as topography and the types and amounts of pollutants emitted. The Proposed Project and the Atwater Station Alternative are located within SJVAB; operational effects would occur throughout the SFBAAB and SJVAB. The following sections discuss climate and meteorological information specific to these air basins.

San Francisco Bay Area Air Basin

Climate in the SFBAAB is primarily affected by marine air flow and the basin's proximity to the San Francisco Bay. The Proposed Project and the Atwater Station Alternative would affect shuttle operations in the SFBAAB; specifically, in the northern part of the Santa Clara Valley portion (the Great America Station) and the Livermore Valley (the Pleasanton Station) of the SFBAAB.

The Santa Clara Valley is bounded by the San Francisco Bay and mountains to the east, south, and west. Temperatures are warm on summer days and cool on summer nights, and winter temperatures are fairly mild. At the northern end of the Santa Clara Valley, mean maximum temperatures are in the low 80s (Fahrenheit [F]) during the summer and the high 50s during the winter, and mean minimum temperatures range from the high 50s in the summer to the low 40s in the winter. Further inland, where the moderating effect of the Bay is not as strong, temperature extremes are greater.

Winds in the Santa Clara Valley are greatly influenced by the terrain, resulting in a prevailing flow that roughly parallels the valley's northwest-southeast axis. A north-northwesterly sea breeze flows through the valley during the afternoon and early evening, and a light south-southeasterly drainage flow occurs during the late evening and early morning.

The air pollution potential of the Santa Clara Valley is high. Warm summer temperatures, stable air and mountains surrounding the valley combine to promote ozone formation. In addition to the many local sources of pollution, ozone precursors from San Francisco, San Mateo, and Alameda Counties are carried by prevailing winds to the Santa Clara Valley. The valley tends to channel pollutants to the southeast. In addition, on summer days with low-level inversions, ozone can be recirculated by southerly wind drainage flows in the late evening and early morning and by the prevailing northwesterlies in the afternoon. A similar recirculation pattern occurs in the winter, affecting levels of CO and PM. This movement of the air up and down the valley increases the impact of the pollutants considerably (Bay Area Air Quality Management District 2017a).

[4] As noted above, added ridership resulting from the Proposed Project and Atwater Station Alternative would have system-wide effects throughout the SFBAAB; specifically, the number of connecting shuttles at the Great America and Pleasanton stations would increase. As such, the SFBAAB is included in the environmental setting.

The Livermore Valley is a sheltered inland valley near the eastern border of SFBAAB. The western side of the valley is bordered by 1,000 to 1,500 foothills with two gaps connecting the valley to the central SFBAAB, the Hayward Pass and Niles Canyon. The eastern side of the valley also is bordered by 1,000 to 1,500 foothills with one major passage to the San Joaquin Valley called the Altamont Pass and several secondary passages. To the north lie the Black Hills and Mount Diablo. A northwest to southeast channel connects the Diablo Valley to the Livermore Valley. The south side of the Livermore Valley is bordered by mountains approximately 3,000 to 3,500 feet high.

During the summer months, when there is a strong inversion with a low ceiling, air movement is weak and pollutants become trapped and concentrated. Maximum summer temperatures in the Livermore Valley range from the high-80s to the low-90s, with extremes in the 100s. At other times in the summer, a strong Pacific high-pressure cell from the west, coupled with hot inland temperatures causes a strong onshore pressure gradient which produces a strong, afternoon wind. With a weak temperature inversion, air moves over the hills with ease, dispersing pollutants.

In the winter, with the exception of an occasional storm moving through the area, air movement is often dictated by local conditions. At night and early morning, especially under clear, calm and cold conditions, gravity drives cold air downward. The cold air drains off the hills and moves into the gaps and passes. On the eastern side of the valley the prevailing winds blow from north, northeast and east out of the Altamont Pass. Winds are light during the late night and early morning hours. Winter daytime winds sometimes flow from the south through the Altamont Pass to the San Joaquin Valley. Average winter maximum temperatures range from the high-50s to the low-60s, while minimum temperatures are from the mid-to-high-30s, with extremes in the high teens and low-20s.

Like the Santa Clara Valley, air pollution potential is high in the Livermore Valley, especially for photochemical pollutants in the summer and fall. High temperatures increase the potential for ozone to build up. The valley not only traps locally generated pollutants but can be the receptor of ozone and ozone precursors from San Francisco, Alameda, Contra Costa and Santa Clara counties. On northeasterly wind flow days, most common in the early fall, ozone maybe carried west from the San Joaquin Valley to the Livermore Valley.

During the winter, the sheltering effect of the valley, its distance from moderating waterbodies, and the presence of a strong high-pressure system contribute to the development of strong, surface-based temperature inversions. Pollutants such as CO and PM, generated by motor vehicles, fireplaces and agricultural burning, can become concentrated. Air pollution problems could intensify because of population growth and increased commuting to and through the subregion (Bay Area Air Quality Management District 2017a).

San Joaquin Valley Air Basin

Approximately 250 miles long and averaging 35 miles wide, SJVAB is the second largest air basin in the state. SJVAB is defined by the Sierra Nevada in the east (8,000–14,000 feet in elevation), the Coast Ranges in the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains in the south (6,000–8,000 feet in elevation). The valley is basically flat with a slight downward gradient to the northwest. The valley opens to the sea at the Carquinez Straits where the San Joaquin–Sacramento Delta empties into San Francisco Bay. The San Joaquin Valley, thus, could be considered a “bowl” open only to the north.

SJVAB has an inland Mediterranean climate averaging more than 260 sunny days per year. The valley floor experiences warm, dry summers and cool, wet winters. Summer high temperatures

often exceed 100°F, averaging in the low 90s in the northern valley and high 90s in the south. In the entire SJVAB, high daily temperature readings in summer average 95°F. Over the last 30 years, SJVAB averaged 106 days a year 90°F or hotter, and 40 days a year 100°F or hotter. The daily summer temperature variation can be as much as 30°F.

In winter, as the cyclonic storm track moves southward, the storm systems moving in from the Pacific Ocean have a maritime influence on SJVAB. The high mountains to the east prevent the cold, continental air masses of the interior from influencing the valley. Winters are mild and humid. Temperatures below freezing are unusual. Average high temperatures in the winter are in the 50s, but highs in the 30s and 40s can occur on days with persistent fog and low cloudiness. The average daily low temperature is 45°F.

Although marine air generally flows into the basin from the San Joaquin River Delta, the region's topographic features restrict air movement through and out of the basin. The Coastal Range hinders wind access into SJVAB from the west, the Tehachapi Mountains prevent southerly passage of air flow, and the high Sierra Nevada is a significant barrier to the east. These topographic features result in weak air flow, which becomes blocked vertically by high barometric pressure over SJVAB. As a result, SJVAB is highly susceptible to pollutant accumulation over time. Most of the surrounding mountains are above the normal height of summer inversion layers (i.e., 1,500–3,000 feet) (San Joaquin Valley Air Pollution Control District 2015).

3.3.3.2 Pollutants of Concern

Criteria Air Pollutants

As discussed in Section 3.3.2, *Regulatory Setting*, the federal and state governments have established NAAQS and CAAQS, respectively, for six criteria pollutants. Ozone is considered a regional pollutant because its precursors affect air quality on a regional scale. Pollutants such as CO, NO_2, SO_2, and Pb are considered local pollutants that tend to accumulate in the air locally. PM10 and PM2.5 are both regional and local pollutants.

The primary criteria pollutants of concern in the project are ozone precursors (i.e., NO_X and ROG), CO, and PM.[5,6]

All criteria pollutants can have human health effects at certain concentrations. The ambient air quality standards for these pollutants are set to protect public health and the environment with an adequate margin of safety (Clean Air Act [CAA] Section 109). Epidemiological, controlled human exposure, and toxicology studies evaluate potential health and environmental effects of criteria pollutants, and form the scientific basis for new and revised ambient air quality standards.

Principal characteristics and possible health and environmental effects from exposure to the primary criteria pollutants generated by the Proposed Project and the Atwater Station Alternative are discussed in this section.

[5] As discussed above, there are also ambient air quality standards for SO_2, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulates. However, these pollutants are typically associated with industrial sources, which are not included as part of the project. Accordingly, they are not evaluated further.

[6] Most emissions of NO_x are in the form of nitric oxide (NO). Conversion to NO_2 occurs in the atmosphere as pollutants disperse downwind. Accordingly, NO_2 is not considered a local pollutant of concern for the project and is not evaluated further.

Ozone, or smog, is a photochemical oxidant that is formed when ROG and NO_X (both by-products of the internal combustion engine) react with sunlight. ROG are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle use is the major source of hydrocarbons. Other sources of ROG are emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas that forms from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown irritating gas formed by the combination of NO and oxygen. In addition to serving as an integral participant in ozone formation, NO_X also directly acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.

Ozone poses a higher risk to those who already suffer from respiratory diseases (e.g., asthma), children, older adults, and people who are active outdoors. Exposure to ozone at certain concentrations can make breathing more difficult, cause shortness of breath and coughing, inflame and damage the airways, aggravate lung diseases, increase the frequency of asthma attacks, and cause chronic obstructive pulmonary disease. Studies show associations between short-term ozone exposure and non-accidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to ozone may increase the risk of respiratory-related deaths (U.S. Environmental Protection Agency 2020a). The concentration of ozone at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least responsive individual after a 2-hour exposure to 400 parts per billion of ozone and a 50 percent decrease in forced airway volume in the most responsive individual. Although the results vary, evidence suggests that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum ozone concentration reaches 80 parts per billion (U.S. Environmental Protection Agency 2016a).

Additionally, ozone has been tied to crop damage, typically in the form of stunted growth and premature death. Ozone can also act as a corrosive, resulting in property damage such as the degradation of rubber products and other materials.

NO_X serve as integral participants in the process of photochemical smog production. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown gas formed by the combination of NO and oxygen. NO_X acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.

CO is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. In the air quality study area, high CO levels are of greatest concern during the winter, when periods of light winds combine with the formation of ground-level temperature inversions from evening through early morning. These conditions trap pollutants near the ground, reducing the dispersion of vehicle emissions. Moreover, motor vehicles exhibit increased CO emission rates at low air temperatures. The primary negative health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation. Exposure to CO at high concentrations can also cause fatigue, headaches, confusion, dizziness, and chest pain. There are no ecological or environmental effects of CO at or near existing background CO levels (California Air Resources Board 2020a).

PM consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulates are now recognized—inhalable coarse particles, or PM10, and inhalable fine particles, or PM2.5. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind on arid landscapes also contributes substantially to local particulate loading. Both PM10 and PM2.5 may negatively affect the human respiratory system, especially in those people who are naturally sensitive or susceptible to breathing problems.

Particulate pollution can be transported over long distances and may adversely affect humans, especially for people who are naturally sensitive or susceptible to breathing problems. Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms. Studies show that long-term exposure to PM2.5 was associated with increased risk of mortality, ranging from 6 to 13 percent increased risk per 10 $\mu g/m^3$ of PM2.5 (California Air Resources Board 2010). For every 1 $\mu g/m^3$ reduction in PM2.5 results in a 1 percent reduction in mortality rate for individuals over 30 years old (Bay Area Air Quality Management District 2017b). Studies also show an approximate 0.5 percent increase in overall mortality for every 10 mg/m^3 increase in PM10 measured the day before death (U.S. Environmental Protection Agency 2005). PM10 levels have been greatly reduced since 1990. Peak concentrations have declined by 60 percent and annual average values have declined by 50 percent (Bay Area Air Quality Management District 2017b). Depending on its composition, both PM10 and PM2.5 can also affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain (U.S. Environmental Protection Agency 2020b).

Toxic Air Contaminants

Although NAAQS and CAAQS have been established for criteria pollutants, no ambient standards exist for TACs. Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, CARB has consistently found no levels or thresholds below which exposure is risk-free. Individual TACs vary greatly in the risks they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment (OEHHA). The primary TACs of concern associated with the project are asbestos and DPM.

Air toxics are generated by a number of sources, including *stationary sources*, such as dry cleaners, gas stations, auto body shops, and combustion sources; *mobile sources*, such as motor vehicles, diesel trucks, ships, and trains; and *area sources*, such as farms, landfills, and construction sites. Negative health effects of TACs can be carcinogenic (cancer-causing), short-term (acute) noncarcinogenic, and long-term (chronic) noncarcinogenic. Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to the brain and nervous system, and respiratory disorders.

The primary TACs of concern associated with the Proposed Project are PM2.5 and DPM, asbestos, and Valley Fever. Principal characteristics surrounding these pollutants are discussed in this section.

DPM is generated by diesel-fueled equipment and vehicles. Short-term exposure to DPM can cause acute irritation (e.g., eye, throat, and bronchial), neurophysiological symptoms (e.g., lightheadedness and nausea), and respiratory symptoms (e.g., cough and phlegm). The USEPA has determined that

diesel exhaust is "likely to be carcinogenic to humans by inhalation." (U.S. Environmental Protection Agency 2003)

Asbestos is the name given to a number of naturally occurring fibrous silicate minerals. Asbestos has been mined for applications requiring thermal insulation, chemical and thermal stability, and high tensile strength. Asbestos is also found in its natural state in rock or soil (known as naturally occurring asbestos [NOA]). Mapping published by the U.S. Geological Survey and California Geological Survey indicates that the Proposed Project and the Atwater Station Alternative are not located within an area known to contain NOA (U.S. Geological Survey 2011). The inhalation of asbestos fibers into the lungs can result in a variety of adverse health effects, including inflammation of the lungs, respiratory ailments (e.g., asbestosis, which is scarring of lung tissue that results in constricted breathing), and cancer (e.g., lung cancer and mesothelioma, which is cancer of the linings of the lungs and abdomen).

Valley Fever is not an air pollutant, but is a disease caused by inhaling *Coccidioides immitis* (*C. immitis*) fungus spores. The spores are found in certain types of soil and become airborne when the soil is disturbed. After the fungal spores have settled in the lungs, they change into a multicellular structure called a spherule. Valley Fever symptoms generally occur within 2 to 3 weeks of exposure. Approximately 60 percent of Valley Fever cases are mild and display flu-like symptoms or no symptoms at all. Of those who are exposed and seek medical treatment, the most common symptoms are fatigue, cough, chest pain, fever, rash, headache, and joint aches. The fungus *C. immitis* is endemic to SJVAB (U.S. Geological Survey 2000).

Odors

Offensive odors can be unpleasant and lead to citizen complaints to local governments and air districts. According to CARB's *Air Quality and Land Use Handbook*, land uses associated with odor complaints typically include sewage treatment plants, landfills, recycling facilities, manufacturing, and agricultural activities. CARB provides recommended screening distances for siting new receptors near existing odor sources (California Air Resources Board 2005).

3.3.3.3 Existing Air Quality Conditions

Local Monitoring Data

A number of ambient air quality monitoring stations are located in SFBAAB and SJVAB to monitor progress toward air quality standards attainment of NAAQS and CAAQS (see Table 3.3-1). BAAQMD and SJVAPCD maintain these stations. Tables 3.3-3 and 3.3-4 summarize the values measured at monitoring stations near the Proposed Project and Atwater Station Alternative, and near existing ACE stations in the Bay Area that will be affected by increased ridership. The tables also comparisons to NAAQS and CAAQS.

Attainment Status

Local monitoring data (Tables 3.3-3 and 3.3-4) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for NAAQS and CAAQS. The four designations are further defined as:

- **Nonattainment**—Areas where monitored pollutant concentrations violate the standard in question.

- **Maintenance**—Areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- **Attainment**—Areas where pollutant concentrations meet the standard in question over a designated period of time.
- **Unclassified**—Areas where data are insufficient to determine whether a pollutant is violating the standard in question.

Table 3.3-5 summarizes the attainment status for Santa Clara, Alameda, San Joaquin, Stanislaus, and Merced Counties with regard to NAAQS and CAAQS.

Sensitive Receptors

BAAQMD and SJVAPCD generally define a *sensitive receptor* as a facility or land use that houses or attracts members of the population who are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of sensitive receptors include residential areas, schools, and hospitals. The Proposed Project and the Atwater Station Alternative are surrounded by a mix of industrial, commercial, residential, and recreational land uses. The closest sensitive receptors (residences) are located immediately adjacent to the ROW, with various other receptor locations near the Proposed Project.

Table 3.3-3. Ambient Criteria Pollutant Concentrations at Air Quality Monitoring Stations Closest to Existing Affected ACE Stations (2017–2019)

	BAAQMD			BAAQMD			BAAQMD		
	San Jose Jackson Street			Livermore Rincon			Pleasanton Owens Court		
Pollutant and Standards	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Ozone (O_3)									
Maximum 1-hour concentration (ppm)	0.121	0.078	0.095	0.109	0.099	0.105	NA	NA	NA
Maximum 8-hour concentration (ppm)	0.099	0.061	0.082	0.086	0.078	0.078	NA	NA	NA
Number of days standard exceeded[a]									
CAAQS 1-hour (>0.09 ppm)	3	0	1	5	2	4	NA	NA	NA
CAAQS 8-hour (>0.070 ppm)	4	0	2	6	3	7	NA	NA	NA
NAAQS 8-hour (>0.070 ppm)	4	0	2	6	3	7	NA	NA	NA
Carbon Monoxide (CO)									
Maximum 8-hour concentration (ppm)	1.8	2.1	1.3	NA	NA	NA	NA	2.0	1.0
Maximum 1-hour concentration (ppm)	2.1	2.5	1.7	NA	NA	NA	NA	2.3	1.3
Number of days standard exceeded[a]									
NAAQS 8-hour (≥9 ppm)	0	0	0	NA	NA	NA	NA	0	0
CAAQS 8-hour (≥9.0 ppm)	0	0	0	NA	NA	NA	NA	0	0
NAAQS 1-hour (≥35 ppm)	0	0	0	NA	NA	NA	NA	0	0
CAAQS 1-hour (≥20 ppm)	0	0	0	NA	NA	NA	NA	0	0
Nitrogen Dioxide (NO_2)									
State maximum 1-hour concentration (ppm)	67	86	59	45	56	47	NA	64	63
State second-highest 1-hour concentration (ppm)	64	82	59	45	55	46	NA	59	53
Annual average concentration (ppm)	NA	12	10	8	8	7	NA	NA	13
Number of days standard exceeded[a]									
CAAQS 1-hour (0.18 ppm)	0	0	0	0	0	0	0	0	0
Particulate Matter (PM10)[b]									
National[c] maximum 24-hour concentration ($\mu g/m^3$)	69.4	115.4	75.4	NA	NA	NA	NA	NA	NA
National[c] second-highest 24-hour concentration ($\mu g/m^3$)	67.3	111.6	53.6	NA	NA	NA	NA	NA	NA
State[d] maximum 24-hour concentration ($\mu g/m^3$)	69.8	121.8	77.1	NA	NA	NA	NA	NA	NA
State[d] second-highest 24-hour concentration ($\mu g/m^3$)	67.6	118.5	56.0	NA	NA	NA	NA	NA	NA
National annual average concentration ($\mu g/m^3$)	20.7	20.9	18.4	NA	NA	NA	NA	NA	NA
State annual average concentration ($\mu g/m^3$)[e]	21.3	23.1	19.1	NA	NA	NA	NA	NA	NA

Pollutant and Standards	BAAQMD San Jose Jackson Street			BAAQMD Livermore Rincon			BAAQMD Pleasanton Owens Court		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
Number of days standard exceeded[a]									
NAAQS 24-hour (>150 μg/m³)[f]	0.0	0.0	0.0	NA	NA	NA	NA	NA	NA
CAAQS 24-hour (>50 μg/m³)[f]	19.2	12.2	11.8	NA	NA	NA	NA	NA	NA
Particulate Matter (PM2.5)									
National[c] maximum 24-hour concentration (μg/m³)	49.7	133.9	27.6	41.5	172.6	28.8	NA	164.7	29.1
National[c] second-highest 24-hour concentration (μg/m³)	46.5	130.5	27.4	37.6	136.2	23.1	NA	137.3	23.3
State[d] maximum 24-hour concentration (μg/m³)	49.7	133.9	34.4	41.5	172.6	28.8	NA	164.7	29.1
State[d] second-highest 24-hour concentration (μg/m³)	46.5	130.5	29.9	37.6	136.2	23.1	NA	137.3	23.3
National annual average concentration (μg/m³)	9.5	12.7	9.0	8.4	11.2	6.3	NA	NA	6.2
State annual average concentration (μg/m³)[e]	NA	12.9	9.1	8.4	11.3	6.4	NA	NA	6.3
Number of days standard exceeded[a]									
NAAQS 24-hour (>35 μg/m³)	6.0	15.5	0.0	2.0	14.6	0.0	0	13	0
Sulfur Dioxide (SO_2) - No data available									

Sources: California Air Resources Board 2020b; U.S. Environmental Protection Agency 2020c.

BAAQMD = Bay Area Air Quality Management District.
SJVAPCD = San Joaquin Valley Air Pollution Control District.
ppm = parts per million.
NAAQS = national ambient air quality standards.
CAAQS = California Ambient Air Quality Standards.
μg/m³ = micrograms per cubic meter.
> = greater than.
≥ = greater than or equal to.
NA = not applicable or there was insufficient or no data available to determine the value.

[a] An exceedance is not necessarily a violation.
[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.
[c] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California-approved samplers.
[d] Measurements usually are collected every 6 days.
[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
[f] Mathematical estimate of how many days' concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

1

Table 3.3-4. Ambient Criteria Pollutant Concentrations at Air Quality Monitoring Stations Closest to the Proposed Project and the Atwater Station Alternative (2017–2019)

	SJVAPCD			SJVAPCD			SJVAPCD			SJVAPCD		
	Modesto 14th Street			Turlock			Merced M Street			Merced Coffee Avenue		
Pollutant and Standards	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Ozone (O_3)												
Maximum 1-hour concentration (ppm)	0.111	0.103	0.102	0.114	0.108	0.090	NA	NA	NA	0.093	0.104	0.087
Maximum 8-hour concentration (ppm)	0.098	0.091	0.083	0.099	0.095	0.082	NA	NA	NA	0.085	0.084	0.077
Number of days standard exceeded[a]												
CAAQS 1-hour (>0.09 ppm)	3	2	1	3	7	0	NA	NA	NA	0	4	0
CAAQS 8-hour (>0.070 ppm)	23	14	9	31	28	13	NA	NA	NA	17	23	6
NAAQS 8-hour (>0.070 ppm)	21	13	8	31	26	13	NA	NA	NA	16	21	6
Carbon Monoxide (CO)												
Maximum 8-hour concentration (ppm)	1.6	2.1	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Maximum 1-hour concentration (ppm)	2.0	2.7	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Number of days standard exceeded[a]												
NAAQS 8-hour (≥9 ppm)	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
CAAQS 8-hour (≥9.0 ppm)	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
NAAQS 1-hour (≥35 ppm)	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
CAAQS 1-hour (≥20 ppm)	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen Dioxide (NO_2)												
State maximum 1-hour concentration (ppm)	NA	NA	NA	58	67	59	NA	NA	NA	38	45	38
State second-highest 1-hour concentration (ppm)	NA	NA	NA	56	57	56	NA	NA	NA	38	44	38
Annual average concentration (ppm)	NA	NA	NA	9	9	8	NA	NA	NA	7	7	6
Number of days standard exceeded[a]												
CAAQS 1-hour (0.18 ppm)	NA	NA	NA	0	0	0	NA	NA	NA	0	0	0
Particulate Matter (PM10)[b]												
National[c] maximum 24-hour concentration (μg/m³)	129.3	224.9	309.1	111.7	238.7	95.9	146.6	137.0	96.1	NA	NA	NA
National[c] second-highest 24-hour concentration (μg/m³)	112.4	184.8	105.0	107.1	110.7	93.9	94.1	80.1	80.6	NA	NA	NA
State[d] maximum 24-hour concentration (μg/m³)	128.9	236.4	315.6	109.4	250.4	98.4	144.0	142.7	99.1	NA	NA	NA
State[d] second-highest 24-hour concentration (μg/m³)	114.6	193.8	107.7	108.4	116.2	95.5	98.5	83.5	84.4	NA	NA	NA
National annual average concentration (μg/m³)	31.4	32.1	27.8	36.4	36.8	30.1	35.4	34.1	29.2	NA	NA	NA
State annual average concentration (μg/m³)[e]	31.1	NA	NA	36.9	37.5	30.6	35.8	34.6	29.8	NA	NA	NA

Pollutant and Standards	SJVAPCD Modesto 14th Street 2017	2018	2019	SJVAPCD Turlock 2017	2018	2019	SJVAPCD Merced M Street 2017	2018	2019	SJVAPCD Merced Coffee Avenue 2017	2018	2019
Number of days standard exceeded[a]												
NAAQS 24-hour (>150 μg/m³)[f]	0.0	4.3	1.1	0.0	6.1	0.0	0.0	0.0	0.0	NA	NA	NA
CAAQS 24-hour (>50 μg/m³)[f]	57	44	41	91.8	79.6	60.5	76.6	59.6	54.4	NA	NA	NA
Particulate Matter (PM2.5)												
National[c] maximum 24-hour concentration (μg/m³)	74.5	189.8	34.4	72.3	187.3	40.7	66.7	94.7	41.6	69.3	88.2	35.5
National[c] second-highest 24-hour concentration (μg/m³)	69.5	146.1	32.9	58.7	144.7	40.6	63.9	73.8	30.6	60.6	81.7	29.5
State[d] maximum 24-hour concentration (μg/m³)	74.5	189.8	34.4	72.3	187.3	40.7	66.7	94.7	41.6	69.3	88.2	35.5
State[d] second-highest 24-hour concentration (μg/m³)	69.5	146.1	32.9	58.7	144.7	40.6	63.9	73.8	30.6	60.6	81.7	29.5
National annual average concentration (μg/m³)	12.8	15.2	7.7	12.7	17.2	10.6	12.6	14.2	9.6	13.2	15.1	9.1
State annual average concentration (μg/m³)[e]	12.9	15.2	7.7	12.7	17.2	10.6	NA	14.2	9.6	13.2	15.1	9.1
Number of days standard exceeded[a]												
NAAQS 24-hour (>35 μg/m³)	25.1	21.5	0.0	29.2	25.7	8.3	20.4	29.7	3.0	18.7	21.2	1.0
Sulfur Dioxide (SO_2) - No data available												

Sources: California Air Resources Board 2020b; U.S. Environmental Protection Agency 2020c.

BAAQMD = Bay Area Air Quality Management District.
SJVAPCD = San Joaquin Valley Air Pollution Control District.
ppm = parts per million.
NAAQS = national ambient air quality standards.
CAAQS = California Ambient Air Quality Standards.
μg/m³ = micrograms per cubic meter.
> = greater than.
≥ = greater than or equal to.
NA = not applicable or there was insufficient or no data available to determine the value.

[a] An exceedance is not necessarily a violation.
[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.
[c] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California-approved samplers.
[d] Measurements usually are collected every 6 days.
[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
[f] Mathematical estimate of how many days' concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

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Table 3.3-5. Federal and State Attainment Status

Pollutant	Santa Clara County		Alameda County		Stanislaus County		Merced County	
	Federal	State	Federal	State	Federal	State	Federal	State
Ozone	N	N	N	N	N	N	N	N
CO	A	A	A	A	A/U	A	A/U	U
PM10	A/U	N	A/U	N	A	N	A	N
PM2.5	A/U	N	A/U	N	N	N	N	N
SO_2	A	A	A	A	A/U	A	A/U	A
NO_2	A	A	A	A	A/U	A	A/U	A
Lead	A	A	A	A	A	A	A	A

Sources: California Air Resources Board 2019; U.S. Environmental Protection Agency 2020d.

(P) Applies only to a portion of the county.

A/U = Attainment/Unclassified.

CO = carbon monoxide.

M = Maintenance.

N = Nonattainment.

NO_2 = nitrogen dioxide.

PM10 = particulate matter that is 10 microns in diameter and smaller.

PM2.5 = particulate matter that is 2.5 microns in diameter and smaller.

SO_2 = sulfur dioxide.

3.3.4 Impact Analysis

This section describes the environmental impacts of the Proposed Project and the Atwater Station Alternative on air quality. It describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. Measures to mitigate significant impacts are provided, where appropriate.

3.3.4.1 Methods for Analysis

Air quality impacts associated with construction and operation of the Proposed Project and the Atwater Station Alternative were evaluated and quantified using standard and accepted software tools, techniques, and emission factors. A summary of the methodology is provided in this section and a full list of assumptions is provided in Appendix J, *Air Quality, Greenhouse Gas, and Health Risk Assessment Supporting Documentation*.

The construction air quality analysis is limited to the corridor between Ceres and Merced, as physical improvements are only proposed along this route. Operationally, the analysis also focuses on the Ceres to Merced corridor, because the existing and planned ACE system will be unchanged by the proposed extended service between Ceres and Merced. Thus, the operations analysis includes the emissions changes from increased train service along the corridor as well as reduced vehicle emissions due to increased ridership. In the BAAQMD area, the operational analysis also includes the change in emissions due to increased ACE shuttles at the Pleasanton and Great America stations as well as the reduced vehicle emissions in the Bay Area due to increased ridership. This approach ensures that air quality impacts associated with the Proposed Project are comprehensively assessed, in accordance with air district guidance and thresholds.

Mass Emissions Modeling

Construction

Construction activities for the Proposed Project and the Atwater Station Alternative would occur solely within and under the jurisdiction of the SJVAPCD. Construction activities in the SJVAPCD would generate emissions of criteria pollutants (ROG, NO_X, CO, PM10, PM2.5, and sulfur oxide [SO_X]) that would result in short-term effects on ambient air quality in the study area. Emissions would originate from off-road equipment exhaust, employee and haul truck vehicle exhaust (on-road vehicles), locomotive exhaust, site grading and earth movement, and paving. These emissions would be temporary (i.e., limited to the construction period) and would cease when construction activities are complete.

Emissions estimates for construction of the Proposed Project and the Atwater Station Alternative were based on a combination of engineering inputs and model defaults. Total emissions from construction of the Proposed Project and the Atwater Station Alternative are presented at the average daily and annual time scales and compared with SJVAPCD construction thresholds.

- **Off-Road Equipment**: Emission factors for off-road construction equipment (e.g., loaders, graders, bulldozers) were obtained from the *CalEEMod (version 2016.3.2) User's Guide* appendix, which provides values per unit of activity (in grams per horsepower-hour) by calendar year (Trinity Consultants 2017). Criteria pollutants were estimated by multiplying the CalEEMod emission factors by the equipment inventory provided by the project engineer (AECOM 2020a).
- **On-Road Vehicles**: On-road vehicles (e.g., pickup trucks, flatbed trucks) would be required for material and equipment hauling, onsite crew and material movement, and employee

commuting. Exhaust emissions from on-road vehicles were estimated using the EMFAC2017 emissions model and activity data provided by the project engineer (AECOM 2020a). Emission factors for haul trucks are based on aggregated-speed emission rates for EMFAC's "T7 Single" vehicle category. Factors for on-site water, and concrete trucks were based on 5 miles per hour (mph) emission rates for the "T6 Heavy" category, and factors for on-site pickup trucks and sport utility vehicles are based on 5 mph emission rates for the light-duty truck (LDT) and medium-duty vehicle categories, respectively. Factors for employee commute vehicles are based on a weighted average for all vehicle speeds for EMFAC's light-duty auto/LDT vehicle categories. Fugitive re-entrained road dust emissions were estimated using USEPA's *Compilation of Air Pollutant Emission Factors* (AP-42), Sections 13.2.1 and 13.2.2 (U.S. Environmental Protection Agency 2006, 2011).

- **Locomotives**: Emissions from diesel-powered locomotives used to transport rail materials were quantified using the USEPA's locomotive engine emission standards (U.S. Environmental Protection Agency 2009) and activity data provided by the project engineer (AECOM 2020a). All locomotives were assumed to utilize a 1,500 horsepower, Tier 0 engine.
- **Site Grading and Earth Movement**: Fugitive dust emissions from earth movement (i.e., site grading, bulldozing, and truck loading) were quantified using emission factors from CalEEMod and USEPA's AP-42 (U.S. Environmental Protection Agency 1998a and 2006). Data on the total graded acreage and quantity of cut-and-fill material were provided by the project engineer (AECOM 2020a).
- **Paving**: Fugitive ROG emissions associated with paving were calculated using data (e.g., square feet paved) provided by the project engineer and the CalEEMod default emission factor of 2.62 pounds of ROG per acre paved (AECOM 2020a; Trinity Consultants 2017).

Operations

Operation of the Proposed Project and the Atwater Station Alternative would increase passenger train activities (including locomotive movement, locomotive idling[7], and connecting shuttle service), as well as attract additional motor vehicles to existing and new ACE stations. The Proposed Project and the Atwater Station Alternative operations would expand existing ACE service, which would also remove some single-occupancy vehicles from the transportation network and reduce mobile source emissions. Emissions calculations consider both direct and indirect emissions generated by these sources. Emissions were modeled for existing (2019)[8], full operations (2030)[9], and horizon year (2040) conditions to capture changes in Proposed Project and the Atwater Station Alternative

[7] For locomotive idling, the worst-case year would be full operations (2030) because there would be about twice as much idling at the Merced Station and about four times as much idling at the Merced Layover & Maintenance Facility, compared to the idling at these two locations for initial operations of one train in 2025. This analysis evaluates the full operational scenario in 2030.

[8] 2019 was used as the baseline condition because full year data was not available for 2020 during EIR preparation and because 2020 is an anomalous year for transportation emissions due to the substantial disruptions due to the COVID-19 health emergency.

[9] As discussed in Chapter 2, Project Description, operations could start by 2025 with one round trip per day between Ceres and Merced, increasing to four round trips per day in 2030. The year 2030 was selected for the air quality analysis over 2025 since the Project would first reach its full level of operation in 2030 including its full level of train operations. In addition, given the progressive improvement in passenger vehicle efficiency, the benefits of diverting passenger vehicle use through increase train use would be lower in 2030 than in 2025 on a per vehicle-mile travelled (VMT) diverted basis and thus the analysis for 2030 would be conservative compared to 2025.

activity. In addition, emissions were modeled using regional emission factors to represent vehicles in both the BAAQMD and SJVAPCD.

Chapter 2, *Project Description*, provides additional information on the ridership estimate for the Proposed Project and the Atwater Station Alternative.

ACE Operations

Expanded passenger rail service would result in increased diesel fuel combustion and associated criteria pollutant emissions from increased locomotive activity. Table 3.3-6 summarizes the daily operating hours. As noted in the table, all locomotives would operate with Tier 4 engines (Leavitt pers. comm.). The locomotives for the Project would use renewable diesel fuel. Because the locomotives were modeled with Tier 4 engines, the use of renewable diesel would not result in any further direct criteria pollutant emissions reductions from the locomotive exhaust stacks.

Table 3.3-6. Daily Locomotive Operating Hours by Engine Tier in the Ceres to Merced Corridor

Condition	Tier 4 Daily Operating Hours[a]
Existing (2019)[b]	-
2030 No Project Conditions[b]	-
2030 Project and Atwater Station Alternative	4.8[c]
2040 No Project Conditions[b]	-
2040 Project and Atwater Station Alternative	4.8[c]

[a] The assumption that all locomotives would have tier 4 engines is from Leavitt pers. comm.

[b] For the existing and no project conditions, it is assumed that there would be no increase in locomotive operating hours. There would be operating hours associated with the existing ACE system, but no additional locomotive operating hours would occur in the Ceres to Merced corridor.

[c] Based on the prototypical schedule, the operating duration for one train would be 34 or 40 minutes, depending on the route direction. The total duration for the eight daily trains between Ceres and Merced would be four hours and 50 minutes, or approximately 4.8 hours.

Diesel locomotive engine power is controlled by "notched" throttles. Idling, braking, and moving the locomotive is conducted by placing the throttle in one of several available "notch" settings. A locomotive's *duty cycle* is a description of how much, on average, the locomotive spends in each notch setting while operating. ROG, NO_X, CO, and PM emissions generated by ACE operations were estimated using USEPA's (U.S. Environmental Protection Agency 2009) locomotive emissions standards and default assumptions for an average locomotive duty cycle (U.S. Environmental Protection Agency 1998b). The emission standards are defined per unit of activity (in grams per horsepower-hour) by engine tier (e.g., Tier 4). SO_X emissions were calculated based on a diesel fuel density of 3,200 grams per gallon (U.S. Environmental Protection Agency 2009) and a sulfur content of 15 parts per million sulfur, consistent with CARB and USEPA requirements (U.S. Environmental Protection Agency 2016b). Daily criteria pollutant emissions were annualized assuming 254 operating days per year, because ACE service operates only on weekdays.

ACE locomotives idle while loading passengers at stations, when at the end of the line, and while warming up after receiving routine maintenance. The locomotives traveling between Ceres and Merced would receive maintenance at the proposed Merced Layover & Maintenance Facility. Idling emissions at the stations (during passenger loading and end-of-line time) and at the Merced Layover & Maintenance Facility were quantified using USEPA's locomotive emissions standards (U.S.

Environmental Protection Agency 2009). Daily idling hours were provided by the engineering team (AECOM 2020a). In the future, ACE locomotives may be even lower-emitting than Tier 4 because hybrid-electric equipment may be used. The analysis presented here is conservative, however, because the modeling and analysis assumed that locomotives, while Tier 4, would be fully diesel-powered and not hybrid-electric.

Facility Operation

The Merced Layover & Maintenance Facility would consume natural gas and occasionally use a diesel-powered emergency generator, both of which generate criteria pollutant emissions. Natural gas consumption at the Merced Layover & Maintenance Facility was estimated in CalEEMod based on the default consumption rates for light industrial uses and the facility's square footage. Criteria pollutant emissions from the emergency generator were quantified based on the operating characteristics of the emergency generator at the ACE Rail Maintenance Facility in Stockton (generator model, operating time) and emission factors from CalEEMod (AECOM 2020d).

Expanded Shuttle Service

ACE provides shuttle connections at the Great America and Pleasanton Stations, which are used by nearly half of ACE riders (Altamont Corridor Express 2015). Changes in ACE ridership, therefore, will have corresponding effects on shuttle demand and vehicle miles traveled (VMT). Criteria pollutant emissions associated with changes in Great America Station and Pleasanton Station shuttle service were estimated using VMT data provided by AECOM and emission factors obtained from EMFAC2017 for the relevant years of analysis (i.e., operational emissions from the shuttles in 2030 were estimated using a 2030 emission factor, etc.) (AECOM 2020b). Re-entrained road dust was calculated using the same methodology as for construction trips (refer to discussion above of *On-Road Vehicles* under *Construction*). Because all shuttle trips would occur in the Bay Area, all emissions were assigned to BAAQMD. The shuttle emissions are a conservative estimate because the shuttles may be fully electric in 2030 and/or 2040. Shuttles would still generate tire, brake, and road dust, but there would not be any exhaust-related emissions.

Under the No Project Conditions, there would be a bus bridge[10] service between Ceres and Merced instead of the locomotive service. Thus, the No Project Conditions includes emissions associated with the electric bus trips between Ceres and Merced. Because electric buses would be utilized for this service, the vehicles would not generate any exhaust criteria pollutant emissions. Re-entrained road dust was calculated using the same methodology as described for construction trips (refer to discussion above of *On-Road Vehicles* under *Construction*). Because all trips would occur in the San Joaquin Valley, all road dust emissions were assigned to SJVAPCD. With buildout of the Proposed Project, the bus bridge would no longer be provided.

Displaced Vehicles Miles

Operation of the Proposed Project and the Atwater Station Alternative would expand passenger rail service between Ceres and Merced that would result in reductions in passenger vehicle usage. AECOM provided displaced VMT by year and scenario (Proposed Project in 2030, Atwater Station Alternative in 2030, etc.). The VMT was apportioned into 5-mph speed bins based on overall speed profiles from CARB's EMFAC2017 model. Criteria pollutant reductions achieved by displaced VMT were estimated using emission factors from EMFAC2017. Re-entrained road dust was calculated

[10] This would be an electric bus bridge.

using the same methodology as for construction trips (refer to discussion of *On-Road Vehicles* under *Construction*, above).

Emission reductions from displaced VMT were apportioned to the two air districts based on the expected distribution of miles, as analyzed in the programmatic analysis of the Ceres to Merced extension from the *ACE Extension Lathrop to Ceres/Merced EIR* (Prior EIR). In that analysis, emission reductions from displaced VMT between the Stockton and Ceres Stations were allocated to SJVAPCD, for example. Emissions reductions for VMT that span both SJVAPCD and BAAQMD were apportioned to each air district based on the roadway miles between each station.

The No Project Conditions would involve the use of a bus bridge between Ceres and Merced instead of train service. This bus bridge would result in VMT reductions (compared to the existing conditions without the bus bridge) because passengers would use the bus bridge and then ACE train service instead of driving. The passenger ridership quantities and VMT reductions associated with the bus bridge are considered to be part of the system-wide No Projection Conditions. The Proposed Project's displaced quantity of VMT is relative to No Project Conditions and, thus, represents the Proposed Project's incremental reduction in VMT relative to system-wide ACE operation, including operation of the bus bridge.

Net Operational Emissions

The impact analysis evaluates total operational emissions inclusive of the four emission components (*ACE Operations*, *Locomotive Idling*, *Expanded Shuttle Service*, and *Displaced Vehicles Miles*) discussed in this section. Expansion of ACE and connecting shuttle services, as well as operation of the three additional stations, are emissions sources that would result in an increase in daily criteria pollutants relative to existing conditions and No Project Conditions. Displaced VMT would result in a decrease in daily emissions relative to existing conditions and No Project Conditions. The difference between emissions generated by operation of the ACE locomotives and shuttles, and reductions achieved by displaced VMT represents the total net operational impact.

Health Risk Analysis

Construction

Construction of the Proposed Project would generate DPM from diesel-powered off-road equipment, locomotives, and haul trucks. Exposure to construction-related DPM was assessed by predicting the health risks in terms of excess cancer and non-cancer hazard impacts. USEPA's AERMOD dispersion model was used to predict DPM hourly concentrations at sensitive land uses based on the maximum daily PM10 exhaust emissions, with exhaust emissions of PM10 used as a surrogate for DPM based on SJVAPCD guidance. Project-level cancer risk and non-cancer hazard index (HI) were estimated based on annual concentrations from AERMOD using CARB's Hot Spots Analysis and Reporting Program Version 2 (HARP 2). HARP 2 incorporates OEHHA's recent guidance update, which includes age-specific factors to account for the increased sensitivity to carcinogens during early-in-life exposure.

Health risks from construction emissions were assessed for worst-case scenarios for the Proposed Project and the Atwater Station Alternative. The analysis evaluates health risks from construction of the stations under a worst-case scenario. The worst-case scenario was modeled at the Atwater Station Alternative because this station was determined to have the highest DPM emissions density per area and has sensitive receptors that are immediately adjacent to the station footprint. Health

risks for Atwater Station construction were modeled based on the estimated construction duration of the station (12 months). Consequently, the station construction analysis represents the worst-case health risks associated with construction of any of the stations.

The new Ceres to Merced Extension Alignment was modeled as a line source because the environmental footprint is long and narrow. To evaluate a worst-case scenario, receptors were placed at the mid-point of a 2-kilometer segment representing the alignment construction, and the receptors were oriented perpendicular to the rail alignment on both sides of the rail line. The closest receptor was placed at 30 feet from the centerline of the railway, then at 50, 75, 100, 150, 200, 250, 300, 350, 400, 450, and 500 feet. Construction of the alignment for the representative two kilometer segment was assumed to occur for 12 months, which is a conservative assumption. It is likely that any given receptor would be exposed to construction emissions for less than 12 months, because construction will progress linearly along the alignment.

Operations

Proposed Project operations would increase DPM emissions along the extension alignment corridor from new ACE train service, and could also affect existing freight rail emissions. Health risks from DPM emissions from locomotive emissions (from ACE operation and idling and freight relocation) were modeled. Health risks from ACE operations were modeled for one condition, because there is not expected to be notable differences in ACE operations from Ceres to Merced between full operations in 2030 and the horizon year of 2040. The ACE locomotives are expected to have Tier 4 engines in both years. The health risk is determined primarily as a function of the operational emissions, local meteorology, and proximity to the rail line. The health risk analysis is based on the number of train trips because the intensity of the emissions is dependent on train trips. The analysis presented here is conservative because ACE locomotives may be even lower-emitting than Tier 4 in the future. Hybrid-electric equipment may be used, but this analysis assumes that locomotives, while Tier 4, will be fully diesel-powered and not hybrid-electric.

ACE Operations

Expanded passenger rail service would result in increased diesel fuel combustion and increased health risk from exposure to diesel exhaust from increased locomotive activity. Using the operating characteristics and locomotive fleet characteristics in Table 3.3-6, above, DPM emissions were determined for Proposed Project operations from the additional locomotive DPM emissions. Health risks were assessed based on a combination of Project engineering input and defaults, as described in the following list.

- **Air Dispersion Model**: USEPA's AERMOD (version 19191) model is a steady-state Gaussian dispersion model that determines air dispersion based on planetary boundary layer turbulence using similarity theory, and includes treatment for both surface and elevated releases. It is USEPA's preferred air dispersion model for near-field air quality impact assessment. The model was used to assess the DPM that occur as result of operational activities associated with the Proposed Project and the Atwater Station Alternative.
- **Track Layout:** To model the alignment, the general orientation of the rail line was determined based on reviewing engineering diagrams and Google Earth maps of the rail alignment. The alignment was represented by a 2-kilometer segment to characterize the spatial allocation of emissions over the rail line.

- **Meteorology:** For each segment, 5 years of representative meteorological data was acquired from the SJVAPCD for use in the air dispersion model. The meteorological data was provided by SJVAPCD. The Merced Airport meteorological dataset was used for each modeling analysis.
- **Exposure Assessment**: The exposure assessment was conducted using HARP 2. This software was originally developed to assist with the programmatic requirements of California's Air Toxics "Hot Spots" Program (Assembly Bill 2588) and has been extended for use in conducting health risk assessments (HRA) under CEQA. For this study, only the risk assessment standalone tool was used, which calculates cancer risk from the AERMOD modeled concentrations using the 2015 OEHHA HRA guidance.
- **Receptor Locations:** Receptors were placed at the mid-point of a 2-kilometer segment representing the alignment to minimize end effects, and the receptors were oriented perpendicular to the rail alignment on both sides of the rail line. The closest receptor was placed at 30 feet from the centerline of the railway, then at 50, 75, 100, 150, 200, 250, 300, 350, 400, 450, and 500 feet.
- **Source Characterization:** The 2-kilometer segment was divided into 15 area sources, each 133.4 meters long and 14 meters wide. The width was based on a doubletrack width of 8 meters (as measured based on the Proposed Project engineering drawings) plus 3 meters on either side to include turbulent wake mixing effects. Locomotive release height and initial vertical dispersion were conservatively modeled for a daytime period. The locomotive modeling approach and assumptions were first developed by CARB in their Roseville Railyard Study (California Air Resources Board 2004) and further developed in the *Air Dispersion Modeling Assessment of Air Toxic Emissions from the BNSF Richmond Railyard* (Richmond Railyard Study) (Environ 2006). The train was conservatively assumed to have maximum exposure when traveling at a slow speed (notch setting one) resulting in having a daytime release parameter for the plume height and initial vertical dimension of 5.87 and 1.37 meters, respectively. These calculations are based on a 4.52-meter stack height for the locomotive. Further source details are shown in Table 3.3-7.
- **Land-Use Characterization:** Most locations along the Proposed Project route where the vast majority of population exposure occurs have urban land uses. Thus, the urban dispersion modeling algorithm was used in the assessment. This algorithm accounts for the increased dispersion that occurs in nighttime conditions in urban areas due to the urban heat island effect. Population data is used in defining the strength of the urban heat island effect, and the population for Merced County was used in the modeling (California Employment Development Department n.d.).

Table 3.3-7. Modeled Area, Track Orientation, and Representative Meteorology

Modeled Area	Track Orientation (degrees)	Representative Meteorology
Ceres to Merced	110/290	Merced (2013–2017)

Additional locomotive idling will occur at the new stations. The largest increase in idle emissions will occur at the new Merced station where baseline emissions are currently zero and where trains will idle for up to 15 minutes during end-of-line start-up and shut-down. Thus, the station idling analysis focuses on the Merced Station, which has the greatest potential to expose receptors to

health risks. Table 3.3-8 identifies the facility/station analyzed, number of daily train visits, distance to the nearest residential receptor, and the representative meteorological data used in the dispersion modeling. Health risks were based on a similar approach to the train operations, but with the following changes.

- **Receptor Locations:** Receptors were placed at the nearest potential receptor locations near the train station or layover facility.
- **Source Characterization:** During idle periods the trains behave as a point source of emissions. Thus, the locomotive emissions were modeled as a point source using the stack parameters for line-haul engines as used in Richmond Railyard Study (Environ 2006). The locomotive stack height was set at 4.52 meters, with a stack temperature of 389.1 Kelvin, exit velocity of 5.1 meters per second, and stack diameter of 0.55 meter.

Table 3.3-8. Number of New ACE Train Visits per Day, Distance to Nearest Resident, and Representative Meteorology for the Proposed Project

Name of New Station/Facility	Distance to Nearest Residential Receptor (meters) and Direction (degrees)	Maximum Train Visits Per Day	Representative Meteorology
Merced Station	7 meters, 20°	8	Merced (2013–2017)
Merced Layover & Maintenance Facility	50 meters, 90°	4	Merced (2013–2017)

Source: Compilation by ICF from project plans.

Freight Relocation

Because the Proposed Project would result in the construction of an additional track that may be used by freight trains, the existing distance between the train tracks and sensitive receptors could decrease with new track construction. It is expected that up to half of the existing freight rail traffic could use the new track, while the remaining half of freight traffic would use the existing track. Thus, the incremental change in DPM emissions between the No Project Conditions (freight rail on existing tracks) and the Proposed Project scenarios (half of freight on existing track, half on new track) was modeled to determine the Proposed Project's incremental contribution to health risks as a result of the freight relocation.

The freight relocation analysis was modeled using the same methods as the methods described above (i.e., a 2 kilometer segment, with receptors placed at the midpoint starting at 30 feet from the centerline). For the freight evaluation, a single track was modeled for the 2030 and 2040 No Project Conditions, with a track width of 3.1 meters and plus 3 meters on either side to include turbulent wake mixing effects. For the Proposed Project, a double track area with a width of 8 meters was modeled, with 3 meters on either side. Emissions from diesel-powered freight locomotives used were quantified using the USEPA's locomotive engine emission standards and fuel economy data from Union Pacific (U.S. Environmental Protection Agency 2009; Union Pacific 2019). Estimated freight train numbers were taken from the California State Rail Plan (California Department of Transportation 2018a).

Carbon Monoxide Hot Spot Analysis

Implementation of the Proposed Project and the Atwater Station Alternative would attract additional motor vehicles to existing and new ACE stations. Vehicles may also experience additional delay at railway crossings as a result of increased transit service. SJVAPCD has adopted screening criteria that provide a conservative indication of whether a project's-generated traffic would cause a potential CO hot spot. If an intersection exceeds level of service standards in a congestion management program (CMP), the added traffic associated with the project could exacerbate that exceedance.

To evaluate potential impacts, a microscale CO hot-spot analysis at the intersection of West 16th Street and R Street in Merced in the SJVAPCD was conducted to verify that Project traffic would not cause or contribute to a violation of the CO CAAQS. Although a project-specific traffic study did not identify intersection traffic volumes, existing intersection data was obtained to develop a worst-case scenario. Out of the proposed stations and the Atwater Station Alternative, parking demand and thus vehicle volumes at the Merced Station would be the largest. Thus, the potential intersections to study for CO impacts were narrowed to those in Merced, particularly those near the proposed station in downtown Merced. To obtain existing traffic data for intersections in Merced, the City's 2030 General Plan EIR was reviewed (City of Merced 2010). Existing peak hour counts for over 40 intersections are included in the transportation appendices of the Draft General Plan EIR. The intersection with the highest traffic volumes and near the Merced Station is the intersection of 16th Street and R Street. Traffic volumes at this intersection, from 2008, were used and scaled to the Proposed Project's operational years of 2030 and 2040 using CARB's EMFAC database.

To calculate the approximate change in vehicle volumes between 2008 and 2030/2040, vehicle population data in each of these years were obtained from EMFAC, and the percentage change values between 2008 and 2030/2040 were calculated. Between 2008 and 2030, the vehicle population in Merced County is anticipated to increase by 32 percent, while the increase between 2008 and 2040 is anticipated to be 55 percent (California Air Resources Board 2020c). These percentage values were then applied to the 2008 intersection data from the Merced General Plan EIR to approximate the vehicle volumes in 2030 and 2040 at 16th Street and R Street in downtown Merced.

Finally, to account for the Project-specific volumes that the new Merced Station would add, the daily parking demand at Merced station was added to the intersection volumes at 16th Street and R Street (AECOM 2020c).

With the traffic volumes at the worst-case intersection determined, the potential for CO hot spots was then evaluated using the California Department of Transportation (Caltrans) Institute of Transportation Studies *Transportation Project-Level Carbon Monoxide Protocol* (CO Protocol) (Garza et al. 1997). The CO Protocol details a step-by-step procedure to determine whether project-related CO concentrations have the potential to generate new air quality violations, worsen existing violations, or delay attainment of CAAQS or NAAQS for CO. This section provides details of the modeling.

Vehicle emission rates were determined using the EMFAC emission rate program. Free flow traffic speeds were adjusted to a speed of 5.0 mph for vehicles entering and exiting intersection segments to represent a worst-case scenario because 5.0 mph is the lowest speed EMFAC allows. EMFAC modeling procedures followed the guidelines recommended by Caltrans (Garza et al. 1997). The

program assumed Merced County regional traffic data, averaged for each subarea, operating during the winter months.

CO concentrations were estimated at four receptor locations at the modelled intersection. The receptors were placed at the edge of the mixing zone from the corner of the modelled intersection, accounting for the intersection dimensions as determined by the number of lanes in each direction. The mixing zone is defined by a 3-meter buffer from the outer edge of a roadway. Receptors were modeled at the edge of the mixing zone to represent a worst-case scenario as the nearest location in which a receptor could potentially be located adjacent to a travelled roadway. The modeled receptors are not representative of the actual sensitive receptors and represent receptors located at the nearest possible location at the intersection of the modeled mixing zones.[11] Receptors were chosen based on the CO Protocol (Garza et al. 1997). Receptor heights were set at 5.9 feet.

Meteorological inputs to the CALINE4 model were determined using methodology recommended in Appendix B of the CO Protocol (Garza et al. 1997). The meteorological conditions used in the modeling represent a calm winter period. Worst-case wind angles were modeled to determine a worst-case concentration for each receptor. The meteorological inputs included: 0.5 meters per second wind speed, ground-level temperature inversion (atmospheric stability class G), wind direction standard deviation equal to 15 degrees, and a mixing height of 1,000 meters.

Background concentration data for 1- and 8-hour CO values were obtained from USEPA and added to the project-level values to account for sources of CO not included in the modeling (Table 3.3-3). Eight-hour modeled values were calculated from the 1-hour values using a persistence factor of 0.7. Background concentrations for the first full year of operations (2030) and the horizon (2040) year conditions were assumed to be the same as those for the current year. Actual 1- and 8-hour background concentrations in future years would likely be lower than those used in the CO modeling analysis, because the trend in CO emissions and concentrations is decreasing as a result of continuing improvements in engine technology and the retirement of older, higher-emitting vehicles. Appendix J, *Air Quality, Greenhouse Gas, and Health Risk Assessment Supporting Documentation,* presents CALINE4 model output files.

3.3.4.2 Thresholds of Significance

CEQA Guidelines Appendix G (14 California Code of Regulations 15000 et seq.) has identified significance criteria to be considered for determining whether a project could have significant impacts on air quality.

An impact would be considered significant is construction or operation of the Proposed Project and the Atwater Station Alternative would have any of the following consequences.

- Conflict with or obstruct implementation of the applicable air quality plan.
    - For this analysis, "conflict with or obstruct implementation" is defined as circumstances in which the project would worsen existing air quality violations or exceed the growth assumptions utilized by MTC, SJCOG, or the StanCOG.

[11] The *mixing zone* represents the region directly over the highway as a zone of uniform emissions and turbulence. This area is the region over the traveled way (traffic lanes, not including shoulders) plus 3 meters on either side. The additional 3-meter width accounts for the initial horizontal dispersion of pollutants by the vehicle wake. Within the mixing zone, the mechanical turbulence created by moving vehicles and the thermal turbulence created by hot vehicle exhaust are assumed to be the dominant dispersive mechanisms (Benson 1989).

- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is designated a nonattainment area under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
    - For this analysis, a "cumulatively considerable net increase" is defined as circumstances in which construction or operational emissions exceed the pertinent air quality thresholds of significance, as described below under *Supplemental Thresholds* and shown in Table 3.3-9.
- Expose sensitive receptors to substantial pollutant concentrations.
    - For this analysis, schools, day care facilities, medical facilities, parks, and residences are considered sensitive receptor locations. A "substantial pollutant concentration" is defined as levels in excess of the applicable air district thresholds described under *Supplemental Thresholds*.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.
    - For this analysis, construction of an odor-producing facility, as defined by the study area air quality management districts, would result in an "objectionable odor" capable of affecting a substantial number of people. Odor-producing facilities include landfills, wastewater treatment plants, food processing facilities, and certain agricultural activities.

The CEQA Guidelines Section 15125 indicate that existing conditions at the time a notice of preparation is released or when environmental review begins "normally" constitute the baseline for environmental analysis. In 2010, the California Supreme Court issued an opinion that while lead agencies have some flexibility in determining what constitutes the baseline, relying on "hypothetical allowable conditions" when those conditions are not a realistic description of the conditions without the Proposed Project, would be an illusory basis for a finding of no significant impact from the Proposed Project and, therefore, a violation of CEQA (*Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 48 Cal. 4th 310).

On August 5, 2013, the California Supreme Court decided *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (57 Cal. 4th 439). This latest decision has clarified that, under certain circumstances, a baseline may reflect future, rather than existing, conditions. The rule specifies that factual circumstances can justify an agency using a future baseline in the following circumstances when such reasons are supported by substantial evidence:

- When necessary to prevent misinforming or misleading the public and decision makers.
- When the use of future conditions in place of existing conditions is justified by unusual aspects of the project or surrounding conditions.

With respect to the Proposed Project and the Atwater Station Alternative, using existing conditions to evaluate criteria pollutant impacts would misrepresent and mislead the public and decision makers with respect to potential air quality impacts, for the following reasons: (1) changes in on-road emission factors, and (2) net Proposed Project VMT reductions.

1. On-road vehicle emissions rates are anticipated to lessen in the future due to continuing engine advancements and more stringent air quality regulations. Applying the complete ridership increase under existing conditions (2019) and quantifying emissions utilizing 2019 vehicle

emissions rates would not only represent a fictitious scenario but would also overestimate emissions reductions and potential air quality benefits achieved by the Proposed Project.

2. Using the relatively higher "existing conditions" emissions factors to quantify emissions reduction benefits assorted with Project-related VMT reductions in the years 2030 and 2040 would overstate the Proposed Project's emissions reduction benefits.

These facts represent substantial evidence in support of using a future conditions analysis, rather than existing conditions, to evaluate air quality impacts. Accordingly, for this analysis, the CEQA assessment evaluates the Proposed Project and the Atwater Station Alternative emissions under the full operations (2030) and horizon (2040) year conditions, compared to the future No Project Conditions. This approach reflects appropriate vehicle fleet characteristics and emission factors. Using future year conditions as the basis for the CEQA analysis avoids misinforming and misleading the public and decision makers with respect to air quality impacts, consistent with current CEQA case law.

For the purposes of full disclosure, the comparison of the Proposed Project's operational emissions is presented relative to both existing and No Project Conditions; however, significance determinations are only made with respect to No Project Conditions based on the rationale explained above.

Supplemental Thresholds

The following section summarizes relevant thresholds and presents substantial evidence regarding the basis upon which they were developed. This section also describes how the thresholds are used to determine whether construction and operation of the Proposed Project and the Atwater Station Alternative would result in a significant impact within the context of (1) interfering with or impeding attainment of CAAQS or NAAQS, or (2) causing or contributing to increased risk to human health.

Regional Thresholds for Air Basin Attainment of State and Federal Ambient Air Quality Standards

BAAQMD and SJVAPCD have established different thresholds for criteria pollutants. The criteria pollutant thresholds identified in Table 3.3-9 were adopted by BAAQMD and SJVAPCD to assist lead agencies in determining the significance of environmental effects with regard to local attainment of state and federal ambient air quality standards.

BAAQMD and SJVAPCD's ROG, NOx, and PM thresholds are based on emissions levels identified under the New Source Review (NSR) program. The NSR program is a permitting program that was established by Congress as part of the CAA Amendments to ensure that air quality is not significantly degraded by new sources of emissions. The NSR program requires stationary sources receive permits before starting construction or use of the equipment. By permitting large stationary sources, the NSR program ensures that new emissions would not slow regional progress toward attaining NAAQS. BAAQMD and SJVPACD have concluded that pollutants generated by land use and other projects not subject to the NSR (like this Project) are equally significant to the stationary pollutants described under the NSR program. BAAQMD's and SJVAPCD's thresholds identified in Table 3.3-9 were set as the total emission thresholds associated within the NSR program to help attain NAAQS (Bay Area Air Quality Management District 2017a; San Joaquin Valley Air Pollution Control District 2015).

Accordingly, emissions in excess of BAAQMD or SJVAPCD thresholds (Table 3.3-9) would be expected to have a significant impact on air quality because an exceedance of the thresholds is anticipated to contribute to CAAQS and NAAQS violations. Further, by its very nature, regional air pollution is a cumulative impact. Emissions from past, present, and future projects contribute to unfavorable air quality on a cumulative basis. No single project by itself would be sufficient in size to result in regional nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative negative air quality impacts. Both BAAQMD and SJVAPCD have identified project-level mass emission thresholds to evaluate impacts on air quality. The thresholds have been adopted to prevent further deterioration of ambient air quality, which is influenced by emissions generated by projects within a specific air basin. The project-level thresholds, therefore, consider relevant past, present, and reasonably foreseeable future projects within SFBAAB and SJVAB. For example, as noted in BAAQMD's CEQA Guidelines,

> In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary (Bay Area Air Quality Management District 2017a).

And in SJVAPCD's GAMAQI,

> If project specific emissions exceed the thresholds of significance for criteria pollutants the project would be expected to result in a cumulatively considerable net increase of any criteria pollutant for which [SJVAPCD] is in non-attainment under applicable federal or state ambient air quality standards (San Joaquin Valley Air Pollution Control District 2015).

The mass emissions thresholds in Table 3.3-9, therefore, represent the maximum emissions a project may generate before contributing to a cumulative impact on regional air quality.

Table 3.3-9. Bay Area Air Quality Management District and San Joaquin Valley Air Pollution Control District Mass Emission Thresholds

Analysis	BAAQMD	SJVAPCD
Construction	Not Applicable [a]	ROG: 10 tons/year or 100 lbs/day[b] NO_X: 10 tons/year or 100 lbs/day[b] PM10: 15 tons/year or 100 lbs/day[b] PM2.5: 15 tons/year or 100 lbs/day[b] CO: 100 tons/year or 100 lbs/day[b] SO_X: 27 tons/year or 100 lbs/day[b]
Operations	ROG: 54 lbs/day or 10 tons/year NO_X: 54 lbs/day or 10 tons/year PM10: 82 lbs/day or 15 tons/year PM2.5: 54 lbs/day or 10 tons/year	Same as construction

Sources: Bay Area Air Quality Management District 2017a; San Joaquin Valley Air Pollution Control District 2015.

ROG	=	reactive organic gases.
lbs	=	pounds.
NO_X	=	nitrogen oxide.
PM10	=	particulate matter that is 10 microns in diameter and smaller.
PM2.5	=	particulate matter that is 2.5 microns in diameter and smaller.
CO	=	carbon monoxide.

SO_X	=	sulfur oxide.
CAAQS	=	California ambient air quality standards.
NAAQS	=	national ambient air quality standards.

[a] Thresholds not applicable to the Proposed Project because there would be no construction in BAAQMD.

[b] The 100-pound-per-day threshold is a screening-level threshold to help determine whether increased emissions from a proposed project will cause or contribute to a violation of CAAQS or NAAQS. Projects with emissions below the threshold will not be in violation of CAAQS or NAAQS. Projects with emissions above the threshold would require an Ambient Air Quality Analysis to confirm this conclusion (San Joaquin Valley Air Pollution Control District 2015).

Health-Based Thresholds for Project-Generated Pollutants of Human Health Concern

In December 2018, the California Supreme Court issued its decision in *Sierra Club v. County of Fresno* (226 Cal.App.4th 704) (hereafter referred to as the "Friant Ranch" decision). The case reviewed the long-term, regional air quality analysis contained in the EIR for the proposed Friant Ranch development. The Friant Ranch project is a 942-acre master-plan development in unincorporated Fresno County within the San Joaquin Valley Air Basin, an air basin currently in nonattainment for the ozone and PM2.5 NAAQS and CAAQS. The Court found that the air quality analysis was inadequate because it failed to provide enough detail "for the public to translate the bare [criteria pollutant emissions] numbers provided into adverse health impacts or to understand why such a translation is not possible at this time." The Court's decision clarifies that environmental documents must connect a project's air quality impacts to specific health effects or explain why it is not technically feasible to perform such an analysis.

As discussed in Section 3.3.3.2, *Pollutants of Concern*, all criteria pollutants that would be generated by the Proposed Project and the Atwater Station Alternative are associated with some form of health risk (e.g., asthma). Criteria pollutants can be classified as either regional or localized pollutants. Regional pollutants can be transported over long distances and affect ambient air quality far from the emissions source. Localized pollutants affect ambient air quality near the emissions source. Ozone is considered a regional criteria pollutant, whereas CO, NO2, SO2, and Pb are localized pollutants. PM can be both a local and a regional pollutant, depending on its composition. As discussed above, the primary criteria pollutants of concern generated by the project are ozone precursors (ROG and NOX), CO, and PM (including DPM).

Because localized pollutants generated by a project can directly affect adjacent sensitive receptors, the analysis of project-related impacts on human health focuses on those localized pollutants with the greatest potential to result in a significant, material impact on human health. Potential health effects associated with project-generated ozone precursors are only discussed within the regional and cumulative context. This approach is consistent with the current state of practice and published guidance by BAAQMD, SJVAPCD, California Air Pollution Control Officers Association, OEHHA, and CARB (Bay Area Air Quality Management District 2017a; San Joaquin Valley Air Pollution Control District 2015; California Air Pollution Control Officers Association 2009; Office of Environmental Health Hazard Assessment 2015; California Air Resources Board 2000). The local pollutants of concern are (1) localized CO, (2) DPM, (3) localized PM, (4) asbestos, and (5) *C. immitis* (Valley Fever). Adopted thresholds of significance for each local pollutant are identified in the following subsections.

Localized Carbon Monoxide Concentrations

BAAQMD and SJVAPCD consider localized CO emissions to result in significant impacts if concentrations exceed CAAQS (Table 3.3-1).

Diesel Particulate Matter and Localized Particulate Matter

BAAQMD and SJVAPCD have adopted separate thresholds to evaluate receptor exposure to DPM emissions. The substantial DPM threshold defined by BAAQMD is the probability of contracting cancer for the maximum exposed individual (MEI) exceeding 10 in 1 million, or the ground-level concentrations of non-carcinogenic TACs resulting in an HI greater than 1 for the MEI. SJVAPCD's HI is also greater than 1 for the MEI, but its cancer risk threshold is 20 in 1 million.

BAAQMD has adopted an incremental concentration-based significance threshold to evaluate receptor exposure to localized PM2.5, where a substantial contribution is defined as PM2.5 exhaust (diesel and gasoline) concentrations exceeding 0.3 µg/m^3. SJVAPCD also requires dust control measures to reduce fugitive PM2.5 and PM10 during construction activities.

BAAQMD's cumulative cancer risk threshold is 100 cases per million and its non-cancer thresholds are an HI greater than 10.0 and a PM2.5 concentration greater than 0.8 µg/m^3. SJVAPCD has not adopted separate cumulative health risk thresholds.

Table 3.3-10 summarizes the cancer and non-cancer health risk thresholds used in the analysis.

Table 3.3-10. Bay Area Air Quality Management District and San Joaquin Valley Air Pollution Control District Cancer and Non-Cancer Health Risk Thresholds

Air District	Cancer Risk	Hazard Index	PM2.5 Concentration (µg/m^3)
BAAQMD	10 per million (project) 100 per million (cumulative)	1.0 (project) 10.0 (cumulative)	0.3 (project) 0.8 (cumulative)
SJVAPCD	20 per million (project and cumulative)	1.0 (project and cumulative)	-

Sources: Bay Area Air Quality Management District 2017a; San Joaquin Valley Air Pollution Control District 2015.
DPM = diesel particulate matter.
PM2.5 = particulate matter that is 2.5 microns in diameter and smaller.
µg/m^3 = micrograms per cubic meter.
- = no threshold.
BAAQMD = Bay Area Air Quality Management District.
SJVACPD = San Joaquin Valley Air Pollution Control District.

Asbestos

There are no quantitative thresholds related to receptor exposure to asbestos. However, SJVAPCD requires the demolition or renovation of asbestos containing building materials to comply with the limitations of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations as listed in the Code of Federal Regulations where all construction activities will occur.

Valley Fever

There are no quantitative thresholds related to receptor exposure to *C. immitis.* The potential for the Proposed Project and the Atwater Stational Alternative to expose receptors to Valley Fever is highest in areas known to contain *C. immitis* and during earthmoving activities that generate fugitive dust. Accordingly, uncontrolled construction dust emissions in endemic regions of *C. immitis* could result in increased health impacts from exposure of receptors to *C. immitis* spores.

3.3.4.3 Impacts and Mitigation Measures

Impact AQ-1	Construction of the Proposed Project could conflict with or obstruct implementation of the applicable air quality plan. Operation of the Proposed Project would not conflict with or obstruct implementation of the applicable air quality plan.
Level of Impact	**Potentially significant impact**
Mitigation Measures	AQ-2.1: Implement advanced emissions controls for off-road equipment
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

A project is deemed inconsistent with air quality plans if it would result in population and/or employment growth that exceeds estimates used to develop applicable air quality plans. Projects that propose development consistent with the growth anticipated by the relevant land use plans would be consistent with the current BAAQMD or SJVAPCD air quality plans. Likewise, projects that propose development less dense than anticipated within a general plan (or other governing land use document) would be consistent with the air quality plans because emissions would be less than estimated for the region. If a project proposes development that is greater than the anticipated growth projections, the project would be in conflict with BAAQMD or SJVAPCD air quality plans and might have a potentially significant impact on air quality because emissions would exceed those estimated for the region. This situation would warrant further analysis to determine if a project and surrounding projects would exceed the growth projections used in BAAQMD or SJVAPCD air quality plans for a specific subregional area.

Proposed Project

As discussed in Section 3.11, *Land Use and Planning*, the Proposed Project would not result in significant environmental impacts with respect to consistency with local general plans and policies. Likewise, as noted in Section 3.13, *Population and Housing,* the Proposed Project would not result in substantial or unplanned population or housing growth. The growth that would occur as a result of the Proposed Project, as noted in Section 3.13, would be supportive of local development plans. The Proposed Project would increase service and ridership on the ACE system; however, this increased service would not materially increase the overall growth pressure in the communities served by ACE, because the stations are located in urbanized and developed areas. The Proposed Project would not provide new access to undeveloped areas. Accordingly, the Proposed Project would not induce growth and would be consistent with recent growth projections for the region.

The Proposed Project is listed and/or mentioned in MTC's *San Francisco Bay Area Regional Rail Plan*, the California High-Speed Rail Authority's *Draft 2020 Business Plan*, and *2018 CA State Rail Plan* (Metropolitan Transportation Commission 2007; California High-Speed Rail Authority 2020; California Department of Transportation 2018b). The Proposed Project is also discussed in the RTP/SCS documents adopted by StanCOG, MCAG, and SJCOG (Stanislaus Council of Governments 2018; Merced Council of Governments 2018; San Joaquin Council of Governments 2018).[12] The

[12] Although no components of the Proposed Project are located in San Joaquin County, the ACE system serves San Joaquin County and thus the benefits from implementing the Proposed Project would also affect this county. The

Proposed Project would expand alternative transportation, alleviate traffic congestion, and reduce VMT throughout Northern California. In addition, the Proposed Project would support transit oriented development, which would also help in the reduction of VMT.

Additionally, the Proposed Project would result in a number of benefits, including reduced VMT and traffic congestion that are consistent with the objectives and policies of BAAQMD's and SJVAPCD's air quality plans. The ultimate goal of the air quality plans, however, is to reduce criteria pollutants for which SFBAAB and SJVAB are currently considered nonattainment in order to achieve NAAQS and CAAQS by the earliest practicable date. Both SJVAPCD and BAAQMD have established project-level thresholds to identify projects that may contribute to violations of the ambient air quality standards (Table 3.3-9). Accordingly, projects that result in construction or operational emissions in excess of district mass emission thresholds would conflict with the primary goal of the air quality plans, which is to achieve the regional attainment of NAAQS and CAAQS.

Operation of the Proposed Project would exceed neither BAAQMD's nor SJVAPCD's recommended analysis thresholds. However, construction emissions would exceed SJVAPCD's annual NO_X threshold. SJVAPCD's thresholds were established to help prevent emissions from new projects in the SJVAB from contributing to regional violations of the ambient air quality standards. Because NO_X emissions exceed SJVAPCD's threshold, construction of the Proposed Project may conflict with the *8-hour SJVAPCD 2007 Ozone Plan* and the *2004 Extreme Ozone 1-hour Attainment Demonstration Plan*. This is a potentially significant impact.

Atwater Station Alternative

Like the Proposed Project, the Atwater Station Alternative would not result in significant environmental impacts with respect to consistency with local general plans and policies, would not result in substantial or unplanned population or housing growth, and would not provide new access to undeveloped areas. The Atwater Station Alternative, like the Proposed Project, would also be supportive of local development plans and increase ridership but not materially increase the overall growth pressure in the communities served by ACE. Compared to the proposed Livingston Station, the Atwater Station Alternative would result in slightly higher ridership. Accordingly, the Atwater Station Alternative would not induce growth and would be consistent with recent growth projections for the region. As noted above, the Proposed Project is listed and/or mentioned in the relevant regional rail plans and RTP/SCS documents. Operations of the Atwater Station Alternative would not exceed any air district thresholds; however, construction emissions would exceed SJVAPCD's annual NO_X threshold, and this is a potentially significant impact.

Nonetheless, there would be no difference in impact between the Atwater Station Alternative and the proposed Livingston Station (both would result in a potentially significant impact that would be reduced to a less-than-significant level with mitigation).

Mitigation Measures

Mitigation Measure AQ-2.1 would apply to the Proposed Project and Atwater Station Alternative for potential impacts on air quality. Descriptions of this measure is provided in Impact AQ-2a.

Proposed Project would also support the applicable sustainable communities strategy (SCS), San Joaquin Council of Government's *Regional Transportation Plan* (RTP)/SCS.

Mitigation Measure AQ-2.1: Implement advanced emissions controls for off-road equipment.

Refer to measure description in Impact AQ-2a.

Significance with Application of Mitigation

Mitigation Measure AQ-2.1 (discussed under Impact AQ-2a) would reduce construction-related NO_X emissions from the Proposed Project below SJVAPCD's annual threshold. Accordingly, construction of the Proposed Project would not conflict with applicable air quality plans with implementation of mitigation, and the impact would be less than significant.

For the same reasons as the Proposed Project, implementation of Mitigation Measure AQ-2.1 would ensure that the Atwater Station Alternative would not conflict with applicable air quality plans, and the impact would be less than significant.

Impact AQ-2a	Construction of the Proposed Project could result in a cumulatively considerable net increase of a criteria pollutant for which the Project region is designated a nonattainment area under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
Level of Impact	**Potentially significant impact**
Mitigation Measures	AQ-2.1: Implement advanced emissions controls for off-road equipment AQ-2.2: Implement advanced emissions controls for locomotives used for construction
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Proposed Project

Construction of the Proposed Project has the potential to create air quality impacts through the use of heavy-duty construction equipment, worker vehicle trips, truck hauling trips, and locomotive trips. In addition, fugitive emissions would result from site grading and asphalt paving. Criteria pollutant emissions generated by these sources were quantified using emission factors from CalEEMod, EMFAC2014, AP-42, and other sources, as described in Section 3.3.4.1, *Methods for Analysis*.

The total amount, duration, and intensity of construction activity could have a substantial effect on the amount of construction emissions, their concentrations, and the resulting impacts occurring at any one time. Consequently, the emission forecasts provided in this analysis reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction takes place in a relatively intensive and overlapped schedule. Because of this conservative assumption, actual emissions could be less than those forecasted. If construction is delayed or occurs over a longer period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix, and/or (2) a less intensive and overlapping buildout schedule (i.e., fewer daily emissions occurring over a longer period).

Table 3.3-11 summarizes estimated unmitigated construction-related emissions in SJVAPCD in pounds per day and tons per year. While emissions are summarized in different units (pounds and

tons), the amounts of emissions are identical (i.e., 2,000 pounds is identical to 1 ton). Summarizing emissions in both pounds per day and tons per year is necessary to evaluate effects against the appropriate air district thresholds, which are given in both pounds and tons. As discussed in Section 3.3.4.2, *Thresholds of Significance*, SJVAPCD has identified project-level mass emission thresholds to evaluate impacts on air quality that are inclusive of past, present, and future projects. The mass emissions thresholds, therefore, represent the maximum emissions the Proposed Project may generate before contributing to a cumulative impact on regional air quality.

Table 3.3-11. Estimated Unmitigated Construction Criteria Pollutant Emissions from Proposed Project Construction and Atwater Station Alternative Construction in the San Joaquin Valley Air Pollution Control District

	Average Pounds per Day						Tons per year					
Construction Year	**ROG**	**NO_X**	**CO**	**PM10**	**PM2.5**	**SO_2**	**ROG**	**NO_X**	**CO**	**PM10**	**PM2.5**	**SO_2**
Proposed Project												
2023	5	56	30	16	8	< 1	1	7	4	2	1	< 1
2024	10	104	55	18	10	< 1	1	12	6	2	2	< 1
Threshold[a]	100	100	100	100	100	100	10	10	100	15	15	27
Atwater Station Alternative												
2023	5	56	30	16	8	< 1	1	7	4	2	1	< 1
2024	10	104	55	18	10	< 1	1	12	6	2	2	< 1
Threshold[a]	100	100	100	100	100	100	10	10	100	15	15	27

Exceedances of air district thresholds are shown in underline.

[a] The 100-pound-per-day threshold is a screening-level threshold to help determine whether increased emissions from a proposed project will cause or contribute to a violation of California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS). Projects with emissions below the threshold would not be in violation of CAAQS or NAAQS. Projects with emissions above the threshold would require an ambient air quality analysis to confirm this conclusion (San Joaquin Valley Air Pollution Control District 2015).

ROG = reactive organic gases.
NO_X = nitrogen oxide.
CO = carbon monoxide.
PM10 = particulate matter that is 10 microns in diameter and smaller.
PM2.5 = particulate matter that is 2.5 microns in diameter and smaller.
SO_2 = sulfur dioxide.

As shown in Table 3.3-11, unmitigated construction emissions would exceed SJVAPCD's annual NO_X threshold, as shown above in Table 3.3-11, by 4 pounds per day (and 2 tons per year). No other pollutant emissions would exceed the SJVAPCD thresholds. Due to the exceedance of NOx shown in Table 3.3-11 above, emissions may contribute to a cumulatively considerable net increase of a criteria pollutant within SJVAB for which the region is designated a nonattainment area. This is a potentially significant impact.

Atwater Station Alternative

Like the Proposed Project, construction of the Atwater Station Alternative also has the potential to create air pollutant impacts through the use of heavy-duty construction equipment, construction worker vehicle trips, truck hauling trips, and locomotive trips. Table 3.3-11 summarizes unmitigated estimated construction-related criteria pollutant emissions in the SJVAPCD for the Atwater Station Alternative. Because of the identical methodologies, the Atwater Station Alternative would result in the same amount of emissions as the Proposed Project. The same conclusions would apply to the Atwater Station Alternative because the construction NOx emissions would exceed the SJVAPCD's threshold by the same amount as the Proposed Project. Construction of the Atwater Station Alternative would result in a potentially significant impact.

There would be no difference in impact between the Atwater Station Alternative and the proposed Livingston Station (both would result in a potentially significant impact that would be reduced to a less-than-significant level with mitigation).

Mitigation Measures

Mitigation Measures AQ-2.1 and AQ-2.2 would apply to the construction of the Proposed Project and the Atwater Station Alternative for potential impacts on air quality in the SJVAPCD.

Mitigation Measure AQ-2.1: Implement advanced emissions controls for off-road equipment

SJRRC will require all off-road equipment greater than 25 horsepower and operating for more than 20 total hours over the entire duration of construction activities have engines that meet or exceed either USEPA or CARB Tier 4 final off-road emission standards.

Mitigation Measure AQ-2.2: Implement advanced emissions controls for locomotives used for construction

SJRRC will require all diesel-powered locomotives used for construction to have engines that meet or exceed either USEPA or CARB Tier 4 locomotive emission standards.

Significance with Application of Mitigation

Mitigation is required to reduce NO_X emissions. Mitigation Measure AQ-2.1 reduces emissions from off-road equipment and requires engines greater than 25 horsepower to meet Tier 4 emission standards. Mitigation Measure AQ-2.2 is not required to mitigate this impact, but the emissions analysis in this impact includes this measure, which is required for a subsequent impact (see Impact AQ-3b). The modeling also accounts for compliance with SJVAPCD Regulation VIII, which is required to control fugitive dust emissions. Table 3.13-12 shows the mitigated emissions in the SJVAPCD with the implementation of Mitigation Measures AQ-2.1 and AQ-2.2.

Additionally, as shown in Table 3.3-12, mitigated emissions of NOx would exceed 2 tons per year, which means that the Proposed Project is subject to SJVAPCD Rule 9510. Although total PM10 emissions would exceed two tons per year, the amount of PM10 from exhaust would be less than two tons per year.

Per Rule 9510, emissions from construction equipment greater than 50 horsepower must be reduced by at least 20 percent relative to the statewide average for NOx. Relative to the unmitigated emissions shown in Table 3.3-11, the mitigated NOx emissions in Table 3.3-12 are reduced by more than 80 percent. The unmitigated emissions represent the fleet average equipment in the years of construction, so the use of Tier 4 equipment per Mitigation Measures AQ-2.1 and AQ-2.2 would result in a reduction greater than the 20 percent required for Rule 9510. Although PM10 exhaust emissions are less than two tons per year, PM10 exhaust emissions would also be reduced more than the required amount (45 percent) relative the fleet average equipment.

As shown in Tables 3.3-11 and 3.3-12, with mitigation, NOx emissions from the Proposed Project and Atwater Station Alternative would be reduced. The reduction in NOx emissions is greater than 80 percent, which satisfies the 20 percent mitigation requirement of Rule 9510.

Table 3.3-12. Estimated Mitigated Construction Criteria Pollutant Emissions from Proposed Project Construction and Atwater Station Alternative Construction in the San Joaquin Valley Air Pollution Control District

Construction Year	Average Pounds per Day						Tons per year					
	ROG	NO_X	CO	PM10	PM2.5	SO_2	ROG	NO_X	CO	PM10	PM2.5	SO_2
Proposed Project												
2023	1	11	29	14	7	< 1	< 1	1	4	2	1	< 1
2024	2	19	52	15	7	< 1	< 1	2	6	2	1	< 1
Threshold[a]	100	100	100	100	100	100	10	10	100	15	15	27
Atwater Station Alternative												
2023	1	11	29	14	7	< 1	< 1	1	4	2	1	< 1
2024	2	19	52	15	7	< 1	< 1	2	6	2	1	< 1
Threshold[a]	100	100	100	100	100	100	10	10	100	15	15	27

Exceedances of air district thresholds are shown in underline. Emissions include implementation of Mitigation Measures AQ-2.1 and AQ-2.2 compliance with San Joaquin Valley Air Pollution Control District Regulation VIII.

[a] The 100-pound-per-day threshold is a screening-level threshold to help determine whether increased emissions from a proposed project will cause or contribute to a violation of California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS). Projects with emissions below the threshold will not be in violation of CAAQS or NAAQS. Projects with emissions above the threshold would require an ambient air quality analysis to confirm this conclusion (San Joaquin Valley Air Pollution Control District 2015).

ROG = reactive organic gases.
NO_X = nitrogen oxide.
CO = carbon monoxide.
PM10 = particulate matter that is 10 microns in diameter and smaller.
PM2.5 = particulate matter that is 2.5 microns in diameter and smaller.
SO_2 = sulfur dioxide.

As shown in Table 3.3-12, Mitigation Measures AQ-2.1 and AQ-2.2 would reduce construction-related NOx emissions in SJVAPCD below the applicable significance threshold. Thus, mitigation would reduce NO_X emissions to below the annual significance threshold, which is based on the NSR program and attainment of the NAAQS, and consider relevant past, present, and reasonably foreseeable future projects within the air basin. Because Proposed Project-generated NO_X emissions are below the relevant threshold with mitigation, the Proposed Project would not incrementally contribute to a significant ozone or associated human heath impact. This impact from construction of the Proposed Project would be less than significant with mitigation.

For the same reasons as the Proposed Project, implementation of Measures AQ-2.1 and AQ-2.2 would reduce construction-related NOx emissions due to the Atwater Station Alternative in SJVAPCD below the applicable significance threshold, and the impact would be less than significant with mitigation.

The Atwater Station Alternative would also be subject to SJVAPCD Rule 9510 for the same reason as the Proposed Project. Mitigated NOx emissions would be greater than two tons per year and a 20 percent reduction is required, but Mitigation Measures AQ-2.1 and AQ-2.2 would satisfy the reduction requirement.

Impact AQ-2b	Operations of the Proposed Project would not result in a cumulatively considerable net increase of a criteria pollutant for which the Project region is designated a nonattainment area under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
Level of Impact	**Less than significant impact (beneficial)** BAAQMD: all pollutants SJVAPCD: CO, PM2.5, PM10, and SOx **Less than significant impact** SJVAPCD: ROG and NOx

Impact Characterization

Proposed Project

Proposed Project operations have the potential to create air quality impacts through extended ACE rail service and increased shuttle activity. However, Proposed Project operations would also improve existing passenger rail opportunities, which would reduce single-occupancy VMT in the transportation network. Criteria pollutant emissions and reductions generated by these sources were quantified for existing (2019), full operations (2030), and horizon year (2040) conditions to capture changes in regional emission as a result of the Proposed Project.

Tables 3.3-13 and 3.3-14 summarize operations emissions in BAAQMD and SJVAPCD, respectively. The estimates reflect the difference between emissions generated by operation of the ACE locomotives and shuttles and reductions achieved by displaced VMT, where negative values represent a net reduction in emissions under the operating scenario. Refer to Appendix J, *Air Quality, Greenhouse Gas, and Health Risk Assessment Supporting Documentation,* for a detailed summary of emissions and reductions by source (e.g., ACE operations). The table also compares emissions to existing and No Project Conditions for informational purposes. The difference in operations

emissions between the Proposed Project and the existing ACE service represents the change in emissions over existing conditions with the Proposed Project, but this comparison is not used to make significance determinations, based on the reasoning described in Section 3.3.4.2, *Thresholds of Significance*. The comparison to the No Project Conditions represents the net impact of Proposed Project operation, and this is the comparison that is used to determine impact significance. As noted in Section 3.3.4.1, *Methods for Analysis,* the No Project Conditions would result in reductions of VMT from the use of the bus bridge. Emissions reductions from those VMT reductions are not included in the No Project Conditions row in Tables 3.3-13 and 3.3-14 because the Proposed Project's emissions are relative to the entire ACE system, including the bus bridge. In other words, for VMT accounting purposes the No Project Conditions are assumed to be zero. Thus, emissions from the No Project Conditions shown in Tables 3.3-13 and 3.3-14 only include direct emissions that are not accounted for elsewhere (i.e. road dust from the electric bus bridge service, emissions from locomotive idling at the maintenance facility and end-of-line station).

Table 3.3-13. Estimated Operational Criteria Pollutant Emissions from Proposed Project and Atwater Station Alternative Operation in the Bay Area Air Quality Management District

	Net Pounds per Day[a]						Net Tons per Year[a]					
Scenario	**ROG**	**NO_X**	**CO**	**PM10**	**PM2.5**	**SO_X**	**ROG**	**NO_X**	**CO**	**PM10**	**PM2.5**	**SO_X**
Existing (2019)	-	-	-	-	-	-	-	-	-	-	-	-
2030 No Project Conditions	-	-	-	-	-	-	-	-	-	-	-	-
2030 Proposed Project	< 1	-2	-31	-59	-15	< 1	< 1	< 1	-4	-8	-2	< 1
2030 Atwater Station Alternative	< 1	-2	-31	-60	-15	< 1	< 1	< 1	-4	-8	-2	< 1
2040 No Project Conditions	-	-	-	-	-	-	-	-	-	-	-	-
2040 Proposed Project	< 1	-2	-23	-76	-19	< 1	< 1	< 1	-3	-10	-2	< 1
2040 Atwater Station Alternative	< 1	-2	-24	-77	-20	< 1	< 1	< 1	-3	-10	-2	< 1
Comparison to Existing (2019)[b]												
2030 Proposed Project	< 1	-2	-31	-59	-15	< 1	< 1	< 1	-4	-8	-2	< 1
2030 Atwater Station Alternative	< 1	-2	-31	-60	-15	< 1	< 1	< 1	-4	-8	-2	< 1
2040 Proposed Project	< 1	-2	-23	-76	-19	< 1	< 1	< 1	-3	-10	-2	< 1
2040 Atwater Station Alternative	< 1	-2	-24	-77	-20	< 1	< 1	< 1	-3	-10	-2	< 1
Comparison to No Project Conditions												
2030 Proposed Project	< 1	-2	-31	-59	-15	< 1	< 1	< 1	-4	-8	-2	< 1
2030 Atwater Station Alternative	< 1	-2	-31	-60	-15	< 1	< 1	< 1	-4	-8	-2	< 1
2040 Proposed Project	< 1	-2	-23	-76	-19	< 1	< 1	< 1	-3	-10	-2	< 1
2040 Atwater Station Alternative	< 1	-2	-24	-77	-20	< 1	< 1	< 1	-3	-10	-2	< 1
BAAQMD Thresholds	**54**	**54**	**-**	**82**	**54**	**-**	**10**	**10**	**-**	**15**	**10**	**-**

[a] The emissions estimates reflect the difference between emissions generated by operation of the Altamont Corridor Express (ACE) locomotives and shuttles and reductions achieved by displaced vehicle miles traveled, where negative values represent a net reduction in emissions under the operating scenario. Refer to Appendix J, *Air Quality, Greenhouse Gas, and Health Risk Assessment Supporting Documentation,* for a detailed summary of emission and reductions by source (e.g., ACE operation).

[b] Comparison provided for informational purposes only. Impact determination based on the net change in emissions relative to the No Project Conditions. Refer to Section 3.3.4.2, *Thresholds of Significance*, for additional information.

ROG	=	reactive organic gases	PM2.5	=	particulate matter that is 2.5 microns in diameter and smaller
NO_X	=	nitrogen oxide	<	=	less than
CO	=	carbon monoxide	SO_X	=	sulfur oxide
PM10	=	particulate matter that is 10 microns in diameter and smaller	BAAQMD	=	Bay Area Air Quality Management District

Table 3.3-14. Estimated Operational Criteria Pollutant Emissions from Proposed Project and Atwater Station Alternative Operation in the San Joaquin Valley Air Pollution Control District

	Net Pounds per Day[a]						Net Tons per Year[a]					
Scenario	**ROG**	**NO_X**	**CO**	**PM10**	**PM2.5**	**SO_X**	**ROG**	**NO_X**	**CO**	**PM10**	**PM2.5**	**SO_X**
Existing (2019)	-	-	-	-	-	-	-	-	-	-	-	-
2030 No Project Conditions	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2030 Proposed Project	1	21	-30	-42	-11	< 1	< 1	3	-4	-5	-1	< 1
2030 Atwater Station Alternative	1	21	-31	-43	-11	< 1	< 1	3	-4	-5	-1	< 1
2040 No Project Conditions	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2040 Proposed Project	1	21	-32	-54	-14	< 1	< 1	3	-4	-7	-2	< 1
2040 Atwater Station Alternative	1	21	-33	-55	-14	< 1	< 1	3	-4	-7	-2	< 1
Comparison to Existing (2019)[b]												
2030 Proposed Project	1	21	-30	-42	-11	< 1	< 1	3	-4	-5	-1	< 1
2030 Atwater Station Alternative	1	21	-31	-43	-11	< 1	< 1	3	-4	-5	-1	< 1
2040 Proposed Project	1	21	-32	-54	-14	< 1	< 1	3	-4	-7	-2	< 1
2040 Atwater Station Alternative	1	21	-33	-55	-14	< 1	< 1	3	-4	-7	-2	< 1
Comparison to No Project Conditions												
2030 Proposed Project	1	21	-30	-43	-11	< 1	< 1	2	-4	-5	-1	< 1
2030 Atwater Station Alternative	1	21	-31	-43	-11	< 1	< 1	2	-4	-5	-1	< 1
2040 Proposed Project	1	21	-32	-55	-14	< 1	< 1	3	-4	-7	-2	< 1
2040 Atwater Station Alternative	1	21	-33	-55	-14	< 1	< 1	3	-4	-7	-2	< 1
SJVAPCD Thresholds[c]	**100**	**100**	**100**	**100**	**100**	**100**	**10**	**10**	**100**	**15**	**15**	**27**

[a] The emissions estimates reflect the difference between emissions generated by operation of the Altamont Corridor Express (ACE) locomotives and shuttles and reductions achieved by displaced vehicle miles traveled, where negative values represent a net reduction in emissions under the operating scenario. Refer to Appendix J, *Air Quality, Greenhouse Gas, and Health Risk Assessment Supporting Documentation,* for a detailed summary of emission and reductions by source (e.g., ACE operation).

[b] Comparison provided for informational purposes only. Impact determination based on the net change in emissions relative to the No Project Conditions. Refer to Section 3.3.4.2, *Thresholds of Significance*, for additional information.

[c] The 100-pound-per-day threshold is a screening-level threshold to help determine whether increased emissions from a proposed project will cause or contribute to a violation of California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS). Projects with emissions below the threshold will not be in violation of CAAQS or NAAQS. Projects with emissions above the threshold would require an ambient air quality analysis to confirm this conclusion (San Joaquin Valley Air Pollution Control District 2015).

ROG	=	reactive organic gases.	PM2.5	=	particulate matter that is 2.5 microns in diameter and smaller.
NO_X	=	nitrogen oxide.	<	=	less than.
CO	=	carbon monoxide.	SO_X	=	sulfur oxide.
PM10	=	particulate matter that is 10 microns in diameter and smaller.			

1

As shown in Table 3.3-13, operation of the Proposed Project would result in emissions reductions for all pollutants in the BAAQMD, relative to No Project Conditions. This result is expected, because the operations emissions associated with ACE locomotives would only occur in the SJVAPCD, while VMT-related emissions reductions would affect the BAAQMD. The Proposed Project would result in emissions from shuttle trips in the BAAQMD, but these emissions are minor relative to the VMT reductions, as reflected in Table 3.3-13. Thus, there would be a regional air quality benefit in BAAQMD.

As shown in Table 3.3-14, operation of the Proposed Project would not generate emissions in excess of SJVAPCD's thresholds for ROG or NOx. Several pollutants (CO, PM10, PM2.5, and SO_2) would be reduced relative to No Project Conditions. For the pollutants that would increase (but be below the SJVAPCD thresholds), emissions from operations of the ACE locomotives would exceed the amount of emissions reduced from VMT reductions in SJVAPCD. For those pollutants that would be reduced, this would be a regional air quality benefit.

Since project emissions would not exceed BAAQMD nor SJVAPCD significance thresholds and the Proposed Project would result in net reductions of criteria pollutant emissions for some pollutants in both SJVAPCD and BAAQMD, there would be no significant impact associated with Proposed Project operations. Thus, the Proposed Project would not result in a cumulatively considerable net increase of a criteria pollutant for which the Project region is designated a nonattainment area. Impacts from operation of the Proposed Project would be less than significant.

Atwater Station Alternative

The operational emissions from the Atwater Station Alternative are also shown in Tables 3.3-13 and 3.3-14 above and are relatively close in magnitude to the Proposed Project. As with the Proposed Project, the Atwater Station Alternative would not generate emissions in excess of BAAQMD or SJVAPCD's thresholds, and the same overall trends are reflected. That is, there would be pollutant decreases in BAAQMD, increases for ROG and NOx in SJVAPCD, but no threshold exceedances in SJVAPCD. Since emissions would not exceed BAAQMD nor SJVAPCD significance thresholds, and the Atwater Station Alternative would result in net reductions of criteria pollutant emissions for some pollutants in both SJVAPCD and BAAQMD, there would be no significant impact associated with project operational criteria pollutants. Impacts from operations of the Atwater Station Alternative would be less than significant.

Compared to the proposed Livingston Station, the Atwater Station Alternative would result in a slightly greater reduction of pollutants (see Tables 3.3-13 and 3.13-14). This is because the Atwater Station Alternative is expected to result in a slightly greater VMT reduction than the proposed Livingston Station, due to a slightly higher ridership.

Impact AQ-3a	Operation of the Proposed Project would not expose sensitive receptors to substantial carbon monoxide concentrations from increased passenger rail traffic.
Level of Impact	**Less than significant impact**

Impact Characterization

Proposed Project

Continuous engine exhaust may elevate localized CO concentrations. People at receptors exposed to these CO hot spots may have a greater likelihood of developing negative health effects (as described

in Section 3.3.3, *Environmental Setting*). CO hot spots are typically observed at heavily congested roadway intersections where a substantial number of gasoline-powered vehicles idle for prolonged durations throughout the day. Construction sites are less likely to result in localized CO hot spots due to the nature of construction activities, which normally utilize diesel-powered equipment for intermittent or short durations. The Proposed Project locomotives are diesel-fueled and are unlikely to contribute to a CO hot spot. Accordingly, this analysis focuses on potential CO hot spots associated with additional motor vehicles at the new stations that would be constructed for the Proposed Project.

Full operations (2030) and horizon year (2040) conditions were modeled to evaluate CO concentrations relative to the NAAQS and CAAQS. As previously discussed, CO concentrations were estimated at 16th Street and R Street in Merced in the SJVAPCD, which is a reasonable estimate for the highest volume intersection in the Proposed Project are. Table 3.3-15 summarizes the results of the intersection CO modeling.

As described in Chapter 2, *Project Description,* the additional shuttles at the Great America and Pleasanton would result in approximately 11 additional daily trips at Great America and 3 additional daily trips at Pleasanton. Given these small volumes, the Proposed Project is not expected to change traffic conditions around these stations. Accordingly, CO concentrations were not modeled for these locations.

Table 3.3-15 indicates that CO concentrations are not anticipated to exceed the 1- or 8- hour NAAQS and CAAQS. Accordingly, implementation of the Proposed Project would not contribute to CO hot spots or expose receptors to substantial CO concentrations. This impact would be less than significant.

Table 3.3-15. Carbon Monoxide Modeling Concentration Results (parts per million)

		2030 Full Operations		2040 Horizon	
Intersection	**Receptor[a]**	**1-hr**	**8-hr**	**1-hr**	**8-hr**
16th Street and R Street, Merced (Proposed Project)	1	3.4	2.5	3.4	2.5
	2	3.4	2.5	3.4	2.5
	3	3.3	2.4	3.4	2.5
	4	3.4	2.5	3.4	2.5
16th Street and R Street, Merced (Atwater Station Alternative)	1	3.4	2.5	3.4	2.5
	2	3.4	2.5	3.4	2.5
	3	3.3	2.4	3.3	2.4
	4	3.4	2.5	3.4	2.5
Threshold (CAAQS and NAAQS)		20 & 35	9.0 & 9	20 & 35	9.0 & 9
Threshold Exceedance?		No	No	No	No

Notes:

[a] Consistent with Caltrans CO Protocol, receptors are located 3 meters from the intersection, at each of the four corners to represent the nearest location in which a receptor could potentially be located adjacent to a travelled roadway. The modeled receptors indicated are not representative of the actual sensitive receptors.

CO = carbon monoxide.
CAAQS = California Ambient Air Quality Standards.
NAAQS = National Ambient Air Quality Standards.

Atwater Station Alternative

As noted in Section 3.3.4.1, *Methods for Analysis, Carbon Monoxide Hot Spot Analysis*, the CO analysis represents a worst-case scenario, because it evaluates traffic volumes at the Merced Station, where parking demand and vehicle volumes would be the greatest. Parking demand at the Merced Station would be lower if the Atwater Station Alternative were implemented instead of the proposed Livingston Station. Table 3.3-15 summarizes the results of the intersection CO modeling at the Merced Station if the Atwater Station Alternative were implemented and it shows that concentrations would be well below the applicable NAAQS and CAAQS. Because CO concentrations are substantially below the NAAQS and CAAQS for the worst-case scenario, this impact would be less than significant.

Implementation of the Atwater Station Alternative would have a slightly reduced impact than implementation of the proposed Livingston Station. Nonetheless, both would result in a less-than-significant impact.

Impact AQ-3b	Construction of the Proposed Project could expose sensitive receptors to substantial diesel particulate matter or localized particulate matter concentrations.
Level of Impact	**Potentially significant impact**
Mitigation Measures	AQ-2.1: Implement advanced emissions controls for off-road equipment AQ-2.2: Implement advanced emissions controls for locomotives used for construction
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Proposed Project

Construction of the Proposed Project would have the potential to create inhalation health risks, which may exceed local significance thresholds for increased cancer and non-cancer health risk at receptor locations adjacent to the track, stations, and/or maintenance facility. As noted in Section 3.3.3.2, *Pollutants of Concern*, the cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other air toxic from construction of the Proposed Project. Accordingly, both the construction and operational HRAs (Impacts AQ-3b through AQ-3e) focus on DPM emissions, as recommended by SJVAPCD, BAAQMD, OEHHA, and CARB.

The local topography and meteorology can have a substantial effect on DPM air concentrations and the resulting exposure. Consequently, DPM concentrations were estimated using conservative air quality modeling options and representative local meteorological conditions. Modeling results are reported based on the annual average concentration collected from 5 years of modeling. Because of these conservative assumptions, actual health risks could be less than the projected exposures.

Table 3.3-16 summarizes estimated unmitigated and mitigated maximum individual cancer risk and chronic health hazard from construction of the Proposed Project in the SJVAPCD.

Table 3.3-16. Estimated Maximum Inhalation Cancer Risk and Chronic and Acute Hazard Index from Construction in the San Joaquin Valley Air Pollution Control District

Segment/Scenario	Cancer Risk (per million) [unmitigated/mitigated]	Chronic HI
Atwater Station Alternative (worst-case station)	49.3/4.4	0.07/0.01
Merced Layover & Maintenance Facility	11.4/1.2	0.03/<0.01
Ceres to Merced Extension Alignment	31.9/2.2	0.04/<0.01
SJVAPCD Threshold	20.0	1.0

Note: Modeling assumes implementation of Mitigation Measures AQ-2.1 and AQ-2.2.
Exceedances of air district thresholds are shown in underline.
HI = hazard index.
µg/m3 = micrograms per cubic meter.
< = less than.
SJVAPCD = San Joaquin Valley Air Pollution Control District.

Without mitigation, the values in Table 3.3-16 would exceed the thresholds. Cancer risks could be as high as 49 per million, which is above the threshold of 20 per million. Hazard index values would be below the threshold. Because of the cancer risk threshold exceedance, this is a potentially significant impact.

Atwater Station Alternative

The Atwater Station Alternative would not result in meaningful differences in DPM exposure, because the analysis conducted above for the Proposed Project represents a worst-case scenario. Construction activities of the Merced Layover & Maintenance Facility and Ceres to Merced Extension Alignment would be the same for both the Proposed Project and the Atwater Station Alternative. With respect to station construction, the Atwater Station Alternative construction activities were determined to be a worst-case scenario, because, as noted above, that station would have the highest DPM emissions density per area and has sensitive receptors that are immediately adjacent to the station footprint. Therefore, the results in Table 3.3-16 are representative of both the Proposed Project and the Atwater Station Alternative, and there would be no meaningful difference in impact between the Proposed Project and the Atwater Station Alternative (both would result in a less-than-significant impact with mitigation).

Mitigation Measures

Mitigation Measures AQ-2.1 through AQ-2.2 would apply to the Proposed Project and Atwater Station Alternative for potential impacts on air quality.

Mitigation Measure AQ-2.1: Implement advanced emissions controls for off-road equipment

Refer to measure description in Impact AQ-2a.

Mitigation Measure AQ-2.2: Implement advanced emissions controls for locomotives used for construction

Refer to measure description in Impact AQ-2a.

Significance with Application of Mitigation

As noted for Impact AQ-2a, Mitigation Measure AQ-2.1 is separately required to reduce NOx emissions. Even with Mitigation Measure AQ-2.1, cancer risks could exceed the SJVAPCD threshold of 20. As such, additional mitigation is required with respect to the locomotives to be used during construction, which, in the absence of further mitigation, would be the primary contributor of DPM during construction. Mitigation Measure AQ-2.2 would require advanced emissions controls for locomotives, which would reduce DPM emissions. As shown in Table 3.3-16, construction of the Proposed Project would not result in increased cancer or chronic health hazards in excess of SJVAPCD thresholds with Mitigation Measures AQ-2.1 and AQ-2.2. Mitigation is thus required to reduce health-related impacts, and this impact would be less than significant with mitigation.

For the same reasons as the Proposed Project, Mitigation Measures AQ-2.1 and AQ-2.2 would reduce health related impacts from construction of the Atwater Station Alternative to a less-than-significant level.

Impact AQ-3c	Operations of the Proposed Project would not expose sensitive receptors to health risks from increased exposure to diesel particulate matter and PM2.5 concentrations.
Level of Impact	**Less than significant impact**

Impact Characterization

Proposed Project

Operation of the Proposed Project locomotive engines and the minor shift in freight train traffic would have the potential to create inhalation health risks. DPM concentrations were estimated using conservative air quality modeling options and representative local meteorological conditions. Modeling results are reported based on the highest annual average concentration collected from 5 years of meteorological data. Because of these conservative assumptions, actual health risks could be less than the projected exposures. Table 3.3-17 summarizes estimated maximum cancer risk and chronic health hazard.[13] Table 3.3-17 also reports the incremental increase in health risks that would result between the Proposed Project and No Project Conditions from the minor shift in freight train traffic that would occur. For freight relocation, the comparison between the No Project Conditions and Proposed Project scenarios represent the net impact of the Proposed Project, and that net effect is compared to SJVAPCD thresholds. That net effect from freight rail is added to the Proposed Project's effect from ACE locomotive operation to determine the total effect from the Proposed Project.

Table 3.3-17. Estimated Maximum Inhalation Cancer Risk and Chronic Hazard Index from Operation of ACE Locomotives and Freight Relocation in the San Joaquin Valley Air Pollution Control District

Segment/Scenario	Cancer Risk (per million)	Chronic HI
ACE Operation		
2030 and 2040	1.3	<0.1

[13] Because the locomotives are exclusively diesel powered, there would be no acute risk.

Segment/Scenario	Cancer Risk (per million)	Chronic HI
Freight Rail – No Project Conditions		
2030	22.8	<0.1
2040	11.6	<0.1
Freight Rail – With Project		
2030	23.7	<0.1
2040	12.1	<0.1
Freight Rail - Project Increment		
2030	0.9	<0.1
2040	0.5	<0.1
ACE Operation + Increment		
2030	2.1	<0.1
2040	1.7	<0.1

ACE = Altamont Corridor Express.
HI = hazard index.
< = less than.

As shown in Table 3.3-17, expansion of ACE service, including the minor shift in freight rail traffic, would not result in increased cancer or chronic health hazards in excess of the SJVAPCD thresholds of 20 cancers per million or hazard index of 1.0. This impact would be less than significant.

Atwater Station Alternative

The Atwater Station Alternative would not result in meaningful differences in DPM exposure because the analysis conducted above for the Proposed Project represents a worst-case scenario. ACE operations on a typical segment of track would result in the same approximate exposure of DPM regardless of whether the Livingston Station or Atwater Station Alternative is implemented. Therefore, the results in Table 3.3-17 are representative of both the Proposed Project and the Atwater Station Alternative, and there would be no meaningful difference in impact between the Proposed Project and the Atwater Station Alternative (both would result in a less-than-significant impact).

Impact AQ-3d	Operations of the Proposed Project could expose sensitive receptors adjacent to ACE stations and maintenance facilities to health risks from increased exposure to diesel particulate matter.
Level of Impact	**Potentially significant impact**
Mitigation Measures	AQ-3.1: Locate emergency generator for the Merced Layover & Maintenance Facility more than 1,000 feet from residences
Level of Impact	**Less than significant impact**

Impact Characterization

Proposed Project

The expanded ACE service from Ceres to Merced would increase locomotive idling at the new stations and the Merced Layover & Maintenance Facility. Receptors adjacent to the Proposed Project stations and the Merced Layover & Maintenance Facility may be exposed to increased cancer and

non-cancer health risks, similar to receptors adjacent to the extension alignment (analyzed under Impact AQ-3c).

DPM concentrations from idling at the Merced Station and the Merced Layover & Maintenance Facility were estimated using conservative air quality modeling options and representative local meteorological conditions. Modeling results are reported based on the highest annual average concentration collected from 5 years of meteorological data. Because of these conservative assumptions, actual health risks could be less than the projected exposures. The Merced Station represents the worst-case scenario out of all the proposed stations, because each train could idle for up to 15 minutes at Merced Station during power-up and power-down, whereas idle time at the non-end-of-line stations would be approximately 1.5 minutes per train. At the Merced Layover & Maintenance Facility, each train could idle up to one hour per day (AECOM 2020a). When locomotives are at the Merced Layover & Maintenance Facility, they would idle for the one hour time period but would be connected to electric power otherwise with engines off.

Table 3.3-18 summarizes the estimated maximum cancer risk and chronic health hazards at the Merced Station and Merced Layover & Maintenance Facility. Both the Merced Station and Merced Layover & Maintenance Facility would be located in SJVAPCD.

Table 3.3-18. Estimated Maximum Inhalation Cancer Risk and Chronic Hazard Index from Increased ACE Locomotive Idling

Location	Cancer Risk (per million)	Chronic HI
Merced Layover & Maintenance Facility	<1	<0.1
Merced Station (worst-case)	<1	<0.1
SJVAPCD Threshold	20	1.0

[a] Receptors adjacent to new stations may also be exposed to running exhaust diesel particulate matter from trains as they exit the station. Refer to Impact AQ-3f for a discussion of overlapping risk from project sources.

ACE = Altamont Corridor Express.
HI = hazard index.
< = less than.
SJVAPCD = San Joaquin Valley Air Pollution Control District.
PM2.5 = particulate matter that is 2.5 microns in diameter and smaller.

As shown in Table 3.3-18, idling at the Merced Station and Merced Layover & Maintenance Facility would not result in increased cancer or chronic health hazards in excess of SJVAPCD thresholds under a worst-case scenario. This impact would be less than significant.

In addition, operations of the Proposed Project would require the operation of a diesel-powered emergency generator at the Merced Layover & Maintenance Facility. There are residences located within 1,000 feet of the eastern part of the Merced Layover & Maintenance Facility (i.e., the part closer to SR 59). These residences are located east of SR 59. If the diesel-powered emergency generator were located within 1,000 feet of these residences, then there is a potential that diesel particulate matter from the emergency generator could result in health risks to nearby residences. A health risk assessment has not been conducted, so this is considered a potentially significant impact.

Atwater Station Alternative

The Atwater Station Alternative would not result in meaningful differences in diesel particulate matter exposure because the analysis conducted above for the Proposed Project represents a worst-

case scenario. Moreover, that worst-case scenario applies to both the Proposed Project and the Atwater Station Alternative, because both would result in trains idling for approximately the same time at the Merced Station and at the Merced Layover & Maintenance Facility. Thus, there would be no meaningful difference in impact between the proposed Livingston Station and the Atwater Station Alternative related to locomotive idling (both would result in a less-than-significant impact).

The Atwater Station Alternative would not change the potentially significant impact at the Merced Layover & Maintenance Facility.

Mitigation Measures

Mitigation Measure AQ-3.1 would apply to the Merced Layover & Maintenance Facility.

Mitigation Measure AQ-3.1: Locate emergency generator for the Merced Layover & Maintenance Facility more than 1,000 feet from residences.

SJRRC or its contractor(s) would locate the emergency generator at the Merced Layover & Maintenance Facility at least 1,000 feet from any sensitive residential receptors east of SR 59. Prior to construction, SJRRC would verify that the emergency generator would be more than 1,000 feet from sensitive receptors through its approval of the final design of the Project.

Significance with Application of Mitigation

Mitigation Measure AQ-3.1 would require that the diesel-powered emergency generator at the Merced Layover & Maintenance Facility be located at least 1,000 feet from any sensitive receptors. Given that the source-receptor distance for the generator would be more than 1,000 feet after implementation of Mitigation Measure AQ-3.1, diesel emissions from the generator would be substantially reduced at the nearest sensitive receptors. Consequently, the impacts on health risks from the Proposed Project (and the Atwater Station Alternative) would be less than significant after the implementation of Mitigation Measure AQ-3.1.

Impact AQ-3e	Operations of the Proposed Project would not expose sensitive receptors adjacent to shuttle routes to health risks from increased exposure to diesel particulate matter and PM2.5 concentrations from expanded shuttle service.
Level of Impact	**Less than significant impact**

Impact Characterization

Proposed Project

The increase in ACE ridership associated with the Proposed Project is anticipated to have a corresponding increase in daily shuttle trips at the Great America and Pleasanton stations. Additional vehicle exhaust can result in higher potential health risks from exposure to DPM and PM2.5. Receptors adjacent to shuttle routes could therefore be exposed to increased cancer and non-cancer health risks.

Based on the anticipated ridership data for the Proposed Project, there would be an increase of 4 shuttle trips in 2030 relative to the No Project Conditions (a 2 percent increase), and an increase in 11 shuttle trips in 2040 relative to the No Project Conditions (a 5 percent increase). At the Great America station, there are nine shuttle routes, and there would be a maximum of 2 additional shuttle trips for any of the routes. At the Pleasanton station, there would be an increase of 1 trip per day on

only one of the routes. As such, although there would be 4 and 11 additional shuttle trips per day in 2030 and 2040, respectively, the increases in trips would be dispersed among the different shuttle routes. After leaving the station areas, the exhaust emissions from all 11 trips would thus not be concentrated on any one route.

The health effects associated with additional shuttle trips were analyzed at both the Great America and Pleasanton stations in the Prior EIR. For that project, there was determined to be a net increase in shuttle trips at the Great America station of 18 in 2020 and 22 in 2040, beyond the number of shuttle trips that would be offered without that project. At the Pleasanton station, the additional trips would be 4 in 2020 and 6 in 2040, beyond the number of shuttle trips offered without that project.

The health risk assessment results for the additional shuttle trips analyzed in the Prior EIR were found to be substantially less than the BAAQMD's thresholds and thus less than significant. At both stations, the increase in cancer risk was found to be less than 1 per million, and the significance threshold is 10 per million. For the hazard indices, the results at both stations were found to be less than 0.1, and the threshold is 1.0. For PM2.5 concentration results, the findings for both stations were less than 0.1, and the threshold is 0.3 $\mu g/m^3$.

Compared to the 18 to 22 additional trips at Great America and 4 to 6 additional trips at Pleasanton analyzed in the Prior EIR, the Proposed Project would add a relatively moderate additional number of trips (a maximum of 11 at Great America, and one at Pleasanton). Consequently, it is reasonable to assume that the analysis results from the Prior EIR demonstrate that an increase of up to 22 trips at Great America and 6 trips at Pleasanton would not result in health risks or PM2.5 concentrations that exceed the BAAQMD's thresholds. As shown in the Prior EIR (Section 4.3, Tables 4.3-21 and 4.3-22), the net change in health risks and PM2.5 concentrations are well below the applicable thresholds. Thus, the Proposed Project's contribution of a maximum of 11 additional daily trips would result in even lower health risks and PM2.5 concentrations than presented in the Prior EIR. This result is to be expected, given the low number of additional shuttle trips that would be added for the Proposed Project. Additionally, the shuttles may be electric in 2030 and/or 2040, which would further reduce the health risks and PM2.5 concentrations. Electric shuttles would not generate any exhaust-related emissions but would still generate tire, brake, and road dust. This analysis is conservative, because it assumes that the shuttles will be internal combustion vehicles in 2030 and 2040.

Given that the Prior EIR demonstrated less than significant effects from a larger number of daily shuttle trips, the Proposed Project would result in a less than significant cancer risk and hazard index impact from the increase in daily shuttle trips at the Great America and Pleasanton stations.

Atwater Station Alternative

Because the expected passenger ridership quantities for Proposed Project and the Atwater Stational Alternative are anticipated to be similar, the additional shuttle trips at the Great America and Pleasanton stations would apply to the Atwater Station Alternative as well. In other words, the difference in ridership numbers between the Proposed Project and Atwater Station Alternative is not likely large enough to cause differences in the required number of additional shuttle trips. Consequently, the analysis above for the Proposed Project also applies to the Atwater Station Alternative. Both would result in a less than significant impact and there would be no difference in impacts between the proposed Livingston Station and the Atwater Station Alternative.

Impact AQ-3f	Construction and operations of the Proposed Project would not expose sensitive receptors to health risks from increased exposure to diesel particulate matter and PM2.5 concentrations from multiple emission sources.
Level of Impact	**Less than significant impact**

Impact Characterization

Proposed Project

Impacts AQ-3b through AQ-3e evaluate risks from receptor exposure to DPM from construction and individual operational emission sources (e.g., ACE operation, station idling, etc.). At some locations, receptors may be exposed to DPM emissions from multiple sources. Combined exposure may occur from new ACE train operations adjacent to a new ACE station. To evaluate the potential overlap of different sources, a worst-case analysis has been quantified in Table 3.3-19. The Atwater Station Alternative was chosen as the worst-case station, because, as noted above that station would have the highest DPM emissions density per area and has sensitive receptors that are immediately adjacent to the station footprint. Although the Atwater Station Alternative would not be a part of the Proposed Project, the worst-case analysis with the Atwater Station Alternative would apply for the Proposed Project.

Table 3.3-19. Estimated Maximum Incremental Change in Inhalation Cancer Risk and Chronic from Combined Proposed Project Emission Sources[a]

Source	Cancer Risk (per million)	Chronic HI
Atwater Station Alternative Construction (mitigated)	4.4	<0.1
Ceres to Merced Extension Alignment Construction (mitigated)	2.2	<0.1
ACE Operation + Freight Shift (2030)	2.1	<0.1
Total	**8.8**	**<0.1**
SJVAPCD Threshold	**20**	**1.0**

[a] Table presents the net change in risk, relative to No Project Conditions.

ACE = Altamont Corridor Express
HI = hazard index
< = less than
SJVAPCD = San Joaquin Valley Air Pollution Control District

The results in Table 3.3-19 do not represent an actual receptor. This is because the same worst-case receptor during construction of the Atwater Station Alternative would not be the same worst-case receptor during construction of the Ceres to Merced Extension Alignment. Furthermore, the worst-case receptors during ACE operation would not likely be the same as those worst-case receptors during construction. However, the results in Table 3.3-19 are shown because they demonstrate that even in a hypothetical situation where several Proposed Project components overlap at the same receptor, the total cancer risk and hazard index would not exceed the SJVAPCD thresholds. Thus, as shown in Table 3.3-19, the cancer risk increase associated with combined risks from Proposed Project construction and operations would not exceed SJVAPCD's health risk thresholds. This impact would be less than significant.

Atwater Station Alternative

The analysis conducted above for the Proposed Project represents a worst-case scenario. The Atwater Station Alternative was chosen as the worst-case station. As such, for the same reasons as the Proposed Project, the cancer risk increase associated with combined risks from construction and operations of the Atwater Station Alternative would not exceed SJVAPCD's health risk thresholds. This impact would be less than significant. There would be no meaningful difference in impact between the proposed Livingston Station and the Atwater Station Alternative (both would result in a less-than-significant impact).

Impact AQ-3g	Construction and operations of the Proposed Project would not expose sensitive receptors to cumulative health risks from increased exposure to diesel particulate matter and PM2.5 concentrations.
Level of Impact	**Less than significant impact**

Impact Characterization and Significance Conclusion

Proposed Project

Multiple existing sources of cumulative DPM emissions and sensitive receptors are located within 1,000 feet of the Ceres to Merced Extension Alignment. When combined with DPM emissions from Proposed Project construction and operations, receptors may be exposed to cumulative health risks in excess of air district thresholds. BAAQMD has established cumulative risk thresholds. Current SJVAPCD guidance for cumulative impacts is to evaluate the potential risks associated from all project-related emission sources. Emission sources outside the project boundaries should not be included in the assessment. If the project-level assessment demonstrates that potential project related health impacts are less than significant, one could conclude that the project would have a less than cumulatively significant impact (Siong pers. comm.). This cumulative health risk discussion is limited to construction within the SJVAPCD and operations in the BAAQMD and SJVAPCD.

As discussed in Impacts AQ-3b through AQ-3d and Impact AQ-3f, neither mitigated construction activities nor operation of the Proposed Project would result in health risks to sensitive receptors in excess of SJVAPCD's thresholds of significance. SJVAPCD considers risks in excess of project-level thresholds to result in a cumulatively considerable impact. Accordingly, since the Proposed Project would not exceed SJVAPCD's project-level thresholds, cumulative health risks within the SJVAPCD would be less than significant.

Similarly, changes in ACE shuttle service within the BAAQMD would not contribute to cumulative health hazards because predicted health risks are anticipated to be well below the applicable threshold (e.g., less than 1 excess cancer case per million relative to a threshold of 10), relative to existing conditions (see Impact AQ-3e above). Unlike the project-level analysis, which relies on a comparison to No Project Conditions to evaluate the incremental effect of the Proposed Project on air quality impacts, cumulative health risks are discussed relative to existing conditions as the baseline. This is because health risks depend on the duration receptors are exposed to the emission source. Individuals currently residing near ACE shuttle routes are exposed to a certain amount of pollution (representative of existing conditions). If the Proposed Project-induced increase in shuttle trips does not occur, the receptors would continue to be exposed to the existing pollution levels from the current number of ACE shuttles and ambient sources.

In addition, regional emissions from motor vehicles including heavy diesel trucks will decline over time due to natural fleet turnover, as older, higher-emitting vehicles are retired and replaced by newer, lower-emitting vehicles. Similarly, existing risks due to stationary sources near receptors may decline as older equipment is retired and replaced. This turnover will reduce existing ambient risk levels independent of Proposed Project operations.

As discussed in Impact AQ-3e above, health risks would decrease or remain virtually unchanged with the additional shuttles from the Proposed Project, and as such, the Proposed Project would not exceed BAAQMD's cumulative risk thresholds or cumulatively contribute to existing risks. Accordingly, this impact would be less than significant.

Atwater Station Alternative

Similar to the Proposed Project, the Atwater Station Alternative would increase emissions from locomotives but reduce automotive emissions and in the future with the Atwater Station Alternative, regional emissions from motor vehicles would be expected to decline over time. For the Atwater Station Alternative, mitigated construction activities and operations would not result in health risks to sensitive receptors in excess of SJVAPCD's thresholds of significance, as discussed in Impacts AQ-3b through AQ-3e. The Atwater Station Alternative's cumulative health risks within the SJVAPCD would be less than significant.

As noted in Impact AQ-3e above, the numbers of additional shuttle trips at the Great America and Pleasanton stations are anticipated to be the same for both the Proposed Project and the Atwater Station Alternative. As a result, health risks would remain virtually unchanged with the additional shuttles, and the Atwater Station Alternative would not exceed BAAQMD's cumulative risk thresholds or cumulatively contribute to existing risks. Accordingly, this impact would be less than significant.

There would be no difference in impacts between the proposed Livingston Station and the Atwater Station Alternative (both would result in a less-than-significant impact).

Impact AQ-3h	Construction of the Proposed Project would not expose sensitive receptors to increased risk of contracting Valley Fever or exposure to asbestos-containing material.
Level of Impact	**Less than significant impact**

Impact Characterization and Significance Conclusion

Proposed Project

Valley Fever

Disturbance of soil containing *C. immitis* could expose the receptors adjacent to the construction site to spores known to cause Valley Fever. Areas endemic to *C. immitis* are generally arid to semiarid with low annual rainfall, and as such, soil containing the fungus is commonly found in Southern California and throughout the Central Valley. Based on Valley Fever hospitalization rates from the California Department of Public Health, over 75 percent of Valley Fever cases have been in people who live in the San Joaquin Valley (California Department of Public Health 2016). Within the Proposed Project study area, Merced County has the highest incidence rate of Valley Fever and is the seventh most affected county in the state (California Department of Public Health 2018).

The presence of *C. immitis* in the Proposed Project area does not guarantee that construction activities would result in increased incidence of Valley Fever. Propagation of *C. immitis* is dependent on climatic conditions, with the potential for growth and surface exposure highest following early seasonal rains and long dry spells. *C. immitis* spores can be released when filaments are disturbed by earthmoving activities, although receptors must be exposed to and inhale the spores to be at increased risk of developing Valley Fever. Moreover, exposure to *C. immitis* does not guarantee that an individual will become ill—approximately 60 percent of people exposed to the fungal spores are asymptomatic and show no signs of an infection (U.S. Geological Survey 2000).

All Proposed Project construction activities are located within Stanislaus and Merced Counties. *C. immitis* is endemic to the Central Valley, in particular San Joaquin County and has been found in Stanislaus County. Earthmoving activities for the Proposed Project may release *C. immitis* spores if filaments are present and other soil chemistry and climatic conditions are conducive to spore development. Receptors adjacent to the construction area, therefore, may be exposed to increase risk of inhaling *C. immitis* spores and subsequent development of Valley Fever. However, the presence of *C. immitis* in the Proposed Project area does not guarantee that construction activities would result in increased incidence of Valley Fever.

Dust control measures are the primary defense against Valley Fever infection (U.S. Geological Survey 2000). Fugitive dust controls required by compliance with SJVAPCD Regulation VIII would avoid dusty conditions and reduce the risk of contracting Valley Fever through routine watering and other controls. Therefore, the impact of exposure of sensitive receptors to increased Valley Fever risk during construction would be less than significant.

Asbestos-Containing Materials

Demolition of existing structures results in fugitive dust and other particulates that may disperse to adjacent sensitive receptor locations. Asbestos-containing materials (ACM) were commonly used as fireproofing and insulating agents prior to the 1970s. The U.S. Consumer Product Safety Commission banned use of most ACM in 1977 due to their link to mesothelioma. However, buildings constructed prior to 1977 that would be demolished by the Proposed Project may have used ACM and could expose receptors to asbestos, which may become airborne with other particulates during demolition.

The Proposed Project would require a small amount of demolition. If ACM were present in the existing structures that would be demolished, demolition activities could expose adjacent receptors to increased risk from airborne asbestos. The asbestos NESHAP regulations for demolition and renovation are outlined in SJVAPCD Regulation III and Regulation VIII. Compliance with the asbestos NESHAP regulations would be mandatory in the event ACM is found in any of the existing structures. Therefore, the impact of exposure of sensitive receptors to increased asbestos during construction would be less than significant.

Atwater Station Alternative

The Atwater Station Alternative is also located in the Central Valley, where *C. immitis* is endemic. However, the presence of *C. immitis* in the area does not guarantee that construction activities would result in increased incidence of Valley Fever. The Atwater Station Alternative would also implement fugitive dust controls required by SJVAPCD Regulation VIII, which would avoid dusty conditions and reduce the risk of contracting Valley Fever through routine watering and other controls. The impact of exposure of sensitive receptors to increased Valley Fever risk during construction would be less

than significant. Consequently, there is no substantial difference between the impacts of the Atwater Station Alternative and the proposed Livingston Station (both would result in a less-than-significant impact).

For asbestos, a small amount of demolition would be required for the Atwater Station Alternative and could expose adjacent receptors to increased risk from airborne asbestos if ACM were present in the existing structures. As with the Proposed Project, compliance with the asbestos NESHAP regulations would be mandatory in the event ACM is found in any of the existing structures. Therefore, the impact of exposure of sensitive receptors to increased asbestos during construction would be less than significant.

The Atwater Station Alternative would require the demolition of more buildings than the proposed Livingston Station. Thus, there is a slightly greater potential that the Atwater Station Alternative could result in impacts related to airborne asbestos. Nonetheless, construction of both the proposed and Livingston Station would require the implementation of the same regulations and would both result in a less-than-significant impact.

Impact AQ-4	Construction and operations of the Proposed Project would not create objectionable odors affecting a substantial number of people.
Level of Impact	**Less than significant impact**

Impact Characterization and Significance Conclusion

Proposed Project

The generation and severity of odors is dependent on a number of factors, including the nature, frequency, and intensity of the source; wind direction; and the location of the receptor(s). Odors rarely cause physical harm, but can cause discomfort, leading to complaints to regulatory agencies. Land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding facilities (California Air Resources Board 2005).

Sources of odor during construction include diesel exhaust from construction equipment and asphalt paving. All odors would be localized, generally confined to the immediate area surrounding the construction site, and would cease once construction activities have been completed. Construction of the Proposed Project would utilize typical construction techniques. The equipment odors would be typical of most construction sites, temporary in nature, and localized to the vicinity of the construction work area. The construction odors would cease once construction activities have been completed. SJVAPCD has adopted rules that limit the amount of ROG emissions from cutback asphalt (see Section 3.3.3, *Environmental Setting*). Accordingly, potential odors generated during asphalt paving would be addressed through mandatory compliance with air district rules. This impact would be less than significant, and no mitigation is required.

The operations associated with the Proposed Project would not include any uses identified by the CARB as being associated with odors. However, expanded passenger rail operation may increase the potential for odors resulting from diesel fuel combustion. The new stations themselves would not represent substantial sources of odor emissions. However, expanded passenger rail operation on the tracks that access the stations may increase odors from train operation. Similarly, odors from increased diesel-powered shuttles that service the stations would slightly increase. These odors would be intermittent, occurring only as trains pass by receptors, and would be consistent with

existing land uses and passenger rail operation. Odors resulting from diesel fuel combustion between Ceres and Merced or at existing or new stations would be short-term, occurring as trains or shuttles pass by, and are not considered a significant odor-generating source (California Air Resources Board 2005). Moreover, odors associated with the expanded passenger rail service would be consistent with existing land uses in the project area, which already includes freight activity. This impact would be less than significant.

Atwater Station Alternative

The operations associated with the Atwater Station Alternative would also not include any uses identified by the CARB as being associated with odors. In general, the potential for odor generation would not differ appreciably for the Proposed Project and Atwater Station Alternative. Short-term and intermittent odors could also occur from construction and operation of the Atwater Station Alternative. Consequently, there is no substantial difference between the odor impacts of the Atwater Station Alternative and the proposed Livingston Station. Both impacts would be less than significant.

3.3.4.4 Overall Comparison of the Proposed Livingston Station and Atwater Station Alternative

Because the Atwater Station Alternative would have slightly higher ridership and associated VMT reductions than the proposed Livingston Station, the Atwater Station Alternative would have slightly greater benefits related to reduction of pollutants, compared to the proposed Livingston Station. Overall, both the Atwater Station Alternative and the proposed Livingston Station would result in benefits from the reduction of pollutants. However, overall, the Atwater Station Alternative would result in greater benefits due to higher ridership and higher VMT reductions.

3.4 Biological Resources

3.4.1 Introduction

This section describes the regulatory and environmental setting for biological resources, including wetlands, in the vicinity of the Proposed Project and the Atwater Station Alternative. It also describes the impacts on biological resources, including wetlands, that would result from implementation of the Proposed Project and the Atwater Station Alternative, and the mitigation measures that would reduce significant impacts, where feasible and appropriate. Appendix K *Supporting Biological Resources Information*, contains additional technical information for this section.

Cumulative impacts on biological resources, including wetlands, in combination with planned, approved, and reasonably foreseeable projects, are discussed in Chapter 4, *Other CEQA-Required Analysis*.

3.4.2 Regulatory Setting

This section summarizes federal, state, regional, and local regulations related to biological resources, including wetlands, that are applicable to the Proposed Project and the Atwater Station Alternative.

3.4.2.1 Federal

Federal Endangered Species Act

The federal Endangered Species Act (ESA) of 1973 requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) when a federal action may result in take of a species listed as threatened or endangered under the ESA. *Take*, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." Under federal regulations, take is further defined to include habitat modification or degradation that results, or is reasonably expected to result, in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Pursuant to the requirements of ESA, when reviewing a proposed action within its jurisdiction, an agency must determine whether any federally listed species may be present on a project site and determine if the proposed action will result in a take of such species. Under ESA, habitat loss is considered an impact on a species. In addition, the agency is required to determine whether the proposed action is likely to jeopardize the continued existence of any species that is proposed for listing under ESA or result in the destruction or negative modification of critical habitat that has been proposed or designated for such species (16 United States Code [U.S.C.] 1536(3), (4)).

Endangered Species Act Section 7 (Consultation Process)

USFWS and NMFS maintain areas of critical habitat for federally regulated species to safeguard the continued existence of such species by restricting the type and extent of activities proposed under Section 7 of ESA. Section 7 of ESA requires federal agencies to consult with USFWS and/or NMFS for actions that may take a listed species or its habitat. Federal agency actions include activities that are on federal land, conducted by a federal agency, funded by a federal agency, or authorized by a federal agency (including issuance of federal permits and licenses).

Under Section 7, the federal agency conducting, funding, or permitting an action (the federal lead agency) must consult with USFWS and/or NMFS, as appropriate, to ensure that the proposed action will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed action "may affect" a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment (BA), evaluating the nature and severity of the expected effect. In response, USFWS and/or NMFS issues a biological opinion (BO), with a determination that the proposed action would have one of the following results.

- Jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding).
- Not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

The BO issued by USFWS and/or NMFS may stipulate discretionary "reasonable and prudent" conservation measures. If the proposed action would not jeopardize a listed species, USFWS and/or NMFS will issue an incidental take statement to authorize the proposed activity.

For the Proposed Project and the Atwater Station Alternative, Section 7 consultation may be initiated by the Federal Railroad Administration (FRA) depending on the level of FRA involvement in the Proposed Project and the Atwater Station Alternative, relative to project approval or funding. If the FRA is not involved in the project overall or in certain project actions or funding, then the U.S. Army Corps of Engineers (USACE) would be the lead federal agency and would complete the consultation under Section 7 related to permits for project activities that affect wetland or waters within its jurisdiction. To the extent that Section 7 consultation does not address certain project activities, San Joaquin Regional Rail Commission (SJRRC) may need to obtain take coverage under Section 10 of ESA instead.

Endangered Species Act Section 9 (Prohibitions)

Section 9 of the ESA prohibits the take of any fish or wildlife species listed under ESA as endangered. Take of threatened species is also prohibited under Section 9, unless otherwise authorized by federal regulations. In addition to the take definition described above, Section 9 prohibits removing, digging up, cutting, or maliciously damaging or destroying federally listed plants on sites under federal jurisdiction. Section 9 does not prohibit take of federally listed plants on sites that are not under federal jurisdiction.

Endangered Species Act Section 10 (Habitat Conservation Plans)

In cases where a nonfederal entity is undertaking an action that does not require federal authorization, the take of listed species must be permitted by USFWS and/or NMFS through the Section 10 process. If a proposed project would result in the incidental take of a listed species, the project proponent must first obtain a Section 10(a)(1)(B) incidental take permit (ITP). *Incidental*

take is defined under Section 10 as the take of federally listed fish and wildlife species that are "incidental to, but not the purposes of, otherwise lawful activities."

To receive an ITP, the nonfederal entity is required to prepare a habitat conservation plan (HCP). The HCP must include conservation measures to avoid, minimize, and mitigate the project's impact on listed species and their habitat. If FRA or USACE is not the lead federal agency, SJRRC would utilize the Section 10 consultation process for this the Proposed Project and the Atwater Station Alternative. SJRRC would work with USFWS or NMFS, as necessary, to meet the Section 10 process requirements.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires that all federal agencies consult with NMFS regarding all actions or proposed actions whether permitted, funded, or undertaken, that may adversely affect *essential fish habitat* (EFH), defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The phrase *adversely affect* refers to any impact that reduces the quality or quantity of EFH.

The Magnuson-Stevens Act states that migratory routes to and from anadromous fish spawning grounds are considered EFH. Federal activities that occur outside of EFH but that may have an impact on EFH must also be considered in the consultation process.

Clean Water Act: Sections 404 and 401

Waters of the United States are protected under Section 404 of the Clean Water Act (CWA). Waters of the United States may include both wetlands and non-wetland waters. Any activity that involves a discharge of dredged or fill material into waters of the United States, including wetlands, is subject to regulation by USACE. *Waters of the United States* are defined to include navigable waters of the United States; interstate waters; all other waters that, through their use, degradation, or destruction, could affect interstate or foreign commerce; direct tributaries of any of these waters; and wetlands that meet any of these criteria or are adjacent to any of these waters. Wetlands are defined under Section 404 as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and, under normal circumstances, do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Jurisdictional wetlands must meet three wetland delineation criteria.

- They support hydrophytic vegetation (i.e., plants that grow in saturated soil).
- They have hydric soil types (i.e., soils that are wet or moist enough to develop anaerobic conditions).
- They have wetland hydrology (i.e., flooding, inundation, or saturation conditions that support wetland communities).

The extent of USACE jurisdiction in inland situations extends to the ordinary high water mark (OHWM)—the line on the shore established by fluctuations of water and indicated by a clear, natural line impressed on the bank, shelving, changes in soil character, destruction of terrestrial vegetation, and/or the presence of litter and debris.

Activities requiring a Section 404 permit must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate, pursuant to CWA Section 401. Either the State Water Resources Control Board (State Water Board) or the Central Valley Regional Water Quality Control Board would have to issue such certification prior to the alteration of or discharge to waters of the United States and the state (i.e., work involving bridge crossings of jurisdictional waters). Waters of the state are defined in Section 3.4.2.2, *State*.

Clean Water Act Section 402

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System program, administered by the United States Environmental Protection Agency. CWA Section 402 is discussed in detail in Section 3.10, *Hydrology and Water Quality*, of this environmental impact report (EIR).

Rivers and Harbors Act Section 10

Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.) is administered by USACE. This section requires permits for all structures in navigable waters of the United States, such as riprap, and for activities such as dredging. Navigable waters are defined as those subject to the ebb and flow of the tide and susceptible to use in their natural condition or by reasonable improvements as means to transport interstate or foreign commerce. USACE grants or denies permits based on the effects on navigation. Most activities covered under this act are also covered under CWA Section 404.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. 661–667(e)) applies to any project with a federal component where any body of water is impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with USFWS and the appropriate state wildlife agency.

General Bridge Act of 1946

Any individual, partnership, corporation, or local, state, or federal legislative body, agency, or authority planning to construct or modify a bridge or causeway across a navigable waterway of the United States must apply for a U.S. Coast Guard bridge permit. This includes all temporary bridges used for construction access or traffic detour.

Executive Order 11990: Protection of Wetlands

Executive Order 11990 (May 24, 1997) directs federal agencies to refrain from assisting in or giving financial support to projects that encroach on publicly or privately owned wetlands. It further requires that federal agencies support a policy to minimize the destruction, loss, or degradation of wetlands. A project that encroaches on wetlands may not be undertaken unless the agency has determined that (1) there are no practicable alternatives to construction, (2) the project includes all practicable measures to minimize harm to wetlands affected, and (3) the impact will be minor.

Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union (now Russia) and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 U.S.C. 703, 50 Code of Federal Regulations [C.F.R.] 21, 50 C.F.R. 10). Most actions that result in taking or in permanent or temporary possession of a protected species constitute violations of the MBTA. Examples of permitted actions that do not violate the MBTA are the possession of a hunting license to pursue specific gamebirds, legitimate research activities, display in zoological gardens, banding, and other similar activities. USFWS is responsible for overseeing compliance with the MBTA, and the U.S. Department of Agriculture's Animal Damage Control Officer makes recommendations on related animal protection issues.

On December 22, 2017, the Department of Interior's (DOI) Solicitor issued Opinion M-37050, which formally revises the DOI's interpretation of the MBTA's prohibition on the take of migratory bird species. Opinion M-37050 concludes that "consistent with the text, history, and purpose of the MBTA, the statute's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same apply only to affirmative actions that have as their purpose the taking or killing of migratory birds, their nests, or their killing of migratory birds, their nests, or their eggs."

On April 11, 2018, USFWS issued guidance on Opinion M-37050, which states that the MBTA's prohibitions on take apply when the purpose of an action is to take migratory birds, their eggs, or their nests. This guidance also states that ESA and some state laws and regulations are not affected by Opinion M-37050.

According to the USFWS guidance, take of a migratory bird, its nest, or eggs that is incidental to another lawful activity does not violate the MBTA, and the MBTA's criminal provisions do not apply to those activities.

Although the proposed action has the potential to affect migratory birds protected by the MBTA, the incidental take of migratory birds during the construction of the Proposed Project and the Atwater Station Alternative would not be enforced by USFWS per this guidance; however, the Proposed Project and the Atwater Station Alternative would still need to comply with state regulations on migratory birds.

Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds

Executive Order 13186 (January 10, 2001) directs each federal agency, when conducting actions that will have or be likely to have a negative impact on migratory bird populations, to work with USFWS to develop a memorandum of understanding (MOU) and promote the conservation of migratory bird populations. Protocols developed under the MOU must include the following agency responsibilities.

- Avoid and minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.
- Restore and enhance habitat of migratory birds, as practicable.
- Prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable.

The Executive Order is designed to assist federal agencies in their efforts to comply with MBTA. The order does not constitute any legal authorization to take migratory birds.

Executive Order 13112: Invasive Species Prevention

Executive Order 11312 (February 3, 1999) directs all federal agencies to prevent and control the introduction and spread of invasive nonnative species in a cost-effective and environmentally sound manner to minimize their effects on economic, ecological, and human health.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 50 C.F.R. 22) prohibits anyone from taking, possessing, or transporting bald eagle or golden eagle, or the parts, nests, or eggs of such birds without prior authorization. *Take* is defined to include pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, and disturb. *Disturb* is further defined in 50 C.F.R. Section 22.3 as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." The BGEPA regulations authorize issuance of incidental take permits of bald and golden eagles under the following conditions: (1) the take is compatible with the preservation of the bald eagle and golden eagle, (2) it is necessary to protect an interest in a particular locality, (3) it is associated with but not the purpose of an otherwise lawful activity, and (4) it cannot be practicably avoided (50 C.F.R. 22.26).

3.4.2.2 State

California Environmental Quality Act

The California Environmental Quality Act (CEQA) of 1970 requires state and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as "a project." A project is any activity undertaken by a public agency or a private activity which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency which may cause either a direct physical change in the environmental or a reasonably foreseeable indirect change in the environment.

California Native Plant Protection Act

The California Native Plant Protection Act of 1977 (Fish & G. Code 1900–1913) prohibits take, possession, transportation, exportation, importation, or sale of rare and threatened plants, except as a result of agricultural practices, fire control measures, timber operations, mining, or actions of public agencies or private utilities. Private landowners are also exempt from the prohibition against removing rare and endangered plants, although they must provide 10-day notice to the California Department of Fish and Wildlife (CDFW) before removing the plants. This act has mostly been superseded by the California Endangered Species Act (CESA).

California Fish and Game Code

California Endangered Species Act

CESA (California Fish and Game Code [Fish & G. Code] 2050–2116) states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, plants, and their habitats that are threatened with extinction, as well as those experiencing a significant decline that, if not halted, would lead to a threatened or endangered designation, will be protected or preserved.

Lake and Streambed Alteration

Section 1600 et seq. requires notifying CDFW prior to any project activity undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel.

Incidental Take Permit

Under Section 2081, an ITP from CDFW is required for projects that could result in take of a species that is state listed as threatened or endangered or identified as candidates for threatened or endangered under CESA. *Take* is defined as an activity that would directly or indirectly kill an individual of a species. The definition does not include harm or harass, as does the definition of take under the ESA. In addition, habitat destruction is not included in the definition of take. Consequently, the threshold for take under CESA is higher than that under ESA. For example, habitat modification is not necessarily considered take under CESA. CDFW administers CESA and authorizes take through Section 2081 agreements (ITPs), except for species designated as fully protected. Section 2081 also requires measures to avoid and minimize take of CESA-regulated species, and to fully mitigate the impact of take.

Bird Nesting Protections

Sections 3503 and 3503.3 state that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the code or any regulation made pursuant thereto.

Fully Protected Species

Sections 3511, 4700, 5050, 5515 list 37 fully protected species and prohibit take or possession at any time of the species listed, except for collecting these species for scientific research and relocation of bird species for the protection of livestock.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969 (California Water Code [Wat. Code] 13000 et seq.) governs water quality in California. This act delegates responsibility to the State Water Board for water rights and water quality protection and directs the nine statewide Regional Water Quality Control Boards (Regional Water Boards) to develop and enforce water quality standards within their jurisdictions. The Porter-Cologne Act requires any entity discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the state to file a report of waste discharge with the appropriate Regional Water Board. *Waters of the state* are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Wat. Code 13050[e]) including both natural and certain artificial or constructed facilities. Waters of the state includes both waters of the United Sates and non-federal waters of the state (State Water Resources Control Boards 2019). The appropriate Regional Water Board then must

issue a permit, referred to as a waste discharge requirement (WDR). WDRs implement water quality control plans and take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, and the need to prevent nuisances (Wat. Code 13263).

3.4.2.3 Regional and Local Plans

SJRRC, a state joint powers agency, proposes improvements inside and outside of the Union Pacific Railroad (UPRR) right-of-way (ROW). The Interstate Commerce Commission Termination Act (ICCTA) affords railroads engaged in interstate commerce considerable flexibility in making necessary improvements and modifications to rail infrastructure, subject to the requirements of the Surface Transportation Board.[1] ICCTA broadly preempts state and local regulation of railroads and this preemption extends to the construction and operation of rail lines. As such, activities within the UPRR ROW are clearly exempt from local building and zoning codes and other land use ordinances. However, facilities located outside of the UPRR ROW, including proposed stations, the proposed Merced Layover & Maintenance Facility, and the Atwater Station Alternative would be subject to regional and local plans and regulations. Though ICCTA does broadly preempt state and local regulation of railroads, SJRRC intends to obtain local agency permits for construction of facilities that fall outside of the UPRR ROW even though SJRRC has not determined that such permits are legally necessary and such permits may not be required.

Appendix G of this EIR, *Regional Plans and Local General Plans*, provides a list of applicable goals, policies, and objectives from regional and local plans of the jurisdictions in which the Proposed Project and the Atwater Station Alternative would be located. Section 15125(d) of the CEQA Guidelines requires an EIR to discuss "any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans." These plans were considered during the preparation of this analysis and were reviewed to assess whether the Proposed Project and the Atwater Station Alternative would be consistent with the plans of relevant jurisdictions;[2] this investigation found that the Proposed Project and the Atwater Station Alternative would generally be consistent with the applicable goals, policies, and objectives related to biological resources, including wetlands, identified in Appendix G.

3.4.3 Environmental Setting

This section discusses the environmental setting related to biological resources, including wetlands, for improvements associated with the Proposed Project and the Atwater Station Alternative. For the purposes of this analysis, the study area for biological resources is specific to the resource analyzed (i.e., special-status species, wetlands, and other waters of the United States). The area for direct impacts is the environmental footprint of the Proposed Project and the Atwater Station Alternative. The area for indirect impacts is the environmental footprint of Proposed Project and the Atwater Station Alternative plus a resource-specific buffer.

[1] ACE operates within a ROW and on tracks owned by the UPRR, which operates interstate freight rail service in the same ROW and on the same tracks.

[2] An inconsistency with regional or local plans is not necessarily considered a significant impact under CEQA, unless it is related to a physical impact on the environment that is significant in its own right.

The study area for each biological resource consists of the direct impact and indirect impact areas are defined as follows.

- The study area for special-status plant species is a 100-foot lateral buffer[3] from the environmental footprint of the Proposed Project and the Atwater Station Alternative.
- The study area for wetlands resources is a 250-foot lateral buffer[4] from the environmental footprint of the Proposed Project and the Atwater Station Alternative. The study area may extend beyond the identified buffer to include the entire vernal pool (seasonal wetland) if a portion is directly affected.
- The study area for special-status wildlife species is a 1,000-foot lateral buffer[5] from the environmental footprint of the Proposed Project and the Atwater Station Alternative. Land cover was analyzed within a 250-foot buffer from the environmental footprint of the Proposed Project and the Atwater Station Alternative. Wildlife species' occurrences and ranges were examined within a 750-foot buffer laterally extending from the environmental footprint of the Proposed Project and the Atwater Station Alternative.

Figures 3.4-1 through 3.4-12 depict the study area for biological resources in the vicinity of the Proposed Project and the Atwater Station Alternative.

Information presented in this section regarding existing biological resources was obtained from the following sources and activities.

- Plants, wildlife, and fish:
  - Background research from the California Natural Diversity Database (CNDDB) and Information for Planning and Consultation (IPaC).
  - Biological reconnaissance-level surveys of land cover types and general habitat characteristics.
  - Reconnaissance-level floristic surveys for special-status plant species.
  - Biological reconnaissance-level surveys for special-status wildlife species and their habitats, sensitive habitats of concern, and wildlife corridors.
- Waters and wetlands:
  - Determination based on standards and procedures presented in the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and as clarified in the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region* (U.S. Army Corps of Engineers 2008).
  - Field analysis of accessible potential waters and wetlands within the Proposed Project and Atwater Station Alternative footprints.
  - Draft map showing all potential jurisdictional areas (e.g., streams, creeks, ditches, wetlands) including all state and federal jurisdictional waters and wetlands.

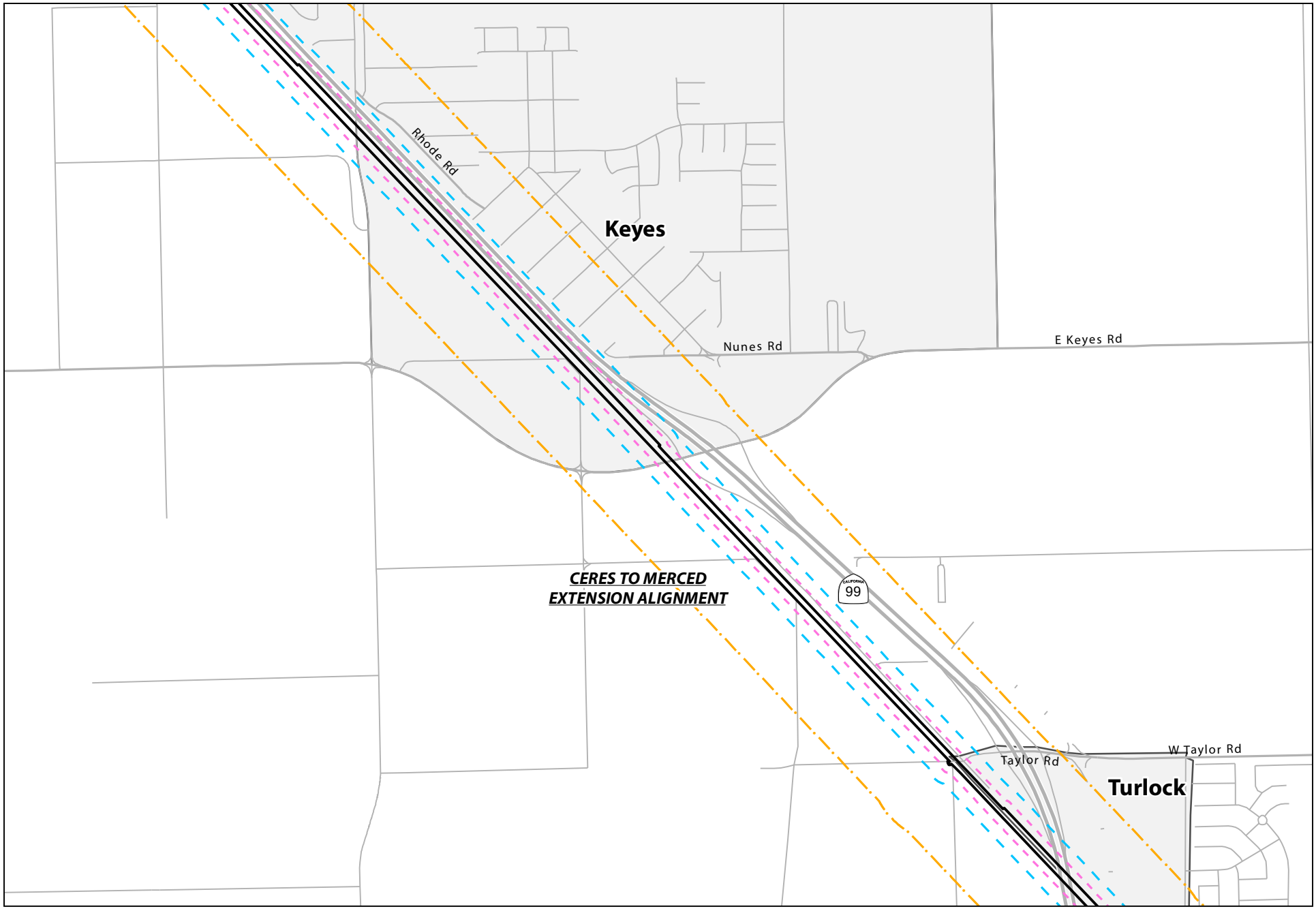
[3] The 100-foot lateral buffer for plants follows resource agency survey protocol.

[4] The 250-foot lateral buffer for wetlands and vernal pools is standard for assessing impacts to hydrology.

[5] The 1,000-foot lateral buffer for wildlife generally allows for assessing impacts to habitat needs, including foraging, breeding, and nesting.



Figure 3.4-1
Biological Resource Study Area
ACE Ceres-Merced Extension



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ALTAMONT CORRIDOR EXPRESS

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Miles

- Direct Impacts Study Area
- Special-Status Plant Study Area (100-ft Buffer)
- Wetland Resource Study Area (250-ft Buffer)
- Special-Status Wildlife Study Area (1000-ft Buffer)

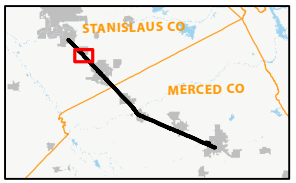
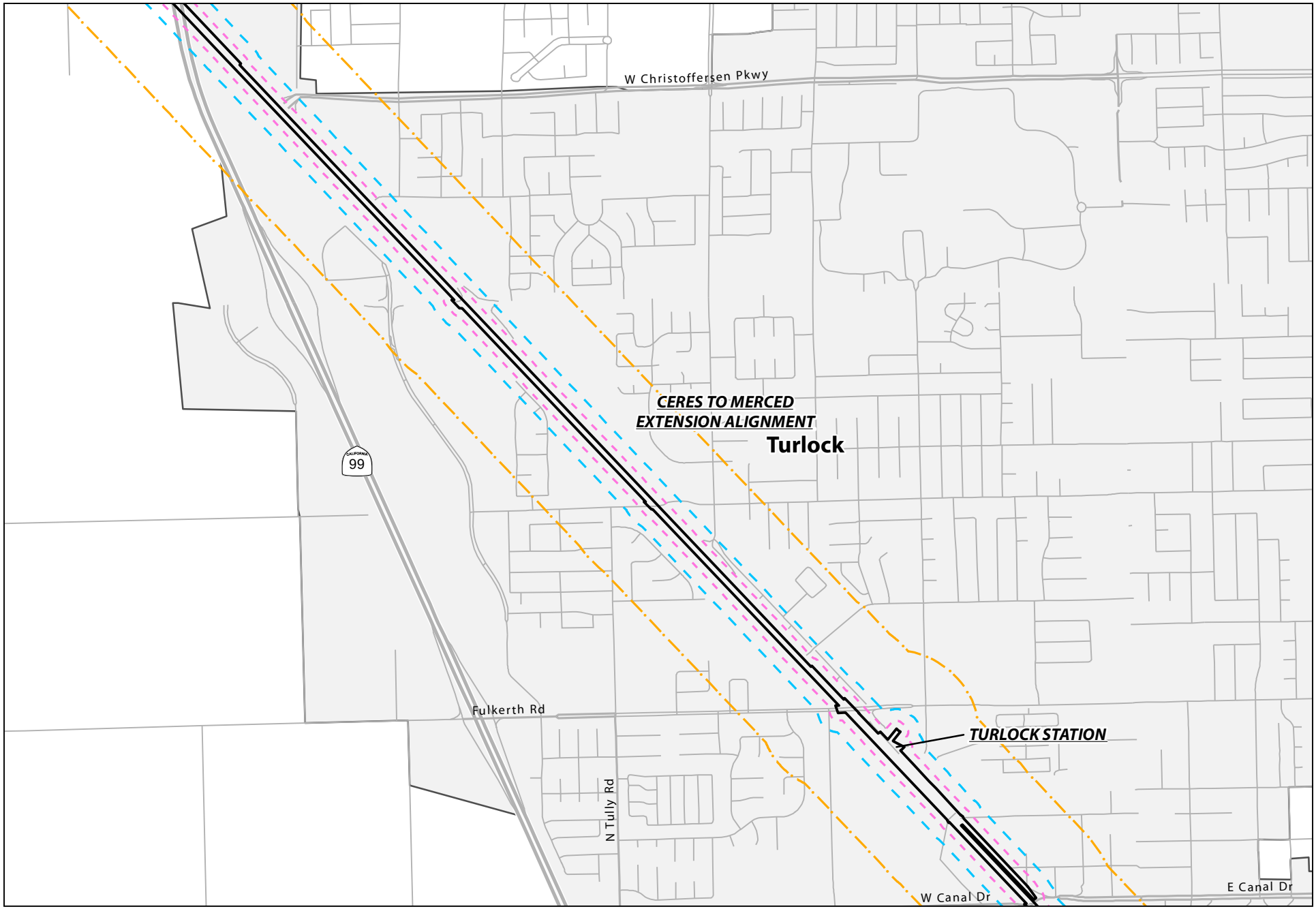


Figure 3.4-2
Biological Resource Study Area
ACE Ceres-Merced Extension



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- Wetland Resource Study Area (250-ft Buffer)
- Special-Status Wildlife Study Area (1000-ft Buffer)

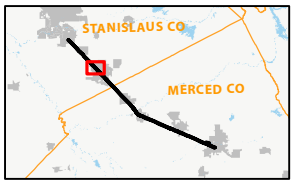


Figure 3.4-3
Biological Resource Study Area
ACE Ceres-Merced Extension

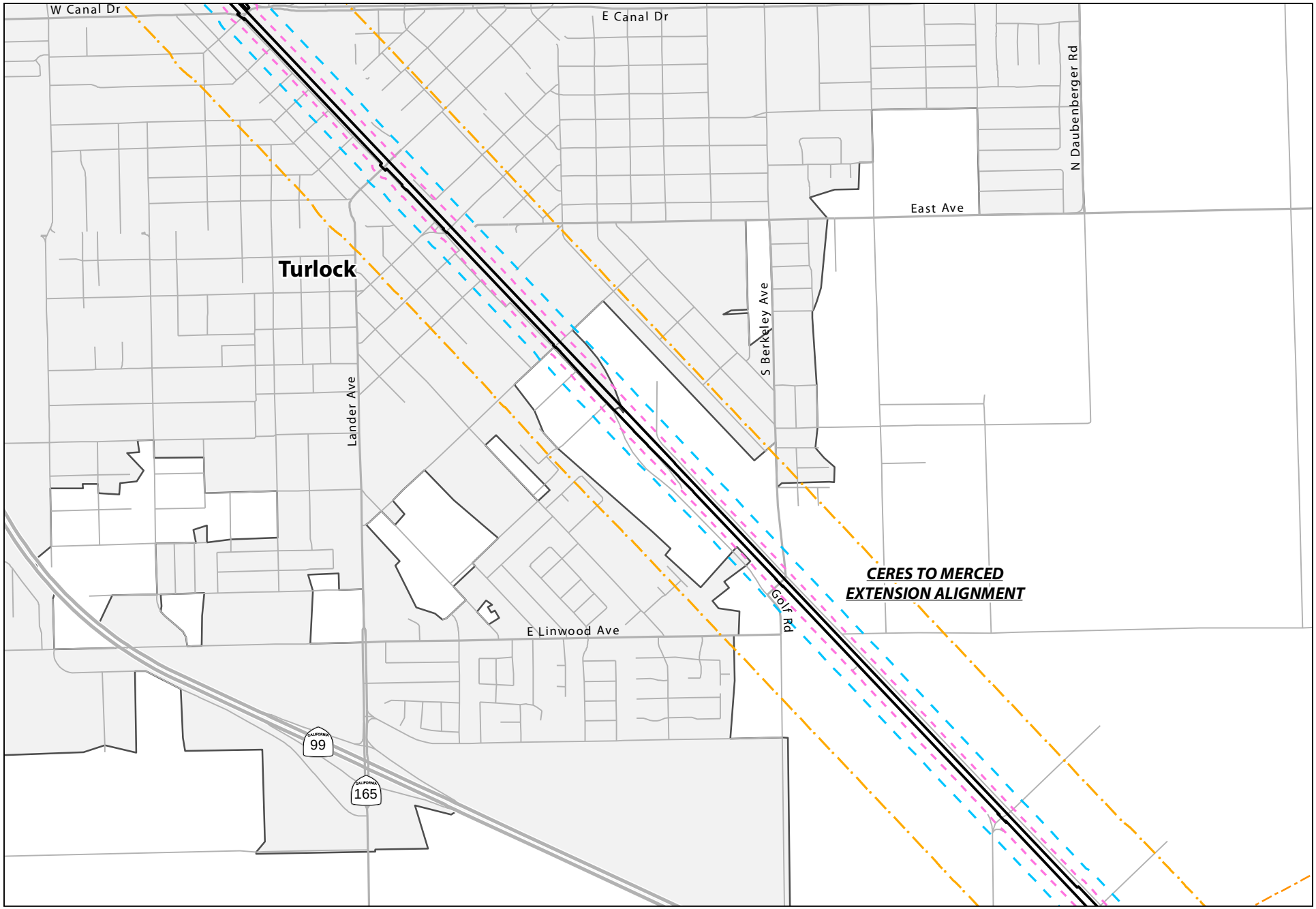
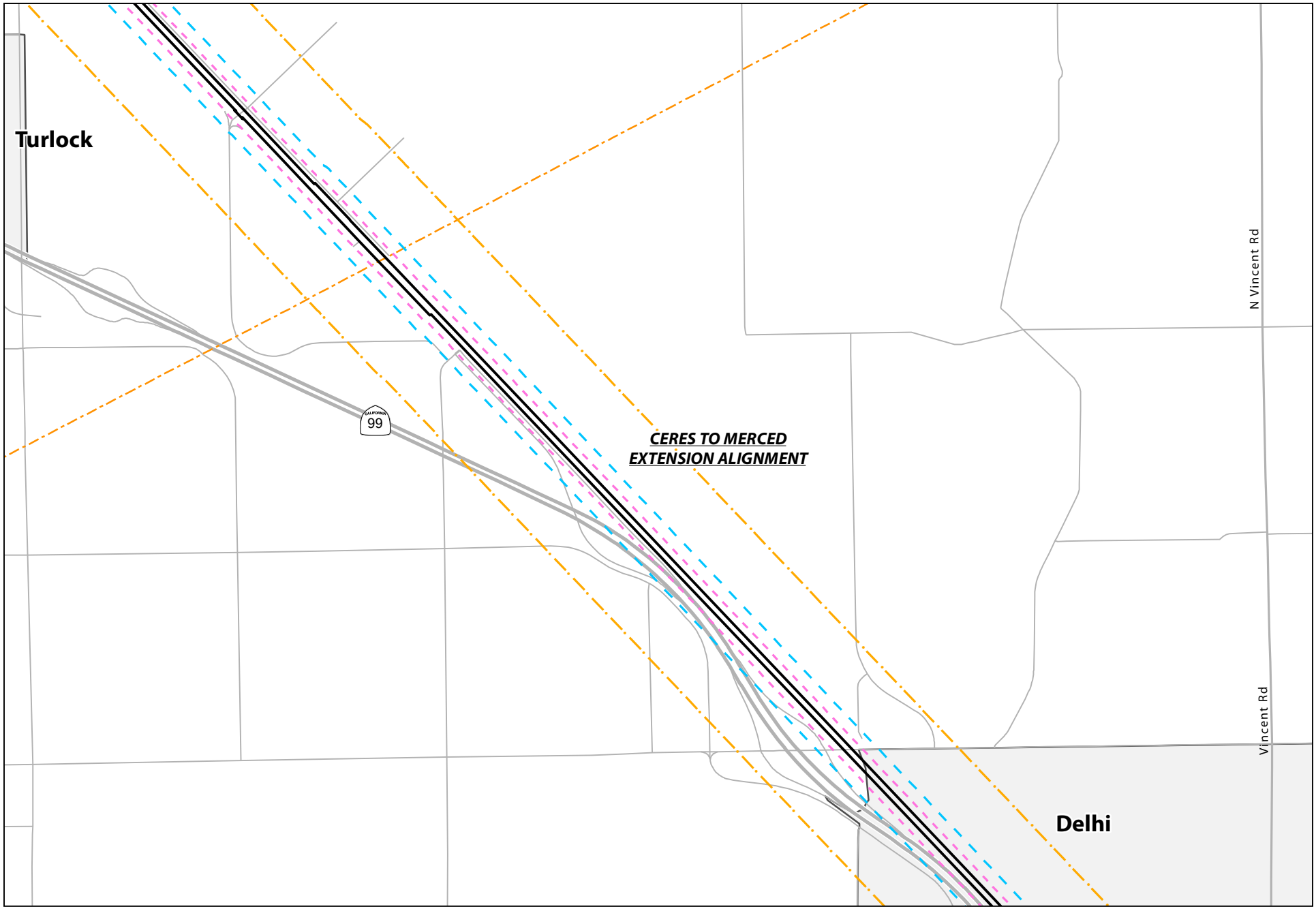


Figure 3.4-4
Biological Resource Study Area
ACE Ceres-Merced Extension



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- Wetland Resource Study Area (250-ft Buffer)
- Special-Status Wildlife Study Area (1000-ft Buffer)

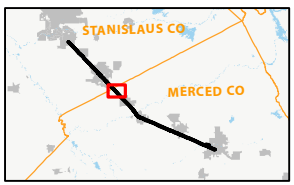
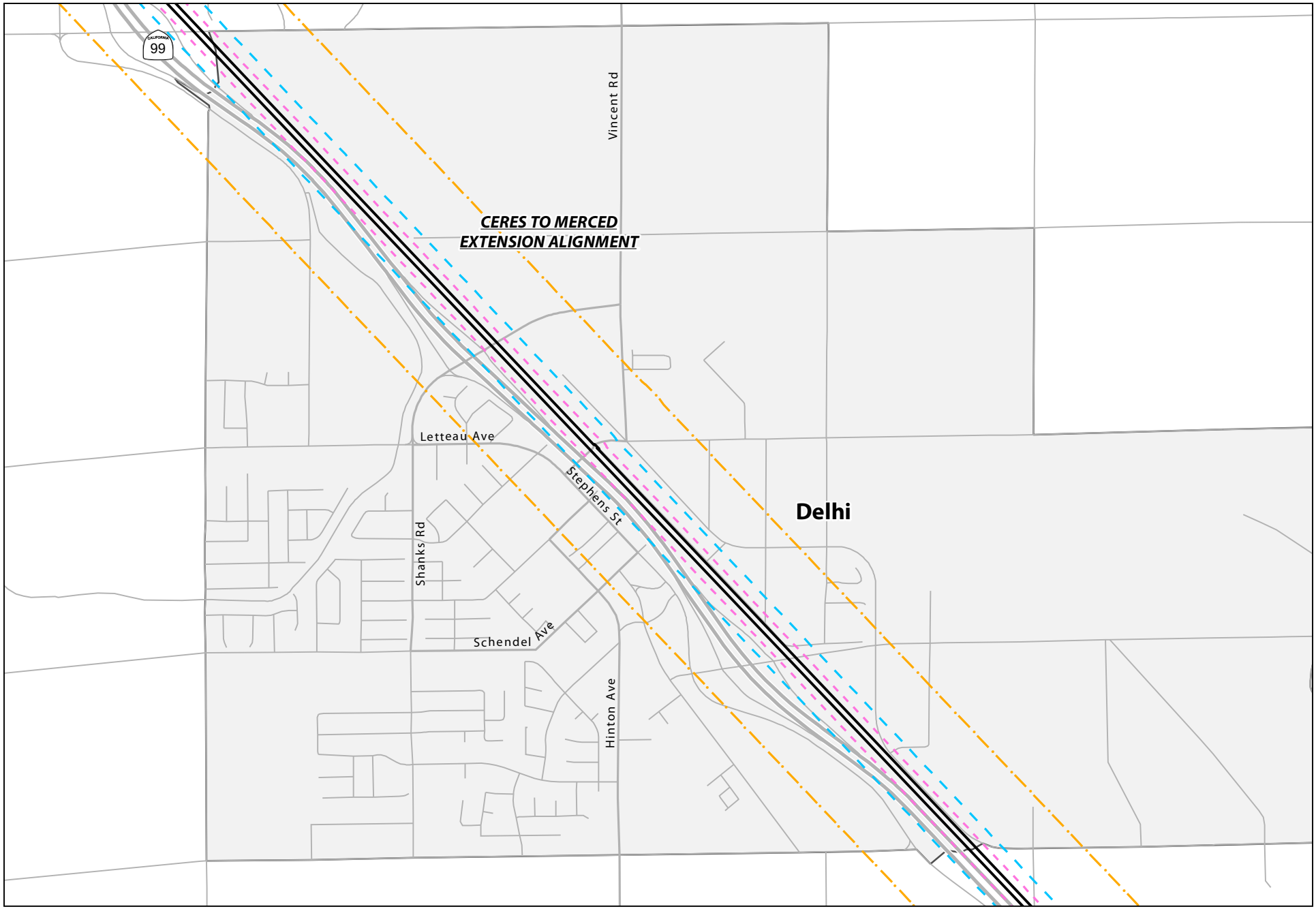


Figure 3.4-5
Biological Resource Study Area
ACE Ceres-Merced Extension



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- Special-Status Plant Study Area (100-ft Buffer)
- Wetland Resource Study Area (250-ft Buffer)
- Special-Status Wildlife Study Area (1000-ft Buffer)

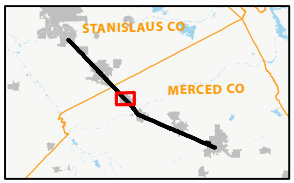
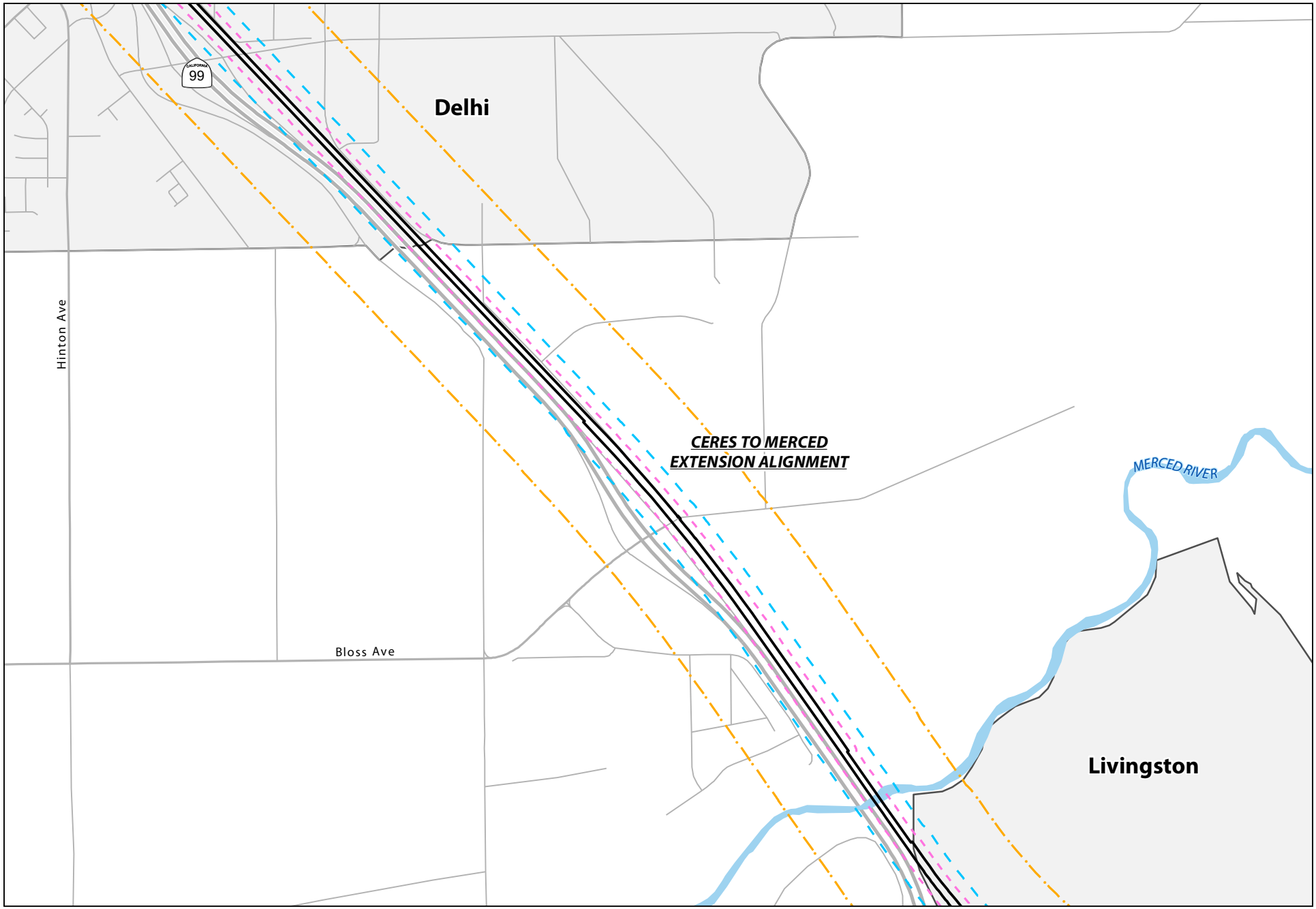


Figure 3.4-6
Biological Resource Study Area
ACE Ceres-Merced Extension



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Direct Impacts Study Area
Special-Status Plant Study Area (100-ft Buffer)
Wetland Resource Study Area (250-ft Buffer)
Special-Status Wildlife Study Area (1000-ft Buffer)

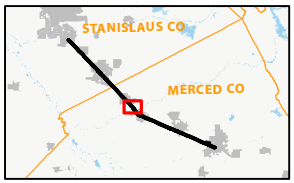
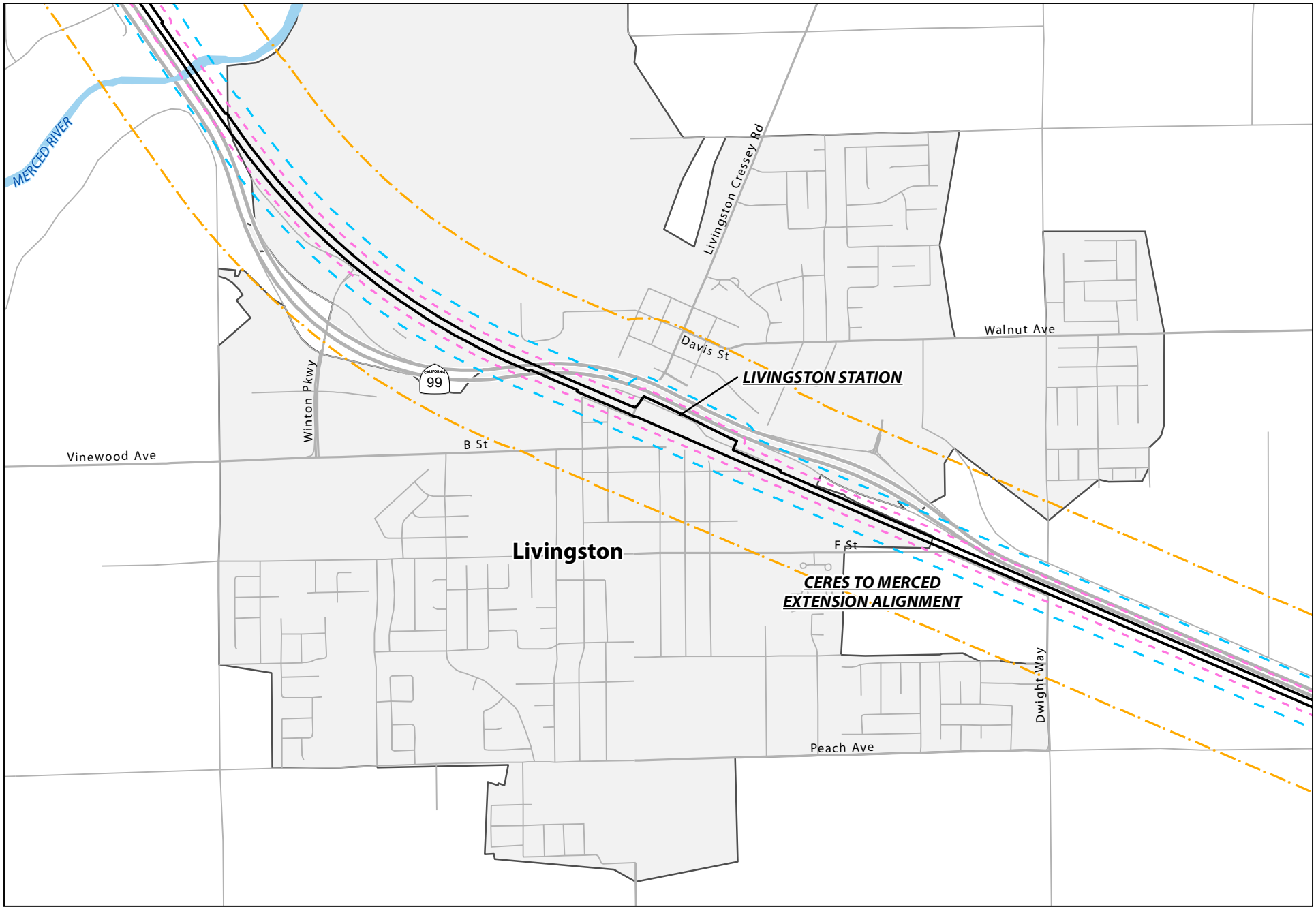


Figure 3.4-7
Biological Resource Study Area
ACE Ceres-Merced Extension



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- Special-Status Plant Study Area (100-ft Buffer)
- Wetland Resource Study Area (250-ft Buffer)
- Special-Status Wildlife Study Area (1000-ft Buffer)

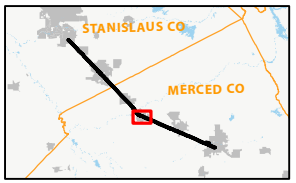
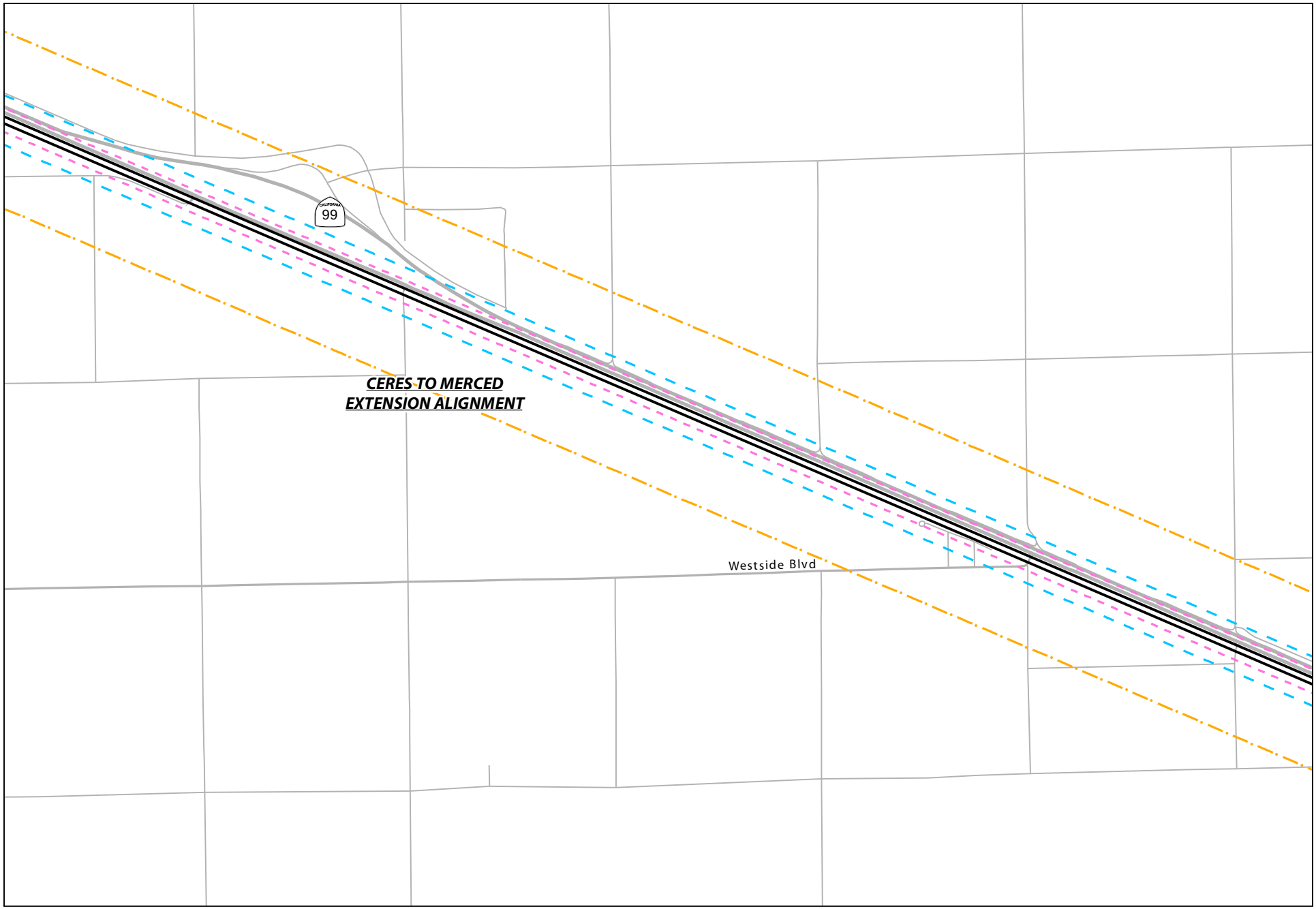


Figure 3.4-8
Biological Resource Study Area
ACE Ceres-Merced Extension



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- Special-Status Plant Study Area (100-ft Buffer)
- Wetland Resource Study Area (250-ft Buffer)
- Special-Status Wildlife Study Area (1000-ft Buffer)

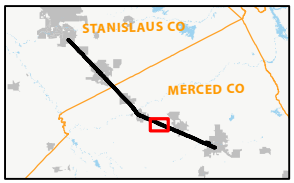
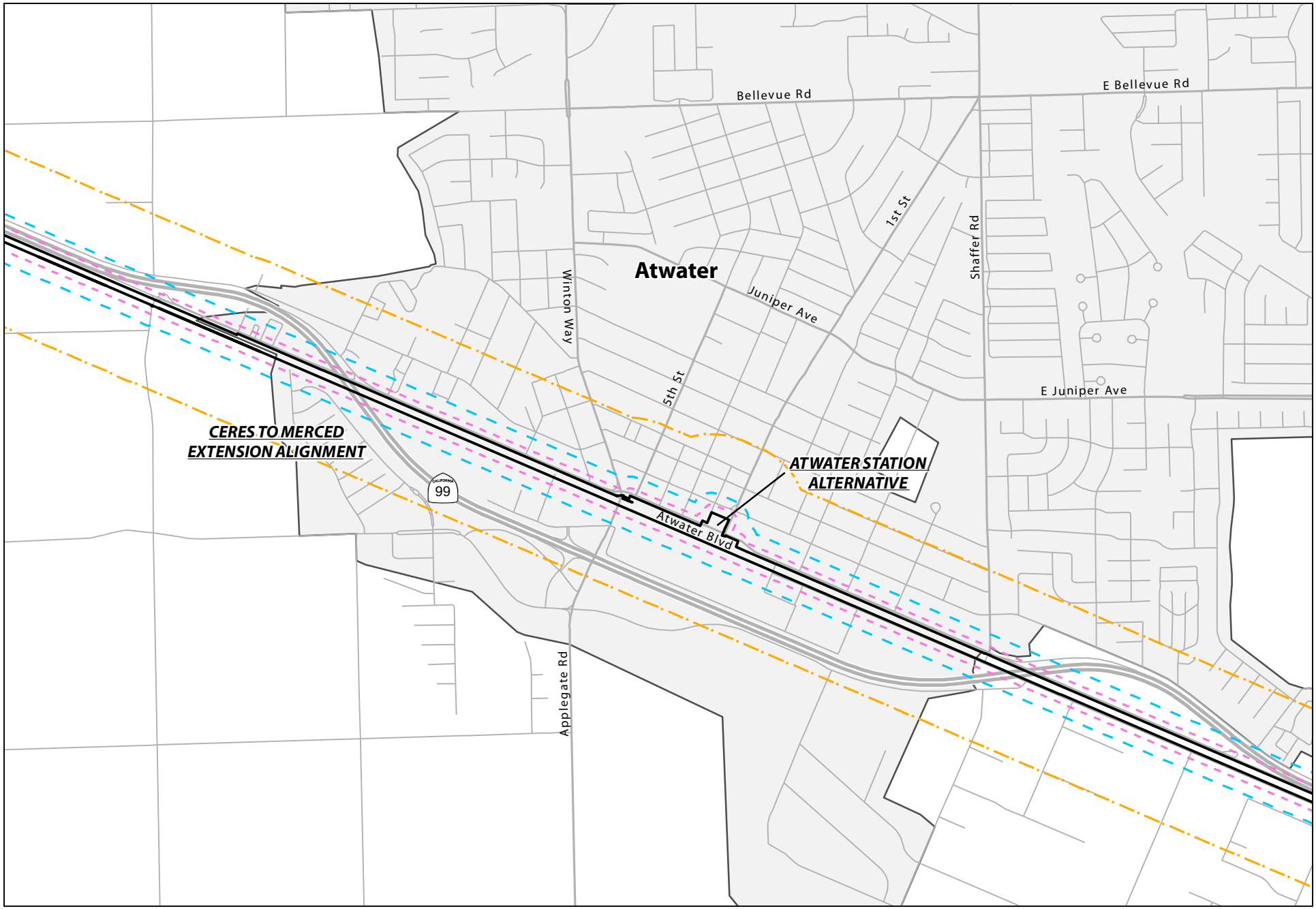


Figure 3.4-9
Biological Resource Study Area
ACE Ceres-Merced Extension



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- Direct Impacts Study Area
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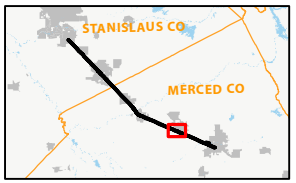
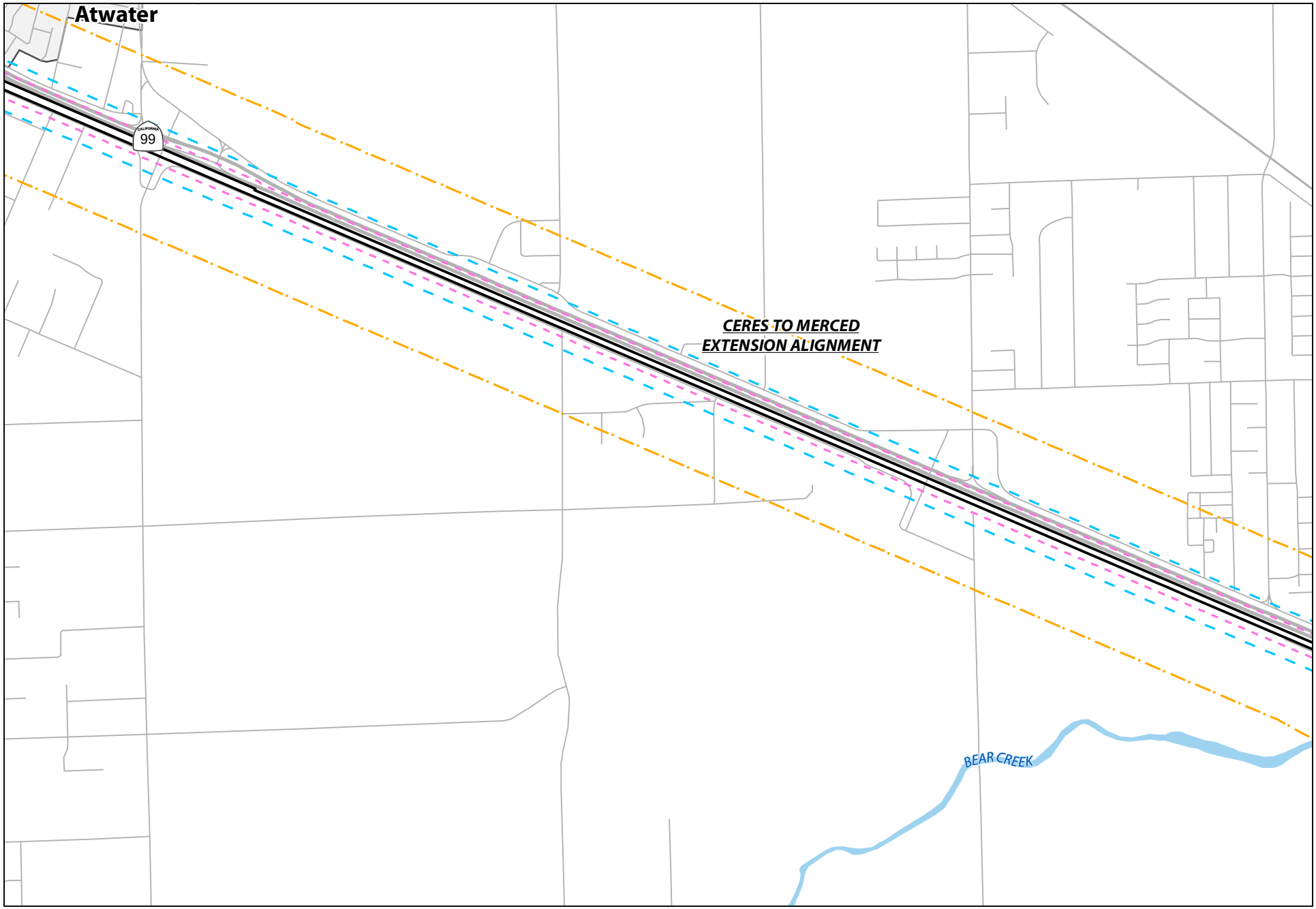


Figure 3.4-10
Biological Resource Study Area
ACE Ceres-Merced Extension



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- Special-Status Wildlife Study Area (1000-ft Buffer)

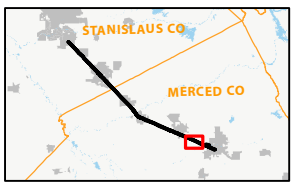
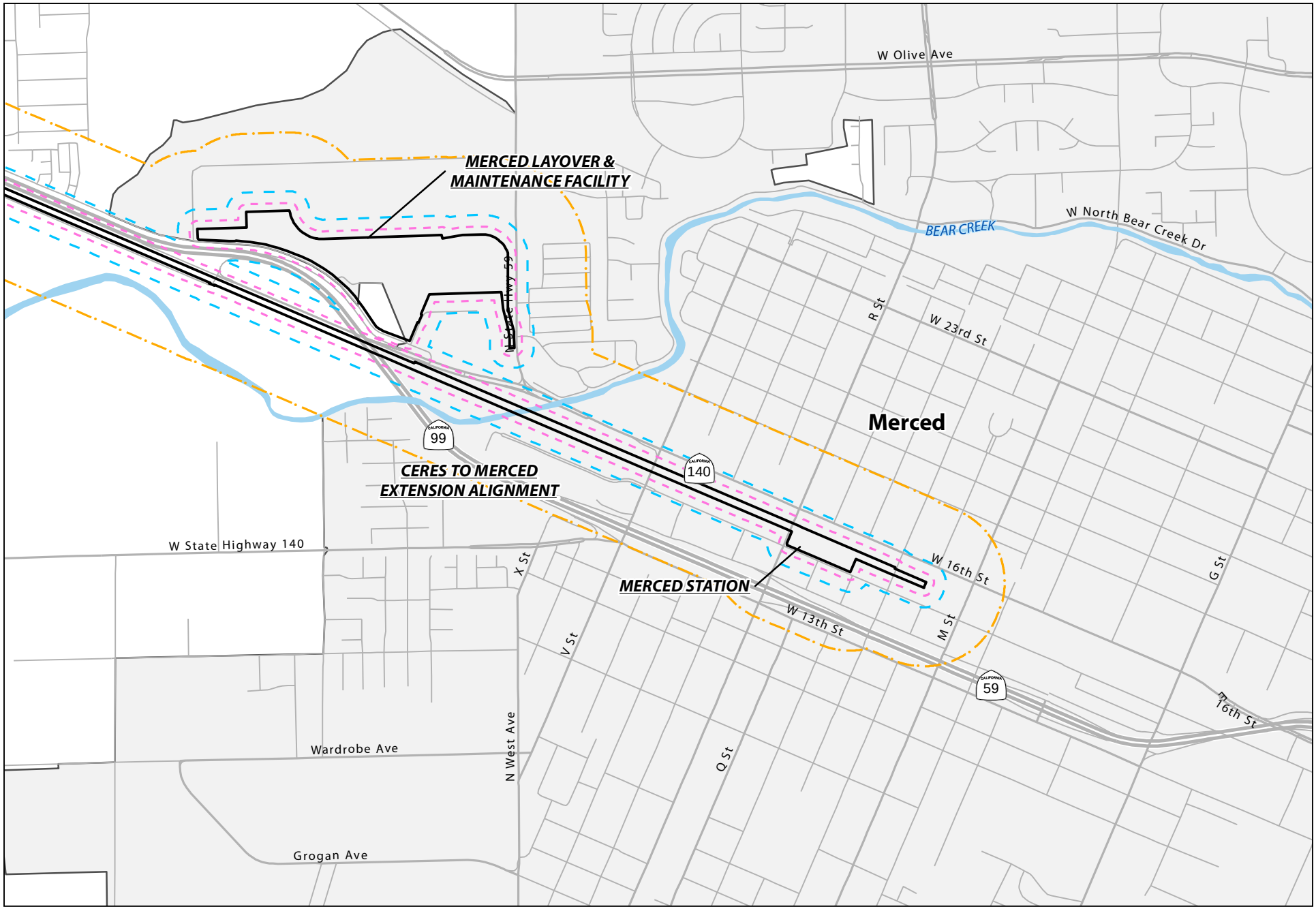


Figure 3.4-11
Biological Resource Study Area
ACE Ceres-Merced Extension



Direct Impacts Study Area
Special-Status Plant Study Area (100-ft Buffer)
Wetland Resource Study Area (250-ft Buffer)
Special-Status Wildlife Study Area (1000-ft Buffer)

N

0 0.125 0.25
Miles

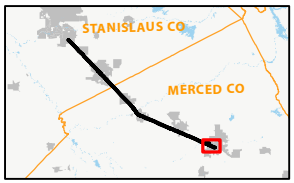


Figure 3.4-12
Biological Resource Study Area
ACE Ceres-Merced Extension

- Stand-alone determination report, including potential waters and wetlands mapping, suitable for submittal to USACE.
- Identification of waters and wetlands using aerial photography and existing water/wetland inventory data (such as the National Wetland Inventory).

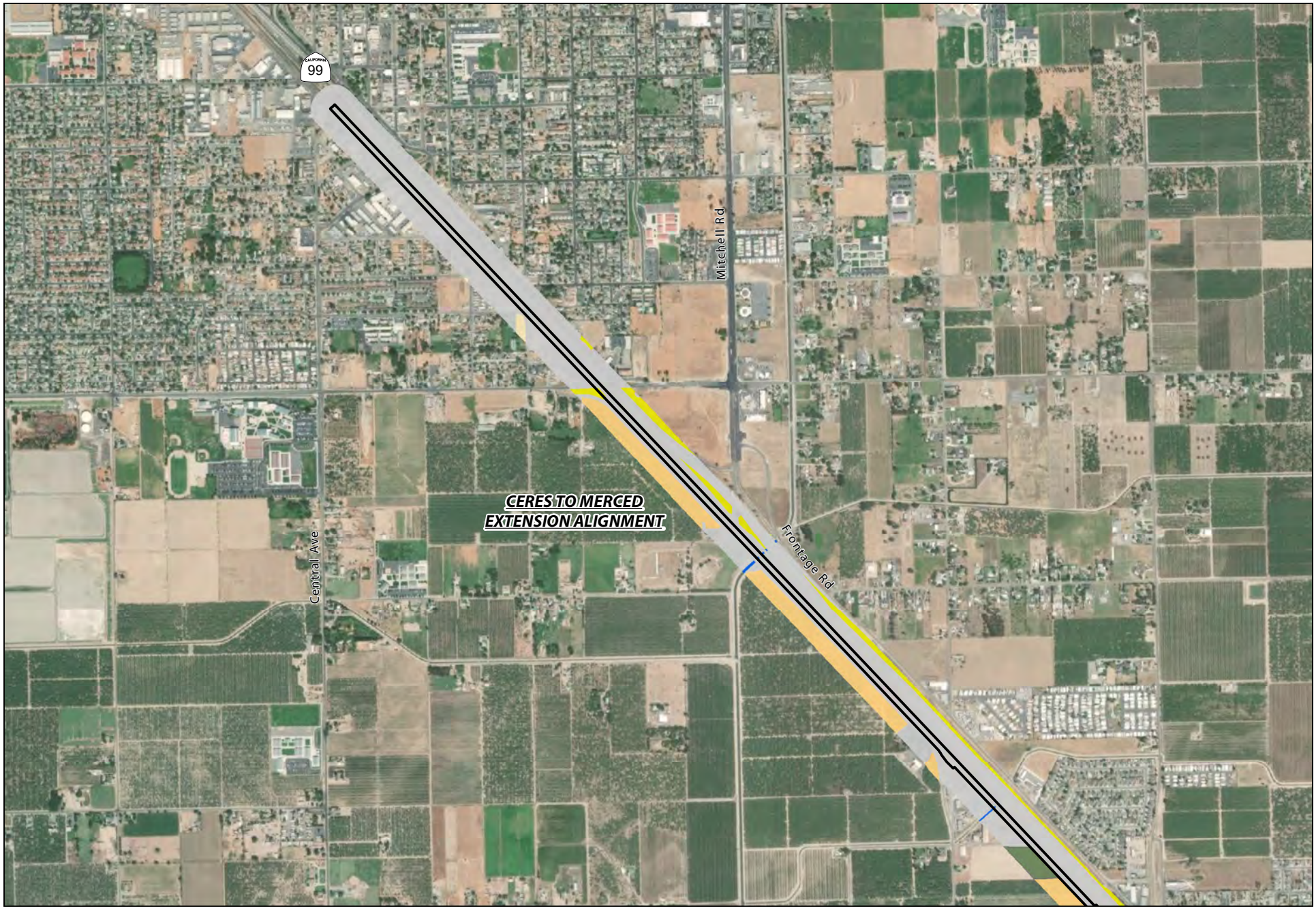
3.4.3.1 Land Cover Types and Associated Wildlife

For the purposes of this analysis, *land cover types* are defined as the dominant character of the land surface, as determined by vegetation, water, or human uses. General land cover types in the study area are as follows.

- Aquatic
- Cropland
- Developed/Landscaped
- Grassland
- Riparian
- Ruderal
- Wetland

Figures 3.4-13 through 3.4-24 depict the land cover types in the study area. Table 3.4-1 presents the acres of land cover types in the environmental footprint for the Proposed Project and the Atwater Station Alternative. The environmental footprint was developed to be a conservative estimation of where facilities could be placed and where construction could occur. The environmental footprint might include certain areas with habitat that might not actually be affected by the Proposed Project. As such, the numbers presented in Table 3.4-1 provide an estimate of the potential impacts to habitat and in some instance, might over-estimate the potential impact. Section 3.4.4.3 provides greater detail of the potential impacts. Where mitigation may be identified for certain impacts requiring compensatory mitigation, the calculation will be based on subsequent estimates of actual impacts based on subsequent final design and may be less than estimated herein.

Vegetation (including plant community and/or vegetation association information from Sawyer et al. 2009, if available) and wildlife associations (including special-status species), for each land cover type are described in the following subsections.



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Riverine
- Cropland
- Cropland, Orchard
- Cropland, Row Crops
- Developed/Landscaped
- Ruderal

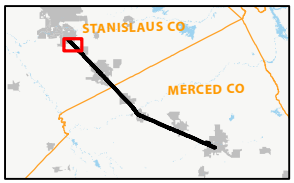
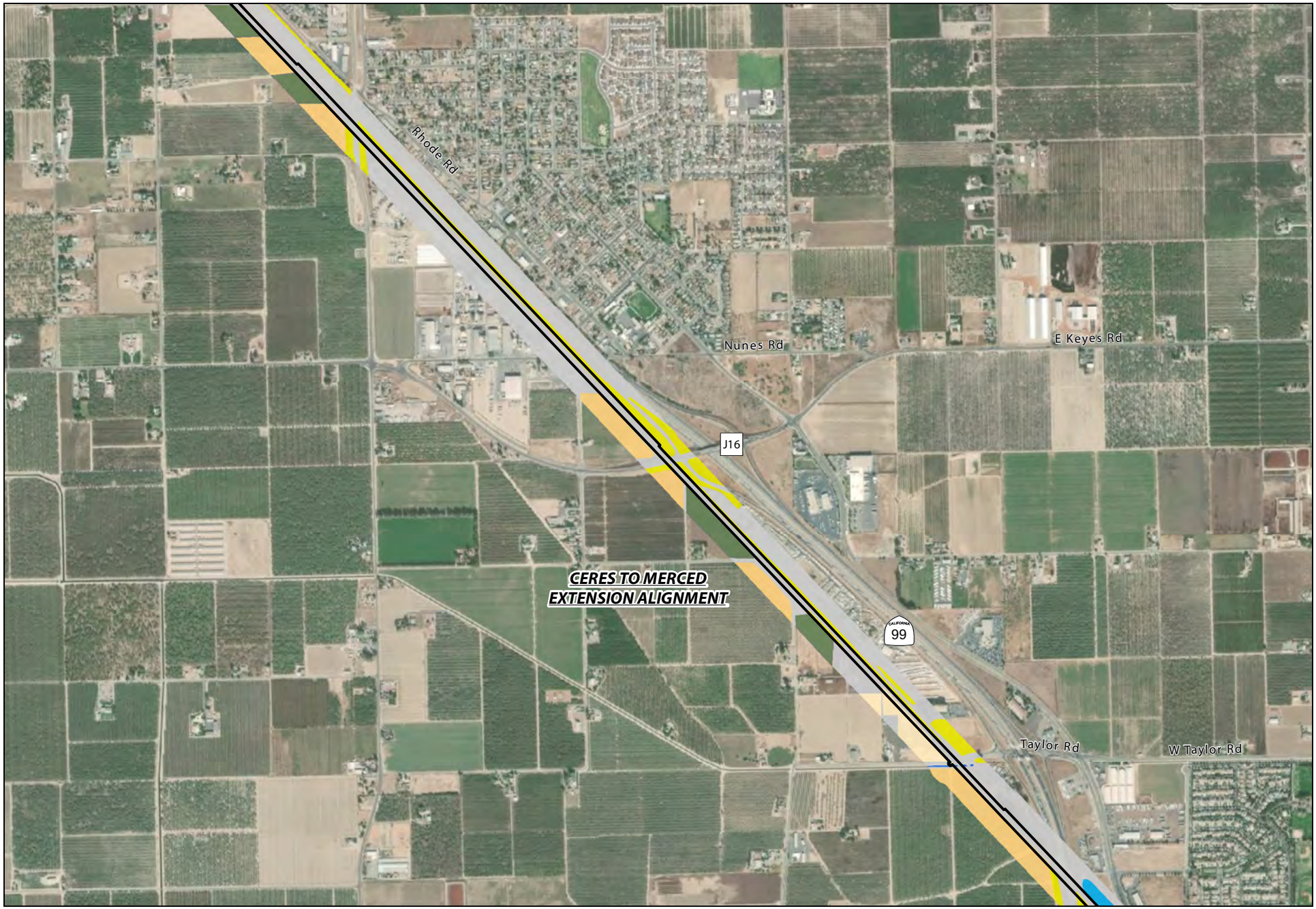


Figure 3.4-13
Land Cover
ACE Ceres-Merced Extension



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Pond
- Aquatic, Riverine
- Cropland
- Cropland, Orchard
- Cropland, Row Crops
- Developed/Landscaped
- Ruderal

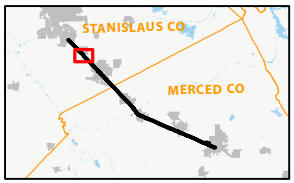
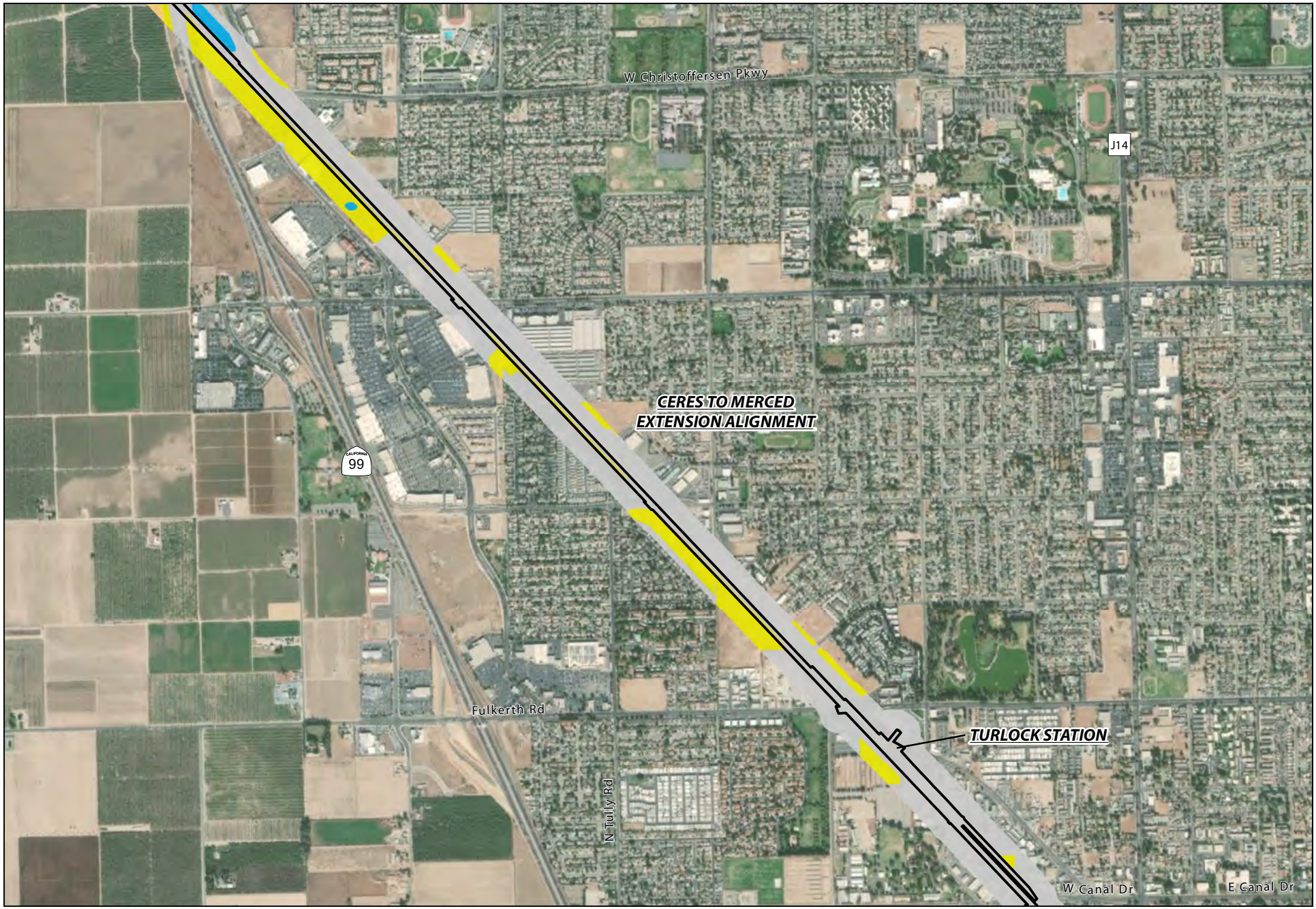


Figure 3.4-14
Land Cover
ACE Ceres-Merced Extension



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area
Ruderal

Land Cover

Aquatic, Pond
Cropland, Orchard
Developed/Landscaped

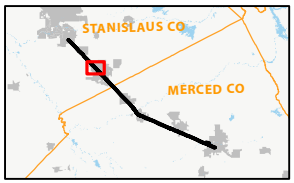


Figure 3.4-15
Land Cover
ACE Ceres-Merced Extension

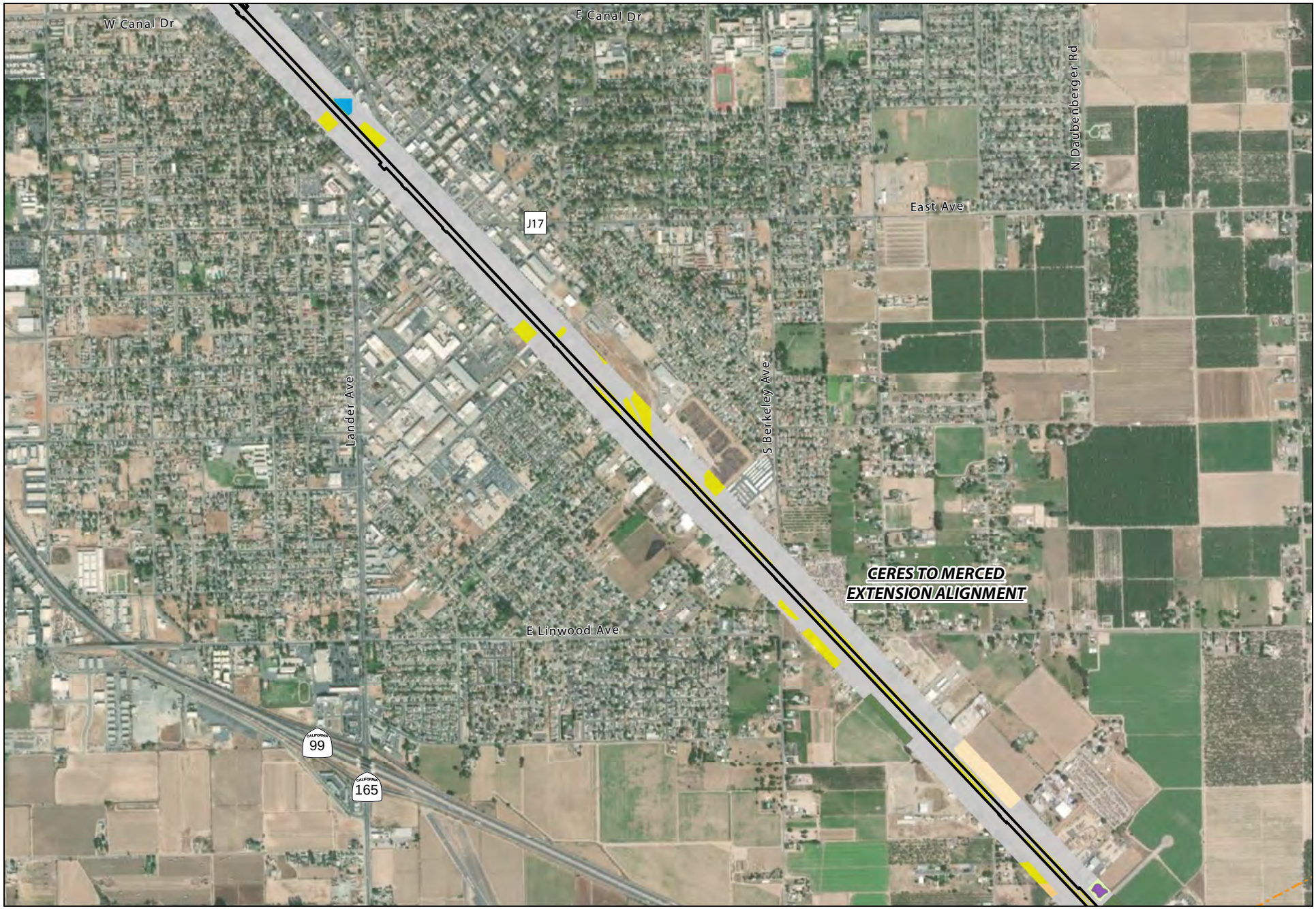
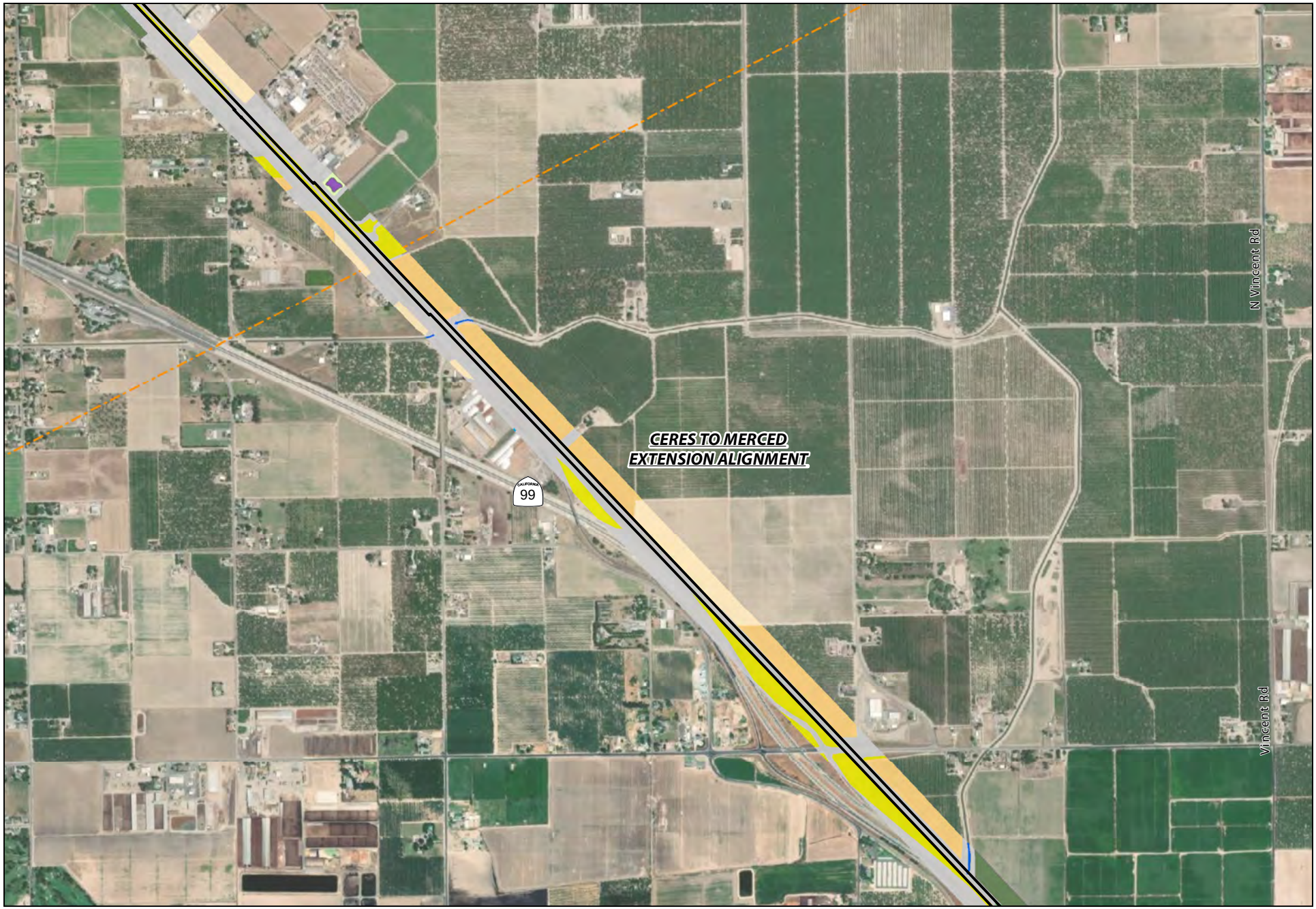


Figure 3.4-16
Land Cover
ACE Ceres-Merced Extension



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Pond
- Aquatic, Riverine
- Cropland
- Cropland, Orchard
- Cropland, Row Crops
- Developed/Landscaped
- Grassland, California Annual Grassland
- Riparian, Mixed Riparian
- Ruderal
- Wetland, Vernal Pool

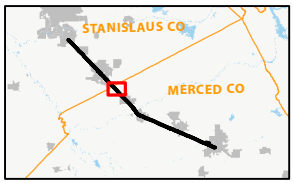
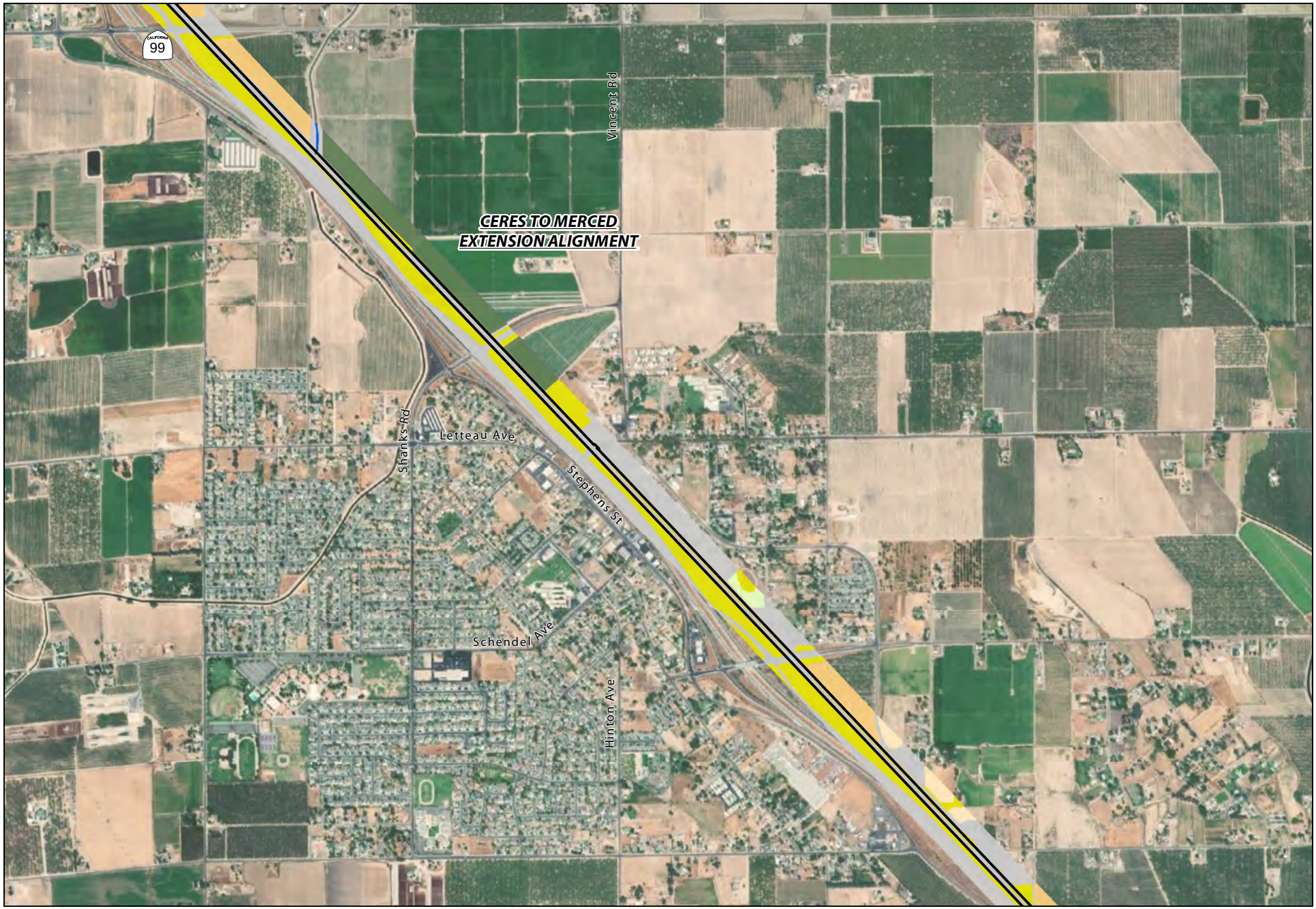


Figure 3.4-17
Land Cover
ACE Ceres-Merced Extension



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Riverine
- Cropland
- Cropland, Orchard
- Cropland, Row Crops
- Developed/Landscaped
- Grassland, California Annual Grassland
- Riparian, Mixed Riparian
- Ruderal

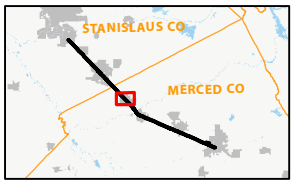


Figure 3.4-18
Land Cover
ACE Ceres-Merced Extension



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Riverine
- Cropland
- Cropland, Orchard
- Developed/Landscaped
- Riparian, Mixed Riparian
- Riparian, Valley Foothill Riparian
- Ruderal

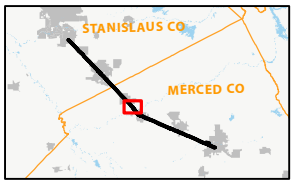
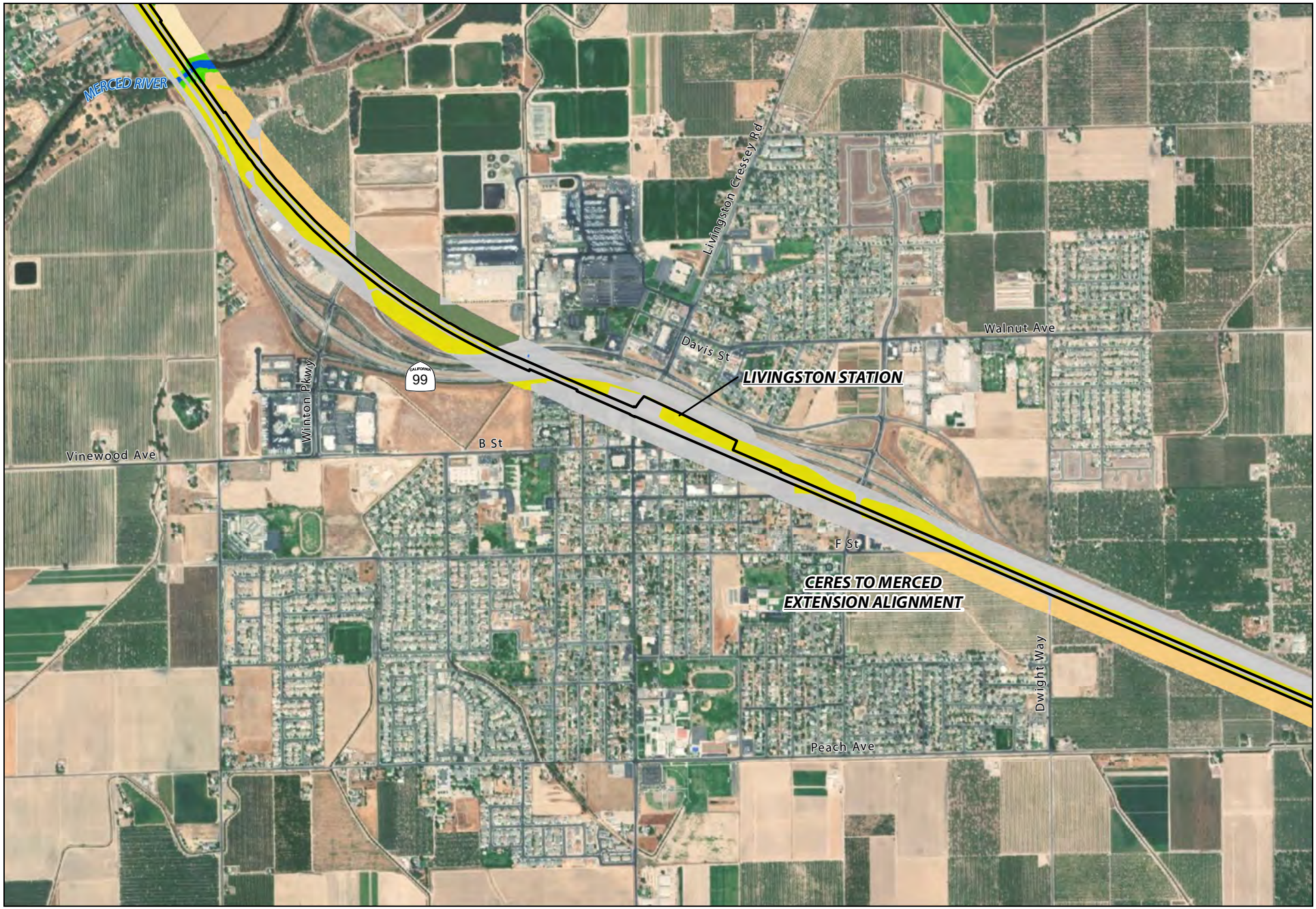


Figure 3.4-19
Land Cover
ACE Ceres-Merced Extension



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Riverine
- Cropland
- Cropland, Orchard
- Cropland, Row Crops
- Developed/Landscaped
- Riparian, Mixed Riparian
- Riparian, Valley Foothill Riparian
- Ruderal

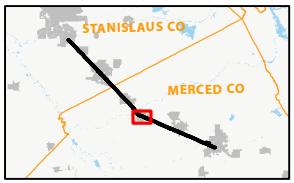


Figure 3.4-20
Land Cover
ACE Ceres-Merced Extension



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Pond
- Aquatic, Riverine
- Cropland
- Cropland, Orchard
- Cropland, Row Crops
- Developed/Landscaped
- Ruderal

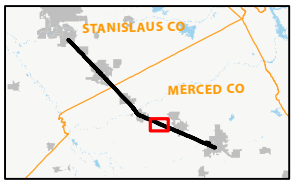


Figure 3.4-21
Land Cover
ACE Ceres-Merced Extension



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Pond
- Aquatic, Riverine
- Cropland, Orchard
- Cropland, Row Crops
- Developed/Landscaped
- Ruderal

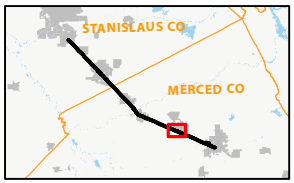
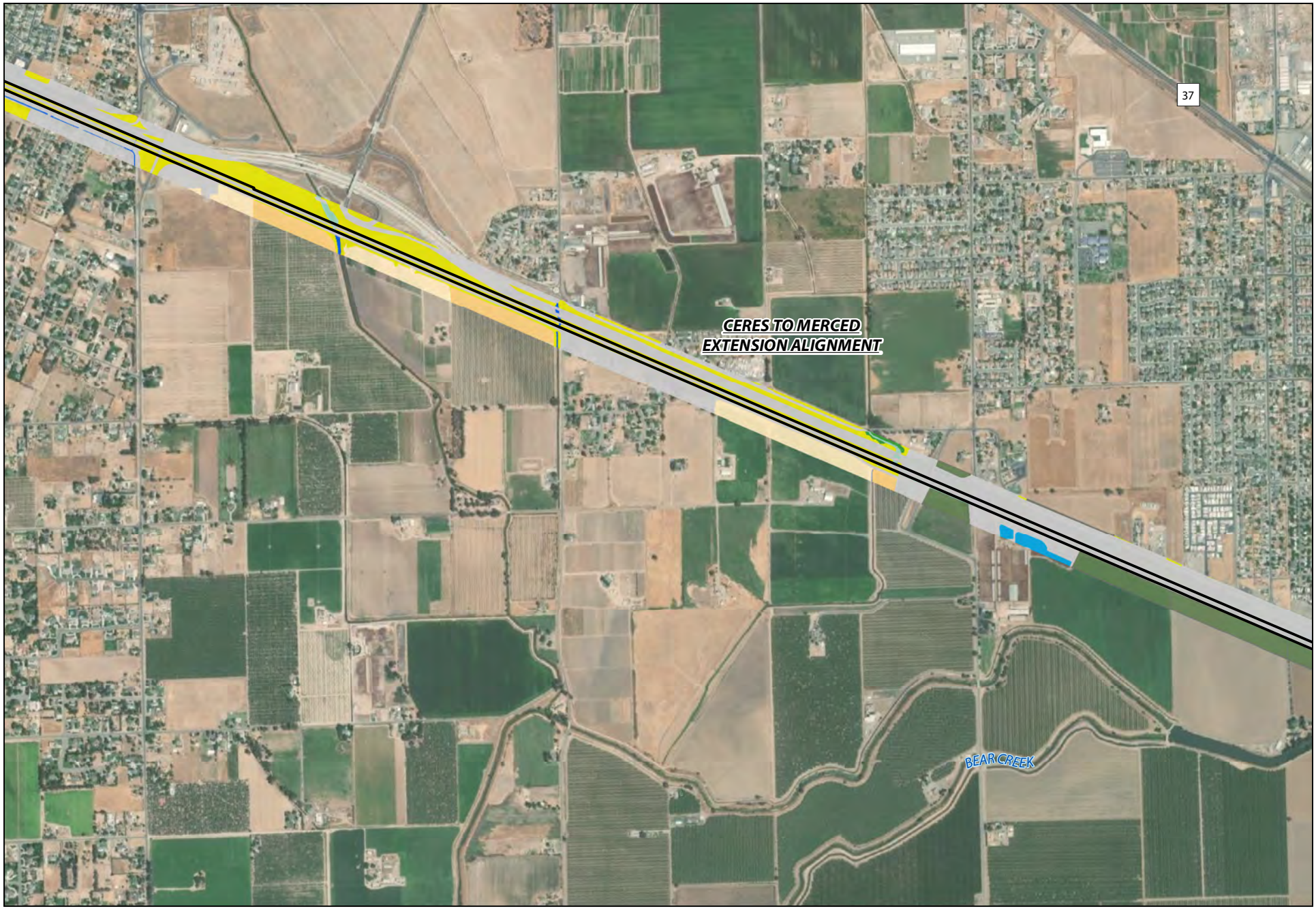


Figure 3.4-22
Land Cover
ACE Ceres-Merced Extension



ACE
ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25
Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Pond
- Aquatic, Riverine
- Cropland
- Cropland, Orchard
- Cropland, Row Crops
- Developed/Landscaped
- Riparian, Mixed Riparian
- Ruderal
- Wetland, Freshwater Marsh

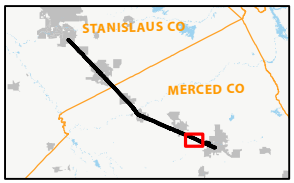
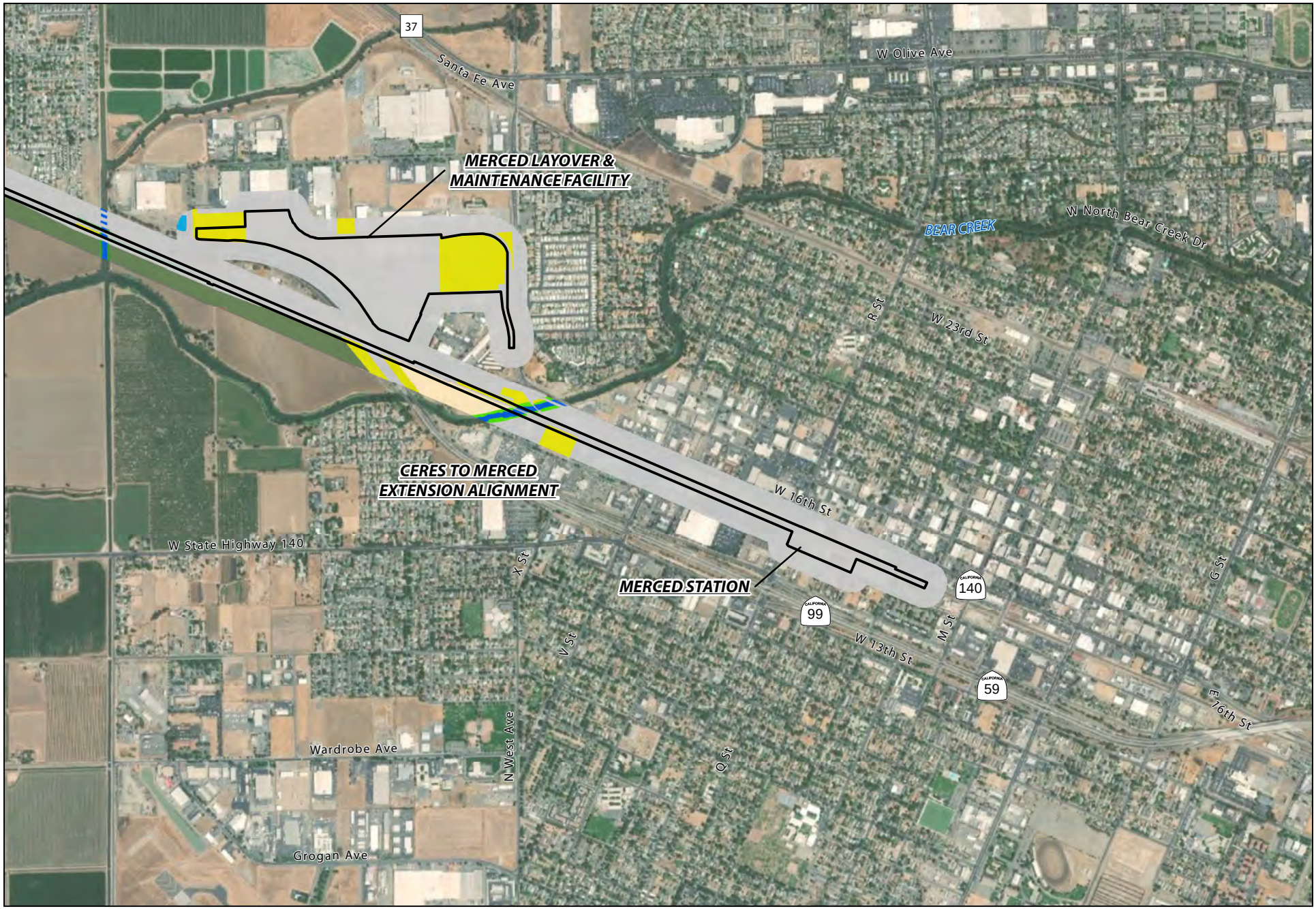


Figure 3.4-23
Land Cover
ACE Ceres-Merced Extension



ACE ALTAMONT CORRIDOR EXPRESS

N

0 0.125 0.25 Miles

Direct Impacts Study Area

Land Cover

- Aquatic, Pond
- Aquatic, Riverine
- Cropland
- Cropland, Row Crops
- Developed/Landscaped
- Riparian, Mixed Riparian
- Riparian, Valley Foothill Riparian
- Ruderal
- Wetland, Freshwater Marsh

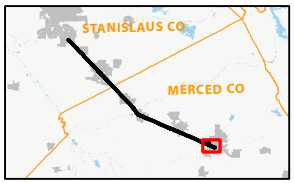


Figure 3.4-24
Land Cover
ACE Ceres-Merced Extension

Table 3.4-1. Land Cover Types in the Environmental Footprint (acres)

Proposed and Alternative Facilities	Aquatic	Cropland		Developed/Landscaped	Riparian		Ruderal	Wetland	Total
	Riverine	Orchard	Row Crops		Mixed Riparian Forest and Woodland	Valley Foothill Riparian		Freshwater Marsh	
Proposed Project									
Ceres to Merced Extension Alignment	0.68	1.02	3.25	261.57	0.52	0.49	80.11	0.70	348.35
Turlock Station	--	--	--	4.88	--	--	0.06	--	4.94
Livingston Station	--	--	--	1.10	--	--	3.65	--	4.75
Merced Layover & Maintenance Facility	--	--	--	42.81	--	--	15.29	--	58.10
Merced Station	--	--	--	3.80	--	--	--	--	3.80
Alternative Analyzed at an Equal Level of Detail									
Atwater Station Alternative	--	--	--	3.60	--	--	0.08	--	3.68

Aquatic

Riverine

The riverine land cover type includes perennial, intermittent, and ephemeral watercourses characterized by a defined bed and bank. Perennial streams support flowing water year-round in normal rainfall years. Intermittent streams carry water through most of the wet season (November to April) and are dry through most or all of the dry season (May to October) in a normal rainfall year. Ephemeral streams carry water only during or immediately following a rainfall event. The riverine land cover type, when assigned to a natural waterway, is most closely associated with riparian plant communities (see *Riparian* section). The riparian plant composition and width of the riparian corridor vary depending on channel slope, magnitude, and frequency of channel and overbank flows, and the frequency and duration of flooding flows that inundate the broader floodplain.

Agricultural canals and ditches are included in the riverine land cover type because they serve a similar function as degraded streams. Due to the nature of these built structures, canals and ditches often are managed for minimal vegetation to enhance the flow of water through the channels.

Perennial watercourses in the study area include the Merced River and Bear Creek.

Pond

Ponds are typically small (smaller than 0.4 acre in surface area), perennial, or seasonal waterbodies that support little or no vegetation. If vegetation is present, it is typically submerged or floating; little to no emergent vegetation is present around pond edges. Ponds in the study area are limited to stock ponds, settlement ponds, and constructed ponds (including water treatment ponds).

Wildlife and Fish Associations

Streams provide habitat for many fish and wildlife species. Fish species present in the study area are both native and nonnative. Species composition in aquatic habitat varies depending on physical characteristics, including salinity, temperature, flow velocity, dissolved oxygen, organic matter, and plant species composition. Some of the watercourses and waterbodies contain special-status anadromous fish species, such as steelhead (*Oncorhynchus mykiss*) and Chinook salmon (*Oncorhynchus tshawytscha*), and California Species of Special Concern, such as hardhead (*Mylopharadon conocephaslus*), Kern Brook lamprey (*Lampetra hubbsi*), Pacific lamprey (*Entosphenus tridentatus*), and Sacramento splittail (*Pogonichthys macrolepidotus)* (Stillwater Sciences 2008). Special-status wildlife species known to use riverine or pond habitat include California tiger salamander (*Ambystoma californiense*), western pond turtle (*Actinemys marmorata*), and giant garter snake (*Thamnophis gigas*). Several waterbird species known to use aquatic communities include American wigeon (*Anas americana*), pied-billed grebe (*Podilymbus podiceps*), mallard (*Anas platyrhynchos*), American coot (*Fulica americana*), and great egret (*Ardea alba*). Common nonnative fish species occurring in the Merced River include mosquito fish (*Gambusia affinis*), bass species such as largemouth, spotted and striped, and sunfish species such as pumpkinseed, redear, and green (Stillwater Sciences 2008). Native fish species include prickly sculpin (*Cottus asper*), Sacramento sucker (*Catostomus occidantalis*), Sacramento pikeminnow (*Ptychocheilus grandis*), and California roach (*Lavinia symmetricus*) (Stillwater Sciences 2008). Common amphibian species that inhabit freshwater aquatic habitat for a portion of their life cycle include Sierran treefrog (*Pseudacris sierra*), California toad (*Anaxyrus boreas halophilus*), and California newt (*Taricha torosa*).

Cropland

Cropland includes both currently cultivated lands (e.g., hay, row crops, orchards, etc.) and fallow fields.

Orchards

Orchards consists of monocultures of evenly spaced, generally low bushy trees that are similar in canopy size and tree height. Canopy cover ranges from open to dense depending on the age of the trees, with saplings and young trees having relatively open canopies and older trees providing more closed canopy cover. Depending on management practices, the understory is either devoid of vegetation or composed of various weedy annual grasses and forbs. Where herbaceous vegetation is present, it is often mowed, sprayed, or tilled to facilitate harvest and conserve water. Orchards in the study area include (*Prunus dulcis*), figs (*Ficus* sp.), cherries (*Prunus* sp.), apricot (*Prunus* sp.), and pistachio (*Pistacia vera*).

Row Crops

Row crops in the study area include (*Medicago sativa*), strawberries (*Fragaria* sp.), watermelon (*Citrullus lanatus*), cantaloupe (*Cucumis melo*), tomato (*Lycopersicon* sp.), and pumpkin (*Curcurbita pepo*).

Wildlife Associations

Field and row crops, such as alfalfa, provide foraging habitat for raptors, particularly Swainson's hawk (*Buteo swansoni*). Row crops can also provide foraging opportunities for tricolored blackbird

(*Agelaius tricolor*). Fallow fields and inactive farmland may provide nesting habitat for several wildlife species, including northern harrier (*Circus cyaneus*) and burrowing owl (*Athene cunicularia*). These and other agricultural lands may provide foraging or dispersal habitat for loggerhead shrike (*Lanius ludovicianus*), white-tailed kite (*Elanus leucurus*), and western red bat (*Lasiurus blossevillii*), which is known to roost in orchards. Although uncommon western yellow-billed cuckoo (*Coccyzus americanus*) and Swainson's hawk have been documented nesting in orchards.

Developed/Landscaped

Developed/landscaped areas include all types of development for residential, commercial, industrial, transportation, landscaping, and recreational uses (e.g., sites with structures, paved surfaces, horticultural and ornamental plantings, golf courses, and irrigated lawns). Vegetation in developed/landscaped areas is highly variable, ranging from nonexistent in paved areas to maintained lawns and ornamental shade trees. Common ornamental species include California fan palm (*Washingtonia filifera*), Canary Island palm (*Phoenix canariensis*), eucalyptus (*Eucalyptus* sp.), olive (*Olea europaea*), oleander (*Nerium oleander*), and pepper tree (*Schinus molle*), among others. Ground cover generally consists of ornamental or ruderal vegetation. The developed/landscaped land cover type is one of the most common land cover types in the study area. This landcover type is predominately associated with the towns of Ceres, Keyes, Turlock, Delhi, Livingston, Atwater, and Merced.

Wildlife Associations

Wildlife species occurring in developed/landscaped areas are typically generalists that have adapted to human-modified landscapes. Ornamental trees and lawns provide nesting and foraging habitat for urban-adapted birds such as American crow (*Corvus brachyrhynchos*), western scrub-jay (*Aphelocoma californica*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), and house finch (*Haemorhous mexicanus*). Other common wildlife found in developed/landscaped areas include Virginia opossum (*Didelphis virginiana*), northern raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and a variety of rodents. Some barren areas along existing railroad grades also support California ground squirrel (*Otospermophilus beecheyi*), which create burrows that also provide habitat for burrowing owl. Western pond turtle can occupy developed/landscaped areas where suitable aquatic habitat is present (e.g., golf course ponds). Although not common, Swainson's hawk have also been observed nesting in urban areas where tall ornamental trees are present; urban nesting sites are near or adjacent to foraging habitat. Urban pollinator gardens associated with developed/landscaped areas can also provide nectar and breeding resources (e.g., milkweed [*Asclepias* spp.]) for Western monarch butterfly (*Danaus plexippus plexippus*).

Grassland

California Annual Grassland

California annual grassland is an herbaceous plant community dominated by nonnative annual grasses (Holland 1986; Sawyer et al. 2009). In the study area, California annual grassland was mapped in only two locations just south of Turlock and Dehli adjacent to the environmental footprint where grasses dominate the land cover, and trees and shrubs provide minimal cover. Dominant species are wild oats (*Avena barbata*, *A. fatua*), ripgut grass (*Bromus diandrus*), soft chess

(*Bromus hordeaceus*), rye grass (*Festuca perennis*), and wall barley (*Hordeum murinum*). Herbaceous cover includes native and nonnative forbs such as bristly ox-tongue (*Helminthotheca echioides*), bull thistle (*Cirsium vulgare*), Italian thistle (*Carduus pycnocephalus* subsp. *pycnocephalus*), lupine (*Lupinus* sp.), prickly lettuce (*Lactuca serriola*), shortpod mustard (*Hirschfeldia incana*), stinkwort (*Dittrichia graveolens*), and yellow star-thistle (*Centaurea solstitialis*).

The California annual grassland cover type is located in the study area, immediately east of the Ceres to Merced Extension Alignment footprint. The California annual grassland cover type is not within the environmental footprint of the Proposed Project or the footprint of the Atwater Station Alternative. The land cover type is intermixed with vernal pool land cover.

Wildlife Associations

Grasslands support insects, amphibians, reptiles, small birds, and mammals that are prey for wildlife such as red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), northern harrier, American kestrel (*Falco sparverius*), burrowing owl, turkey vulture (*Cathartes aura*), coyote (*Canis latrans*), and American badger (*Taxidea taxus*). Grasslands near open water (including vernal pools or seasonal wetlands) and woodland are used by more species than those that lack such features because they provide places for resting, breeding, and escape cover for species that breed in these adjacent habitats. Common wildlife species occurring in grasslands in the study area include black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), California ground squirrel, striped skunk, western fence lizard (*Sceloporus occidentalis*), western kingbird (*Tyrannus verticalis*), loggerhead shrike, horned lark (*Eremophila alpestris*), song sparrow (*Melospiza melodia*), and western meadowlark (*Sturnella neglecta*). Native grasslands can also support insects such as Western monarch butterfly if blooming nectar resources and milkweed plants are present.

Riparian

Mixed Riparian Forest and Woodland

Mixed riparian forest and woodland is a natural community of special concern in undisturbed situations (California Department of Fish and Wildlife 2018a). This land cover type occurs along the margins of natural riverine channels in the study area. Generally, no single species dominates the canopy, and composition varies with elevation, aspect, and hydrology. In the study area along the outer edges of the Merced River floodplain, valley oak (*Quercus lobata*) is most common in the canopy. Other associate canopy species are California sycamore (*Platanus racemosa*), interior live oak (*Quercus wislizeni*), willow (*Salix* spp.), and Fremont cottonwood (*Populus fremontii*).

Valley Foothill Riparian

Valley foothill riparian is a natural community of special concern in undisturbed situations (California Department of Fish and Wildlife 2018a). Dominant canopy species include California sycamore, Fremont cottonwood, and valley oak. Subcanopy trees include box elder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*), and white alder (*Alnus rhombifolia*). The understory shrub layer consists of blackberry (*Rubus* spp.), blue elderberry (*Sambucus nigra* ssp. *caerulea*), California rose (*Rosa californica*), western poison oak (*Toxicodendron diversilobum*), California wild grape (*Vitis californica*), and willow (California Department of Fish and Wildlife 2018a).

Valley foothill riparian cover type is present in the study area and is associated with the Merced River and Bear Creek.

Wildlife Associations

Riparian vegetation is diverse and comprises multiple vegetative strata, which provide high-value habitat for many wildlife species. Dense, multilayered riparian communities provide escape cover, forage, and nesting opportunities for wildlife. Riparian woodlands support many of the same species occurring in other woodland communities discussed in this section, as well as several riparian-specific species, such as Pacific-slope flycatcher (*Empidonax difficilis*), warbling vireo (*Vireo gilvus*), Wilson's warbler (*Cardellina pusilla*), and black-headed grosbeak (*Pheucticus melanocephalus*). The presence of elderberry shrubs (*Sambucus* sp.) in riparian cover type can also provide suitable habitat for valley elderberry longhorn beetle. The presence of milkweed in riparian corridor can also provide suitable habitat for Western monarch butterfly. Riparian woodlands can also be utilized by bat species such as western mastiff bat (*Eumops perotis californicus*) and western red bat. Riparian corridors also function as wildlife corridors as they provide cover and foraging habitat in otherwise suboptimal wildlife habitat (e.g., tree-lined streams in Central Valley cropland). Riparian canopy cover along streams and creeks provides shaded riverine aquatic cover (SRA) that benefits fish by reducing water temperature, providing in-water cover, and increasing aquatic productivity by vegetation input (e.g., leaves, branches) into the channel.

Ruderal

Ruderal cover types occur in areas where natural vegetation has been removed or significantly degraded by past or current human activity. Ruderal vegetation often is associated with the sides of railroad tracks, vacant lots, roadsides, and other highly disturbed areas. Ruderal vegetation is typified by the dominance of nonnative forbs that thrive in disturbed conditions including bristly ox-tongue, bull thistle, Italian thistle, prickly lettuce, shortpod mustard, stinkwort, yellow star-thistle, English plantain (*Plantago lanceolata*), jimson weed (*Datura* sp.), and Russian thistle (*Salsola* sp.). Because of the highly variable nature of ruderal habitats, this type was not classified according to Sawyer et al. (2009) or Holland (1986). Ruderal areas may be similar to California annual grassland but are characterized by a greater level of disturbance. The ruderal land cover type can be found throughout the study area.

Wildlife Associations

Wildlife species occurring in ruderal land cover are primarily determined by the characteristics of nearby natural, less disturbed habitat, although the dense cover provided by weeds can attract large foraging songbirds that are otherwise absent from adjacent developed, grassland, woodland, or wetland areas. Species within this category include white-crowned sparrow (*Zonotrichia leucophrys*), American goldfinch (*Spinus tristis*), dark-eyed junco (*Junco hyemalis*), and song sparrow. Such cover type also provides habitat for common reptiles such as western fence lizard, gopher snake, and common garter snake. Ruderal habitat type can also provide low quality habitat for burrowing owl and loggerhead shrike.

Wetland

Freshwater Marsh

Freshwater marshes in the study area are dominated by emergent herbaceous wetland plants in areas that are either intermittently flooded or contain perennially saturated soils. Cattails (*Typha* spp.) and bulrushes (*Schoenoplectus* spp.) typically are the dominant plant species in freshwater marsh. Freshwater marsh cover type is present in the study area and is associated with Bear Creek riverine and riparian land cover types and with unlined irrigation canals between Merced and Atwater.

Vernal Pool

Vernal pools are seasonal wetlands in which water ponds on the surface for extended durations in winter and spring and dries completely in later spring and summer. They support flora largely comprised of native wetland plant species, such as Fremont's goldfields (*Lasthenia fremontii*), yellow rayed goldfields (*Lasthenia glabrata*), common spikerush (*Eleocharis macrostachya*), vernal pool buttercup (*Ranunculus bonariensis*), coyotethistle (*Eryngium vaseyi*), doublehorn calicoflower (*Downingia bicornuta*), toothed calicoflower (*Downingia cuspidata*), flatface downingia (*Downingia pulchella*), and blow wives (*Achyrachaena mollis*). In the study area, only one vernal pool was observed. The vernal pool land cover type is located within the study area but outside of the environmental footprint, approximately 100 feet away from the environmental footprint south of Turlock and Delhi.

Wildlife Associations

Physical characteristics of wetland communities, including salinity, vegetation species composition, degree of non-vegetated ground, vegetative stratification, and hydraulic regime, strongly determine wildlife species' use. Therefore, common wildlife associations are discussed by wetland community type.

Wildlife species frequently observed within freshwater marsh in the study area include mallard, black phoebe (*Saynoris nigricans*), mosquito fish, great egret, black-necked stilt (*Himantopus mexicanus*), song sparrow, red-winged blackbird (*Agelaius phoeniceus*), and American coot. Freshwater marshes provide drinking water for numerous species of wildlife and attract prey for larger predators when water sources are limited. Freshwater marsh can support suitable habitat for giant garter snake and western pond turtle. As such, freshwater wetlands typically support many wildlife species in addition to those that use such areas exclusively.

Seasonal wetlands and vernal pools can support a variety of invertebrates and amphibians that, in turn, provide food for many other wildlife species, such as great egret, mallard, song sparrow, great blue heron (*Ardea herodias*), American avocet (*Recurvirostra americana*), killdeer (*Charadrius vociferus*), and greater yellowlegs (*Tringa melanoleuca*). Vernal pools generally have a longer period of inundation than seasonal wetlands and can provide suitable habitat for special-status branchiopods (fairy shrimp), including vernal pool tadpole shrimp (*Lepidurus packardi*), and vernal pool fairy shrimp (*Branchinecta lynchi*). Seasonal wetlands and vernal pools also provide aquatic breeding habitat for Sierran treefrog, western spadefoot toad (*Spea hammondi*), and California tiger salamander.

3.4.3.2 Special-Status Species

Special-Status Plants

Appendix K, *Supporting Biological Resources Information*, provides a list of special-status plant species identified during the review of existing information as having the potential to occur in the study area. A brief discussion of the special-status plant species with potential to occur in the study area is also provided in Appendix K. Special-status plant species were determined to be either present or absent in the study area based on suitable habitat, range of the species, and occurrences of the species within 2 miles of the study area.

Special-Status Wildlife

Appendix K provides a list of special-status wildlife species identified during the review of existing information as having the potential to occur in the study area. A brief discussion of the special-status wildlife species with potential to occur in the study area is also provided in Appendix K. Special-status wildlife species were determined to be either present or absent in the study area based on suitable habitat, range of the species, and occurrences of the species within 2 miles of the study area.

Special-Status Fish

Appendix K provides a list of special-status fish species identified during the review of existing information as having the potential to occur in the study area. A brief discussion of the special-status fish species with potential to occur in the study area is also provided in Appendix K. Special-status fish species were determined to be either present or absent in the study area based on suitable habitat, range of the species, and occurrences of the species within 2 miles of the study area.

3.4.3.3 Sensitive Natural Communities

Special-status or *sensitive natural communities* are communities (vegetation types) that are of limited distribution statewide or within a county or region. CDFW's Vegetation Classification and Mapping Program (VegCAMP) works to classify and map the vegetation of California and determine the rarity of vegetation types. Vegetation types with a state rarity ranking of S1 through S3 in CDFW's *List of Vegetation Alliances and Associations* (Natural Communities List) (California Department of Fish and Game 2010) are considered to be highly imperiled, and project impacts on high-quality occurrences of these vegetation types are typically considered significant under CEQA.

Sensitive natural communities in the study area include riparian, wetland, and woodland plant communities. At the state level, riparian plant communities are considered sensitive because of habitat loss and their value to a diverse community of plant and wildlife species (California Department of Fish and Game 2010). In general, wetlands represent a sensitive biotic community due to their limited distribution and importance to special-status plant and wildlife species. Mixed oak forest and valley oak woodland, both dominated by valley oaks, are defined as sensitive in the Natural Communities List.

3.4.3.4 Potential Jurisdictional Waters, Wetlands, and Other Habitats

Waters of the United States Subject to U.S. Army Corps of Engineers Jurisdiction

The term *waters of the United States* is an encompassing term used by USACE for areas that are subject to federal regulation under CWA Section 404 referring to wetlands and non-wetland (other waters) features. Wetlands that exhibit the prevalence of hydrophytic vegetation, hydric soils, and wetland hydrology were identified in the environmental footprint of the Proposed Project and include freshwater marsh, seasonal wetland, and vernal pools. The jurisdictional determination of waters of the United States is in preparation and will be verified by USACE once it is completed (see Appendix K). The information presented for the Proposed Project reflects preliminary research and field delineation efforts conducted for the jurisdictional determination to date (See *Wetland* in Section 3.4.3.1, *Land Cover Types and Associated Wildlife*).

Inland *non-wetland waters of the United States* are seasonal or perennial waterbodies, including lakes, stream channels, and drainages that exhibit an OHWM but lack positive indicators for one or two of the three wetland parameters (33 C.F.R. 328.4). Non-wetland waters of the United States that occur in the study area include Merced River, Bear Creek, canals, and other minor drainages (see Figures 3.4-13 through 3.4-24).

California Fish and Game Code Section 1602 Jurisdiction

Fish & G. Code Section 89.1, through referral to Wat. Code Section 13050, defines *waters of the state* as "any surface water or groundwater, including saline waters, within the boundaries of the state." Activities that result in diversion or obstruction of 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 debris, waste, or other materials that could pass into any river, stream, or lake require that the project applicant enter into a Lake or Streambed Alteration Agreement with CDFW under Section 1602 of the Fish & G. Code (See *Riverine* in Section 3.4.3.1). Major waterways that would be under CDFW 1602 jurisdiction include Merced River and Bear Creek.

Regional Water Quality Control Board Jurisdictional Areas

Waters subject to CWA Section 404 also require a Water Quality Certification from the Regional Water Board under CWA Section 401. The extent of Regional Water Board jurisdiction over wetlands and other waters of the United States is the same as that of USACE. In addition, the Regional Water Board regulates under California's Porter-Cologne Act. Waters regulated under the Porter-Cologne Act are called *waters of the state*. Waters of the state include any surface or groundwater, including saline waters, within state boundaries. Riparian plant communities associated with stream channels in the study area could also be considered jurisdictional by the Regional Water Board. If a project requires a Water Quality Certification, the Regional Water Board will incorporate requirements to also comply with the Porter-Cologne Act. Features that do not fall under USACE jurisdiction (e.g., isolated wetland features, vernal pools, ditches, features excavated in uplands) would be considered *waters of the state*.

Critical Habitat

There are no USFWS-designated critical habitats within the study area. NMFS designates critical habitat for anadromous fish. The following designated critical habitat falls within the study area.

- Central Valley steelhead critical habitat is present in the Merced River (Ceres to Merced Extension Alignment).

Essential Fish Habitat

EFH in the study area was identified according to National Oceanic and Atmospheric Administration's EFH mapper (National Oceanic and Atmospheric Administration 2018). The study area crosses the Merced River (Ceres to Merced Extension Alignment), which is considered EFH for Pacific coast salmon, including the Central Valley fall-run Chinook salmon.

3.4.3.5 Wildlife Corridors

The term *corridor* as used by ecologists and conservation biologists is used in a variety of ways. For the purposes of this EIR, a *wildlife corridor* is defined as "any space, usually linear in shape that improves the ability of organisms to move among patches of their habitat" (Hilty et al. 2006). Corridors can be viewed over broad spatial scales, from those connecting continents (e.g., Isthmus of Panama) to structures crossing agricultural canals or roads. Most wildlife corridors analyzed within the context of land use planning, including those analyzed in this EIR, are moderate in scale and facilitate regional wildlife movement among habitat patches and through human-dominated landscapes.

The Proposed Project crosses natural waterways including the Merced River, Bear Creek, agricultural canals, and other minor drainages that may be used by migratory fish and semi-aquatic species (see Figures 3.10-3 and 3.10-4 in Section 3.10, *Hydrology and Water Quality).* Special-status species that may use these corridors include anadromous fish (e.g., Central Valley steelhead, Chinook salmon, river lamprey), Swainson's hawk, western pond turtle, giant garter snake, and San Joaquin kit fox (*Vulpes macrotis*).

Central Valley steelhead and Central Valley Chinook salmon migrate up the San Joaquin River and many of its tributaries, including the Merced River, to reach spawning habitat. Western pond turtle occurs throughout the San Joaquin River and its tributaries and moves throughout the system where perennial water occurs. Giant garter snake uses sloughs, agricultural canals, ditches with perennial water, and other suitable aquatic habitat to forage and migrate near the Merced River southward. San Joaquin kit fox individuals migrate between core populations, located in the southwestern San Joaquin Valley and the area west of Mendota, and satellite populations, generally in eastern Contra Costa and Alameda Counties (Altamont Hills), central and eastern Merced County, eastern Fresno and Madera Counties, eastern Kings County, eastern and south central Tulare County, north central and central portions of Kern County, and in southwestern San Luis Obispo County. Western yellow-billed cuckoo have historically been documented in Merced County on the Merced River, west of the study area (Gaines and Laymon 1984); individual cuckoos may utilize the river as a wildlife corridor to more suitable habitat north of the study area (i.e., Sacramento and Feather Rivers). Common species of terrestrial wildlife (e.g., California mule deer [*Odocoileus hemionus californicus*], bobcat [*Lynx rufus*]) also migrate through the lowlands along the historic San Joaquin River floodplain.

3.4.4 Impact Analysis

This section describes the environmental impacts of the Proposed Project and the Atwater Station Alternative on biological resources. It describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. Measures to mitigate significant impacts are provided, where appropriate.

3.4.4.1 Methods for Analysis

The method for analyzing impacts on biological resources is the same for both the Proposed Project and the Atwater Station Alternative. ICF biologists evaluated potential negative effects on special-status species in the study area by reviewing the available literature regarding the status and known distribution of special-status species in the study area and field survey data.

Desktop Review

Prior to and concurrent with conducting fieldwork, ICF biologists consulted the following data sources to identify biological resources occurring or potentially occurring in the study area.

- CDFW's CNDDB records search of Arena, Atwater, Ceres, Cressey, La Grange, Merced, Riverbank, Salida, Turlock, and Winton U.S. Geological Survey (USGS) 7.5-minute quadrangles (California Department of Fish and Wildlife 2020a).
- California Native Plant Society's (CNPS) online *Inventory of Rare and Endangered Plants of California* (California Native Plant Society 2020a).
- California invasive plant inventory (California Invasive Plant Council 2020).
- USFWS species list of endangered and threatened species that may occur in the study area, and/or may be affected by the proposed or alternative facilities (U.S. Fish and Wildlife Service 2020a).
- Environmental setting chapter from the *ACE Extension Lathrop to Ceres/Merced Draft EIR* (San Joaquin Regional Rail Commission 2018).
- National Wetland Inventory data for waters of the United States, including wetlands.

In addition, ICF biologists made a determination based on standards and procedures presented in the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and as clarified in the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region* (U.S. Army Corps of Engineers 2008) based on the following.

- Field analysis of potential waters and wetlands within the Proposed Project footprint.
- Draft wetland map showing all potential jurisdictional areas (e.g., streams, creeks, ditches, wetlands) including all state and federal jurisdictional waters and wetlands.
- Stand-alone delineation report, including delineation map, suitable for submittal to USACE (see Appendix K).

Field Surveys

ICF's biological resources team consisted of a wildlife biologist, botanist, and wetland ecologist for the survey efforts for the Proposed Project and the Atwater Station Alternative. Biological resource

surveys included driving, walking, and scanning areas that were accessible at the time of the field surveys. Field surveys were conducted on the following dates.

- May 29, 2020
- June 5, 2020
- June 26, 2020
- July 3, 2020
- July 13, 2020
- July 14, 2020

Biological resource surveys were conducted for resources in the study area that have the potential to be affected by Proposed Project activities. These surveys included defining plant community land cover for project elements; floristic surveys for special-status plant species; biological reconnaissance survey for special-status wildlife species, their habitats; and surveys for waters of the United States, including wetlands. The results of these surveys are included in Appendix K *Supporting Biological Resources Information*. Fisheries resources and their potential to be affected by the Proposed Project and the Atwater Station Alternative were analyzed by ICF fisheries biologist Donna Maniscalco using photos and notes taken during the biological resource surveys. Because private property access was limited along some portions of the study area, most areas were viewed from agricultural and public roads during the 2020 field surveys. This level of survey was determined to be adequate given the extent of agricultural lands and relative lack of native habitats.

Vegetation

Geographic information systems (GIS)–based maps are the primary data source used to map land cover types, including vegetation communities, within the study area. A land cover type is defined as the dominant character of the land, as determined by vegetation, water, or human uses. Land cover types are the most widely used units in analyzing ecosystem function, habitat diversity, natural communities, wetlands and streams, and special-status species habitat.

The following are the primary existing data sources of information for the land cover mapping in the study area.

- *ACE Extension Lathrop to Ceres/Merced Draft EIR* (San Joaquin Regional Rail Commission 2018).
- U.S. Fish & Wildlife Service National Wetlands Inventory (2020b).

In addition to using existing data sets, ICF biologists conducted field visits to accessible portions of the study area to develop and verify land cover mapping. Mapping was verified by visual inspection from locations accessible by public or agricultural roads and the railroad ROW. Classification of land cover types was developed for the study area based primarily on the *Manual of California Vegetation* (Sawyer et al. 2009;) and *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986).

ArcGIS version 10.3.1 software was used to create a GIS dataset of land cover types. The mapping process involved digitizing polygons on screen from the data sources listed above, followed by field verification and a formal accuracy assessment. Digitizing was conducted while viewing the aerial imagery at mapping scales of 1:4,800 to 1:6,000. Once digitized, polygons were assigned to land cover types on the basis of the criteria in the land cover type definitions.

Land cover type data were used to identify all natural communities in the study area. These natural communities were referenced to the current standard list of natural communities to determine if any are considered of special concern (S1–S3 rank) (California Department of Fish and Game 2010). Stands of natural communities in the study area considered of special concern were assessed for whether they can be considered high-quality occurrences of the given community. High-quality occurrences lack invasive exotic species, have little evidence of human-caused disturbance, show continued reproduction, and do not have significant insect infestation or disease damage (California Department of Fish and Wildlife 2018a). Natural communities of special concern that met this criteria were determined to have the potential to occur in the study area.

A search of the USFWS species database, CNDDB records, CNPS online *Inventory of Rare and Endangered Plants of California* (California Native Plant Society 2020a) (Appendix K, *Supporting Biological Resources Information*), and literature review identified special-status plant species with known occurrences in the four USGS 7.5-minute quadrangles of the study area. Appendix K provides a list of special-status plant species with the potential to occur in the study area based on the presence of suitable habitat, range of the species, and occurrences of the species within 2 miles of the study area.

Wildlife and Fish

Wildlife and fish are invariably associated with and their potential for occurrence determined by land cover types present. Consequently, wildlife and fish analysis methods are based on and include those used to determine land cover types described in Section 3.4.3.1, *Land Cover Types and Associated Wildlife.*

In addition to using existing datasets, an ICF biologist conducted field visits to accessible portions of the study area to develop and verify land cover mapping, as well as note wildlife species observed and determine suitability and quality of land cover types to support special-status wildlife and fish species known to occur in the study area. Visual inspections were conducted from locations accessible by public or agricultural roads and the UPRR ROW.

A query of the USFWS Environmental Conservation Online System (ECOS) Information for Planning and Conservation (IPaC) database, CNDDB records, and a literature review identified special-status wildlife and fish species with known occurrences within the study area (Appendix K). Appendix K also provides a list of special-status wildlife and fish species with the potential to occur in the study area based on the presence of suitable habitat, range of the species, and occurrences of the species within 2 miles of the study area. Known native and resident fish and wildlife movement and migration corridors are described and potential impacts are qualitatively analyzed.

Wetlands

Wetlands and non-wetland waters, where accessible, were identified in the study area using the routine onsite determination method described in the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the supplemental procedures and wetland indicators provided in the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region* (U.S. Army Corps of Engineers 2008) for guidance.

Wetland boundaries were determined by establishing representative data points to evaluate the presence or absence of indicators of hydrophytic vegetation, hydric soil, and wetland hydrology, the three federal wetland parameters. The boundaries of inland non-wetland waters were identified by

locating the OHWM, which represents the lateral extent of USACE jurisdiction over non-tidal, non-wetland waters in the absence of adjacent wetlands (33 C.F.R. 328.4(c)). For non-wetland waters, the OHWM was identified using the field indicators provided in C.F.R., Title 33, Sections 328.3(e) and 329.11(a)(1) and *A Guide to Ordinary High Water Mark (OWHM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States* (U.S. Army Corps of Engineers 2014).

Base maps were used during fieldwork to record observations and for mapping purposes. The base maps consisted of 2012 aerial imagery obtained from Microsoft Bing Maps at a scale of 1 inch = 50 feet. The delineators used a resource-grade global positioning system (GPS) unit with sub-meter accuracy, supplemented with aerial photograph interpretation, to map the boundaries of wetlands and non-wetland waters, sample point locations, and the locations of representative photographs taken during the site visits. All GPS data collected in the field were downloaded and differentially corrected using the nearest available base-station data.

In some instances, private land could not be accessed to obtain soil data points and determine wetland boundaries. In these instances, field notes were taken on observable indicators of hydrophytic vegetation and wetland hydrology, and aerial photographs and USFWS National Wetland Inventory maps (U.S. Fish and Wildlife Service 2018) were reviewed to make a determination.

Species Evaluation

Based on the results of the desktop review and field surveys, ICF developed lists of special-status species and other sensitive biological resources (e.g., waters of the United States) potentially occurring in the study area. Appendix K, *Supporting Biological Resources Information*, contains a list of candidate, sensitive, and special-status wildlife species that could potentially occur in the study area. For informational purposes, these tables also include species that have been determined to have no potential to occur in the study area.

For the purposes of this EIR, *special-status species* are defined as follows.

- Species listed or proposed for listing as threatened or endangered under the ESA (50 C.F.R. 17.12 for listed plants, 50 C.F.R. 17.11 for listed animals, and various notices in the *Federal Register* [FR] for species proposed for listing).
- Species that are candidates for possible future listing as threatened or endangered under ESA.
- Species that are listed or proposed for listing by the state as threatened or endangered under CESA (14 California Code of Regulations [Cal. Code Regs.] 670.5).
- Species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines 15380).
- Plants listed as rare under the California Native Plant Protection Act (Fish & G. Code 1900 et seq.)
- Plants with a California Rare Plant Rank of 1A, 1B, 2A, or 2B (California Native Plant Society 2020b).
- Animals designated as California Species of Special Concern by CDFW (California Department of Fish and Wildlife 2020b).

- Animals that are fully protected in California (Fish & G. Code 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).
- Bats identified as medium or high priority on the Western Bat Working Group regional priority species matrix (Western Bat Working Group 2020).

To refine the list of species potentially affected by construction and operation of the Proposed Project or the Atwater Station Alternative, ICF biologists evaluated the species for their potential to occur in the study area (Appendix K).

- Species rated as being "absent" have either no suitable habitat within their range in the study area, or a range that excludes the study area.
- Species rated as being "present" are those species for which low- to high-quality habitat occurs within their range or suitable habitat occurs in the study area.

Species rated as having suitable habitat in the study area were considered in the impact analysis.

With this approach, ICF biologists identified the following special-status species as potentially occurring in the study area as shown in Table 3.4-2.

Table 3.4-2. Special-Status Species Potentially Occurring in the Study Area

Species	
Plants	
Alkali milk vetch	Heartscale
California alkali grass	Lesser saltscale
Colusa grass	Prostrate vernal pool navarretia
Coulter's goldfields	Sanford's arrowhead
Delta button-celery	San Joaquin spearscale
Dwarf downingia	San Joaquin Valley Orcutt grass
Hairy Orcutt grass	Spiny-sepaled button-celery
Succulent owl's clover	Watershield
Vernal pool smallscale	
Total Number of Special-Status Plant Species: 17	
Wildlife	
Conservancy fairy shrimp	Grasshopper sparrow
Vernal pool fairy shrimp	White-tailed kite
Vernal pool tadpole shrimp	Mountain plover
Valley elderberry longhorn beetle	Burrowing owl
Western monarch butterfly	Loggerhead shrike
Crotch bumble bee	Song sparrow (Modesto population)
California tiger salamander	Tricolored blackbird
Western spadefoot toad	Yellow-headed blackbird
Western pond turtle	Pallid bat
Coast horned lizard	Townsend's big-eared bat
Northern California legless lizard	Hoary bat
Giant garter snake	Western mastiff bat

Species	
Golden eagle	Western red bat
Short-eared owl	San Joaquin kit fox
Swainson's hawk	American badger
Northern harrier	
Total Number of Special-Status Wildlife Species: 31	
Fish	
Kern Brook lamprey	Central Valley Chinook salmon
Pacific lamprey	Sacramento splittail
Central Valley steelhead	Hardhead
Total Number of Special-Status Fish Species: 6	

3.4.4.2 Thresholds of Significance

The CEQA Guidelines Appendix G (14 Cal. Code Regs. 15000 et seq.) has identified significance criteria to be considered for determining whether a project could have significant impacts on biological resources.

An impact would be considered significant if construction or operation of the project would have any of the following consequences.

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS.
- Have a substantial adverse effect on state or federally protected (including, but not limited to, marshes, vernal pools, and coastal wetlands) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted HCP, natural community conservation plan (NCCP), or other approved local, regional, or state HCP.

Direct impacts on biological resources are those that take place within the environmental footprint of the Proposed Project or the Atwater Station Alternative. *Indirect impacts* on biological resources differ based on resource type and include impacts that are temporally or spatially separated from direct impacts. *Indirect impacts* are expected to occur within the environmental footprint of Proposed Project or the Atwater Station Alternative, as well as within the resource-specific buffers as defined in Section 3.4.3, *Environmental Setting*.

3.4.4.3 Impacts and Mitigation Measures

For the purposes of organization and due to the large number of mitigation measures, please note that the text of the mitigation measures is presented at the end of this document in Section 3.4.4.5, *Mitigation Measures for Biological Resources*. Please refer to that section to review the contents of the mitigation measures referenced under each impact.

Impact BIO-1	Construction of the Proposed Project could remove or degrade special-status plants and their habitat.
Level of Impact Prior to Mitigation	**Potentially significant impact** Proposed Project Ceres to Merced Extension Alignment **No impact** Proposed Project Turlock Station Livingston Station Merced Station Merced Layover & Maintenance Facility Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative
Mitigation Measures	BIO-1.1: Conduct preconstruction surveys for special-status plant species BIO-1.2: Prepare a salvage, relocation, or propagation and monitoring plan for special-status plant species BIO-1.3: Document affected special-status plant species BIO-1.4: Prevent introduction or spread of invasive plant species HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Construction for the majority of Proposed Project would occur within the existing UPRR ROW and would disturb ruderal areas with limited potential to support special-status plant species. Although unlikely, special-status plant species could be present within the existing UPRR ROW during construction. Outside of the existing UPRR ROW, special-status plant species have the potential to occur in natural land cover with suitable habitat characteristics (e.g., clay soils, riparian vegetation, and sandy soils).

If and where special-status plant species are present, ground disturbance activities could result in the direct mortality of individuals through the removal of vegetation, crushing, trampling, introduction of nonnative or invasive plants, and degradation or loss of habitat. Other temporary construction impacts on special-status plant species would include air pollution from dust and construction and removal of vegetation that would likely regenerate within 1 year. Additionally, there is potential for runoff of sediment and contaminants (e.g., oil, grease, concrete) into upland areas and waterbodies adjacent to construction activities, which would decrease habitat quality and potentially affect special-status plant species.

Impact Details and Conclusions

Proposed Project

The Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility are located within developed and ruderal land covers that have no potential to affect special-status plants given the lack of suitable habitat. In addition, protocol-level plant surveys conducted in 2020 in these areas resulted in no special-status plant species findings and concluded these developed and ruderal areas do not support suitable habitat. The results of these surveys are included in Appendix K, *Supporting Biological Resources Information.* As such, these proposed stations and the layover and maintenance facility are not located in areas that would support suitable habitat for special-status plant species and, thus, would have no impact on special-status plant species.

The Ceres to Merced Extension Alignment is located within developed and agricultural land cover, with small pockets of areas that support natural land cover such as aquatic riverine, riparian habitat, and wetland habitat (Table 3.4-1). In addition, grasslands and vernal pools are located near but not within the footprint of the Ceres to Merced Extension Alignment. In these natural land cover areas, construction of the Ceres to Merced Extension Alignment would remove vegetation, which could potentially affect special-status plants. Protocol-level plant surveys conducted in 2020 in the upland accessible areas containing grasslands and vernal pools resulted in no special-status plant species findings (see Appendix K). These surveys also concluded that the developed, ruderal, grassland, and vernal pool land cover types in and near the Ceres to Merced Extension Alignment do not support suitable habitat for special-status plant species.

Table 3.4-3 identifies only three special-status plant species that could be affected by habitat removal or degradation during construction of the Ceres to Merced Extension Alignment. These three species occur in riparian or wetland habitat that was inaccessible during the protocol-level plant surveys conducted in 2020. The acreages shown in Table 3.4-3 are not actual acreages of special-status plant species; these acreages are for land cover impacts proposed within riparian and wetland habitats in which these three special-status plant species may be found. The actual areas of special-status plant species would be much less than the overall land cover impacts and will be determined based on preconstruction special-status plant species surveys (per Mitigation Measure BIO-1.1).

Overall, the construction of the Proposed Project has a low likelihood to impact special-status plant species given that most of the work proposed is within the UPRR ROW dominated by developed and ruderal land cover types. However, approximately 1.90 acres (0.52 acre of riparian landcover, 0.68 acre of riverine land cover, and 0.70 acre of freshwater marsh landcover) within the footprint of the Ceres to Merced Extension Alignment would affect suitable habitat for special-status plant species, and this is a potentially significant impact.

Table 3.4-3. Impacts on Land Covers That May Contain Suitable Habitat for Special-Status Plant Species (acres)

Species of Plants	Area of Riparian and Wetland Land Cover within the Ceres to Merced Extension Alignment Footprint (acres)
Delta button-celery	1.22
Sanford's arrowhead	1.38
Watershield	0.70

Atwater Station Alternative

The Atwater Station Alternative has no potential to affect special-status plants because there is no suitable habitat for special-species plants within the developed and ruderal land covers located on the site. As such, no impact would occur from construction of the Atwater Station Alternative. Neither the proposed Livingston Station nor the Atwater Station Alternative would affect special-status plant species and there would be no difference between the Atwater Station Alternative and the proposed Livingston Station with respect to impacts on special-status plant species (both would result in no impact on special-status plant species).

Mitigation Measures

Mitigation Measures BIO-1.1, BIO-1.2, BIO-1.3, BIO-1.4, and HYD-1.2 would apply to the Ceres to Merced Extension Alignment for construction impacts on special-status plant species. Mitigation Measures BIO-1.1, BIO-1.2, BIO-1.3, and BIO-1.4 are described in Section 3.4.4.5, *Mitigation Measures for Biological Resources*. Mitigation Measure HYD-1.2 is described in Section 3.10, *Hydrology and Water Quality*.

Significance with Application of Mitigation

Implementation of Mitigation Measures BIO-1.1, BIO-1.2, BIO-1.3, and BIO-1.4 would avoid or minimize impacts on special-status plants by avoidance of plants, salvage and relocation, impact documentation, and prevention of the spread of invasive plants. In addition, implementation of Mitigation Measure HYD-1.2 would require specific procedures for work adjacent to, within, or crossing surface waters. With implementation of Mitigation Measures BIO-1.1, BIO-1.2, BIO-1.3, BIO-1.4, and HYD-1.2, impacts on special-status plant species during construction of the Proposed Project (due to the Ceres to Merced Extension Alignment) would be less than significant.

Impact BIO-2	Construction of the Proposed Project could injure or kill special-status wildlife species and remove or degrade their habitat.
Level of Impact	**Potentially significant impact**
Mitigation Measures	BIO-2.1: Conduct a worker environmental training program for construction personnel BIO-2.2: Avoid vernal pool–endemic species BIO-2.3: Avoid valley elderberry longhorn beetle BIO-2.4: Avoid California tiger salamander and western spadefoot toad BIO-2.5: Avoid western pond turtle and giant garter snake BIO-2.6: Avoid coast horned lizard and Northern California legless lizard BIO-2.7: Avoid nesting birds BIO-2.8: Avoid Swainson's hawk BIO-2.9: Compensate for Swainson's hawk foraging habitat loss BIO-2.10: Avoid burrowing owl BIO-2.11: Compensate for burrowing owl habitat loss BIO-2.12: Avoid song sparrow (Modesto population), tricolored blackbird, and yellow-headed blackbird BIO-2.13: Avoid roosting bats BIO-2.14: Avoid San Joaquin kit fox and American badger BIO-2.15: Compensate for San Joaquin kit fox and American badger habitat loss BIO-2.16: Avoid direct impacts on Western Monarch Butterfly Host Plants & Provide Compensatory Mitigation for Impacts on Monarch Butterfly Habitat
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Construction for the majority of the Proposed Project would occur in the existing UPRR ROW and would disturb developed/landscaped and ruderal areas with limited potential to support special-status wildlife species. Although unlikely, special-status wildlife species could be present within the existing UPRR ROW and previously disturbed areas during construction. Outside of the existing UPRR ROW, special-status wildlife species have the potential to occur in natural land cover with suitable habitat characteristics (e.g., riparian, annual grasslands, woodlands).

Construction of the Proposed Project and the Atwater Station Alternative could have direct and/or indirect effects on special-status wildlife species. Direct effects can be temporary (return to baseline within 1 year of disturbance) or permanent in duration and could be caused by the following actions.

- Injury or mortality of wildlife from construction equipment vehicle strike, crushing, and/or entombment.
- Loss or disturbance of habitat from vegetation clearing (including removal of trees, shrubs and ground cover vegetation), grading, excavating/trenching, tie and ballast installation, bridge work, and concrete work activities during construction.
- Temporary stockpiling, soil movement, construction materials, or other construction waste.
- Excavation and placement of fill.
- Soil compaction, dust, air pollution, and water runoff from the construction site.
- Increased vehicle traffic and human presence.
- Short-term construction-related noise (from equipment and human presence) and visual disturbance.
- Degradation of water quality in aquatic habitat features from construction runoff containing petroleum or concrete products.

Indirect effects on wildlife could be caused by the following actions.

- Increased light and noise levels.
- Alteration of hydrology or aquatic thermal regime.
- Damage through toxicity associated with exposure to herbicides and other chemicals.
- Introduction of invasive (nonnative) species.
- Decreased reproductive success as a result of loss of foraging and nesting habitat.
- Reduced habitat suitability and prey abundance as a result of habitat alteration or degradation.

The types of direct and indirect effects on special-status wildlife resulting from these actions would be similar wherever habitat for a given species or species group is present. For the purposes of this discussion, effects on special-status wildlife are described based on land cover types or habitat features that support special-status species (including some that support multiple species) that could be affected by the Proposed Project and the Atwater Station Alternative. A summary of the land covers that could be affected by the Proposed Project and the Atwater Station Alternative and the associated species that could be affected is included below.

- Pond and Wetland Habitat for Special-Status Invertebrates, Amphibians, Reptiles, and Birds
    - Construction activities affecting ponds and vernal pools could, in turn, affect the following special-status species: Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, western spadefoot toad, western pond turtle, tricolored blackbird, and yellow-headed blackbird. Potential direct effects include mortality and harm of adults, young, larvae, eggs or egg masses, and cysts occurring in aquatic and wetland habitat features within the Proposed Project and the Atwater Station Alternative footprint; permanent habitat loss; and permanent habitat degradation. Potential indirect effects include habitat degradation from invasive plants, increased light and noise levels, alteration of hydrology or aquatic thermal regime, lower reproductive success, altered normal behavior due to increased noise and light, and herbicide exposure.
- Riverine Habitat for Special-Status Amphibians and Reptiles
    - Construction activities affecting aquatic riverine habitat could, in turn, affect the following special-status species: western pond turtle and giant garter snake. Construction activities affecting vegetated irrigation canals could also impact song sparrow (Modesto population). Potential direct effects include injury or mortality of adults, young, larvae occurring in aquatic habitat features within the component footprint; permanent habitat loss; and permanent habitat degradation. Removal of vegetation along riverine habitat could harm and injury individuals. Potential indirect effects include habitat degradation from invasive plants, loss of or reduced prey based due to habitat degradation or modification, increased light and noise levels, visual and vibrational disturbance, alteration of hydrology or aquatic thermal regime, and herbicide exposure.
- Riparian Habitat for Valley Elderberry Longhorn Beetle, Western monarch butterfly, and Special-Status Reptiles, Birds, and Mammals
    - Construction activities affecting riparian habitat could, in turn, affect the following special-status species: valley elderberry longhorn beetle, Western monarch butterfly, western pond turtle, Swainson's hawk, white-tailed kite, western yellow-billed cuckoo (foraging habitat), tricolored blackbird, song sparrow (Modesto population), yellow-headed blackbird, pallid bat, hoary bat, western mastiff bat, and western red bat. Potential direct effects include injury and mortality of adults, young, larvae, and eggs occurring in riparian habitat within the improvements footprint; nest loss; roost loss and disturbance, host plant loss (e.g. *Sambucus* sp.); permanent habitat loss; and permanent habitat degradation through impacts that result in reduced host plant health. Potential indirect effects include habitat degradation from invasive plants; reduced habitat suitability from removal of vegetation cover; increased light and noise levels, alteration of vegetation composition or structure through changes to associated hydrology, alteration of sub-canopy thermal regime, fugitive dust affecting insect host plants, and herbicide/insecticide exposure.
- Grassland Habitat for Special-Status Invertebrates, Amphibians, Reptiles, Birds, and Mammals
    - Construction activities affecting grassland habitat could, in turn, affect the following special-status species: Western monarch butterfly, Crotch bumble bee (*Bombus crotchii*), California tiger salamander, western spadefoot toad, western pond turtle, coast horned lizard (*Phrynosoma blainvillii*), Northern California legless lizard (*Anniella pulchra*), short-eared owl (*Asio flammeus*), grasshopper sparrow (*Ammodramus savannarum*), northern harrier, Swainson's hawk, white-tailed kite, loggerhead shrike, mountain plover (*Charadrius*

montanus), burrowing owl, San Joaquin kit fox, and American badger. Potential indirect effects include habitat degradation from invasive plants, increased light and noise levels, decreased reproductive success, reduced prey abundance, fugitive dust affecting host or nectar plants by covering leaves and reducing plant vigor, and herbicide/insecticide exposure.

- Nesting Habitat for Special-Status Birds
  - Construction activities affecting nesting habitat (i.e., trees, shrubs, bridges, built structures, grasslands, wetlands, gravel, open areas, and river banks) could, in turn, affect the following special-status species: short-eared owl, grasshopper sparrow, Swainson's hawk, northern harrier, white-tailed kite, loggerhead shrike, tricolored blackbird, song sparrow (Modesto population), and other migratory bird species. Potential direct effects include injury and mortality of adults, young, hatchlings, and eggs occurring in nesting habitat within the construction footprint; nest abandonment or loss; permanent habitat loss; and permanent habitat degradation. Potential indirect effects include habitat degradation from invasive plants, increased light and noise levels, reduced reproductive success from loss of foraging habitat and decreased habitat suitability, and herbicide exposure.
- Roosting Habitat for Special-Status Bats
  - Construction activities affecting roosting habitat (i.e., trees, bridges, and anthropogenic structures with little human disturbance) could, in turn, affect the following special-status species: pallid bat, Townsend's big-eared bat, western red bat, hoary bat, and western mastiff bat. Potential direct effects include injury and mortality of adults and young roosting within the construction footprint; permanent loss of roost sites; permanent roosting and foraging habitat loss; and permanent habitat degradation. Potential indirect effects include habitat degradation from invasive plants and domestic wildlife; habitat fragmentation; decreased prey availability as a result of habitat loss, increased light, wind, and noise levels; alteration to roost thermal regime, and herbicide exposure.

Table 3.4-4 identifies the land cover types in the study area where special-status wildlife species have potential to occur. Table 3.4-5 identifies the special-status wildlife species that could be affected due to construction of the Proposed Project and the Atwater Station Alternative**.**

Table 3.4-4. Special-Status Wildlife Species by Land Cover Types in the Study Area

	Land Cover Types										
	Aquatic		Cropland		Developed / Landscaped	Grassland	Riparian		Ruderal	Wetland	
Special – Status Wildlife Species	Riverine	Pond	Orchard	Row Crops	Developed/ Landscaped	California Annual Grassland	Mixed Riparian Forest & Woodland	Valley Foothill Riparian	Ruderal	Freshwater Marsh	Vernal Pool
Conservancy Fairy Shrimp	--	--	--	--	--	--	--	--	--	--	X
Vernal Pool Fairy Shrimp	--	--	--	--	--	--	--	--	--	--	X
Vernal Pool Tadpole Shrimp	--	--	--	--	--	--	--	--	--	--	X
Valley Elderberry Longhorn Beetle	--	--	--	--	--	--	X	X	--	--	--
Crotch Bumble Bee	--	--	--	--	--	X	--	--	--	--	--
Western Monarch Butterfly	--	--	--	--	X	X	X	X	--	--	--
California Tiger Salamander	--	X	--	--	--	X	--	--	--	--	X
Western Spadefoot Toad	--	X	--	--	--	X	--	--	--	--	X
Western Pond Turtle	X	X	--	--	--	X	X	X	--	X	--
Coast Horned Lizard	--	--	--	--	--	X	--	--	X	--	--
Northern California Legless Lizard	--	--	--	--	--	X	--	--	X	--	--
Giant Garter Snake	X	--	--	--	--		--	--	--	X	--
Golden Eagle	--	--	--	X	--	X	X	X	X	--	--
Short-Eared Owl	--	--	--	--	--	X	--	--	--	--	--
Grasshopper Sparrow	--	--	--	--	--	X	--	--	X	X	--
Swainson's Hawk	--	--	X	X	--	X	X	X	X		--
Northern Harrier	--	--	X	X	--	X	X	X	X	X	--

	Land Cover Types										
	Aquatic		Cropland		Developed / Landscaped	Grassland	Riparian		Ruderal	Wetland	
Special – Status Wildlife Species	Riverine	Pond	Orchard	Row Crops	Developed/ Landscaped	California Annual Grassland	Mixed Riparian Forest & Woodland	Valley Foothill Riparian	Ruderal	Freshwater Marsh	Vernal Pool
White-tailed Kite	--	--	X	X	--	X	X	X	X	X	--
Mountain Plover	--	--	--	X	--	X	--	--	X	--	--
Burrowing Owl	--	--	--	X	X	X	--	--	X	--	--
Loggerhead Shrike	--	--	X	X	--	X	X	X	X	X	--
Song Sparrow (Modesto population)	X	--	--	--	--		X	X	X	X	--
Tricolored Blackbird	--	--	X	X	--	X	X	X	X	X	--
Yellow-Headed Blackbird	--	--	--	--	--	--	--	X	X	X	--
Migratory Nesting Birds	--	--	X	X	X	X	X	X	X	X	--
Pallid Bat	--	--	--	--	X	X	X	X	--	--	--
Townsend's Big-eared Bat	--	--	--	--	X	--	X	X	--	--	--
Hoary Bat	--	--	--	--	--	--	X	X	--	--	--
Western Mastiff Bat	--	--	--	--	X	--	X	X	--	--	--
Western Red Bat	--	--	X	--	--	--	X	X	--	--	--
San Joaquin Kit Fox	--	--	--	X	--	X	--	--	X	--	--
American Badger	--	--	--	X	--	X	--	--	X	--	--

Note:
"X" represents suitable habitat for species to occur at improvement locations. Habitat acreage was not estimated due to (1) the species' broad habitat requirements, or (2) the presence of atypical habitat capable of supporting the species.

Table 3.4-5. Special-Status Wildlife Species by Proposed and Alternative Facilities in the Study Area

Special – Status Wildlife Species	Proposed and Alternative Facilities					
	Ceres to Merced Extension Alignment	Turlock Station	Merced Layover & Maintenance Facility	Livingston Station	Merced Station	Atwater Station Alternative
Conservancy Fairy Shrimp	X	--	--	--	--	--
Vernal Pool Fairy Shrimp	X	--	--	--	--	--
Vernal Pool Tadpole Shrimp	X	--	--	--	--	--
Valley Elderberry Longhorn Beetle	X	--	--	--	--	--
Crotch Bumble Bee	X	--	--	--	--	--
Western Monarch Butterfly	X	--	--	--	--	--
California Tiger Salamander	X	--	X	--	--	--
Western Spadefoot Toad	X	--	X	--	--	--
Western Pond Turtle	X	--	X	--	--	--
Coast Horned Lizard	X	--	--	--	--	--
Northern California Legless Lizard	X	--	--	--	--	--
Giant Garter Snake	X	--	--	--	--	--
Golden Eagle	X	--	--	--	--	--
Short-Eared Owl	X	--	--	--	--	--
Grasshopper Sparrow	X	--	--	--	--	--
Swainson's Hawk	X	X	--	X	--	X
Northern Harrier	X	--	--	--	--	--
White-Tailed Kite	X	X	X	X	--	--
Mountain Plover	X	--	--	--	--	--
Burrowing Owl	X	X	X	X	X	X
Loggerhead Shrike	X	X	X	X	X	X
Song Sparrow (Modesto population)	X	--	--	--	--	--
Tricolored Blackbird	X	--	--	--	--	--
Yellow-Headed Blackbird	X	--	--	--	--	--
Migratory Nesting Birds	X	X	X	X	X	X
Roosting Bats	X	X	X	X	X	X
Pallid Bat	X	--	--	--	--	--
Townsend's Big-Eared Bat	X	--	--	--	--	--
Hoary Bat	X	--	--	--	--	--
Western Mastiff Bat	X	--	--	--	--	--
Western Red Bat	X	--	--	--	--	--
San Joaquin Kit Fox	X	--	--	X	--	--
American Badger	X	--	--	X	--	--

Note:
"X" represents suitable habitat for species to occur at the location of proposed and/or alternative facilities. Habitat acreage was not estimated due to (1) the species' broad habitat requirements, or (2) the presence of atypical habitat capable of supporting the species.

Impact Details and Conclusions

Proposed Project

Golden eagle, short-eared owl, bank swallow, least Bell's vireo, western yellow-billed cuckoo, and mountain plover are species that could forage within suitable habitat along the entire Proposed Project; however, these species are not known to nest in the area. Construction of the Proposed Project would not affect individuals and nests of golden eagle, short-eared owl, bank swallow, least Bell's vireo, western yellow-billed cuckoo, and mountain plover. Thus, impacts to these species would be less than significant.

Ceres to Merced Extension Alignment

The majority of the Ceres to Merced Extension Alignment would be constructed in developed land cover, with small pockets of areas that support natural land cover primarily associated with aquatic riverine and cropland (e.g., orchards, row crops) cover. The Ceres to Merced Extension Alignment would span riparian, woodland, and wetland land covers and be constructed adjacent to grassland and vernal pool cover types. In these natural land cover areas, the Ceres to Merced Extension Alignment has the potential to affect special-status wildlife.

Crotch bumble bee, Western monarch butterfly, California tiger salamander, western spadefoot toad, and western pond turtle could be affected through ground-disturbing activities in and near aquatic riverine and ponds and in adjacent upland California annual grassland land covers. Construction activities in and near aquatic riverine and freshwater marsh habitat could also affect giant garter snake, Swainson's hawk, northern harrier, white-tailed kite, mountain plover, burrowing owl, loggerhead shrike, song sparrow (Modesto population), tricolored blackbird, as well as other migratory birds. Wildlife that utilize croplands could also be affected by construction through vegetation removal and ground disturbance.

Disturbance within riparian land cover types and the removal of riparian vegetation could affect western red bat, hoary bat, pallid bat, yellow-headed blackbird, tricolored blackbird, song sparrow (Modesto population), white-tailed kite, Swainson's hawk, coast horned lizard, and western pond turtle. Construction may result in the removal of elderberry shrubs with stems 1 inch in diameter or more and could affect valley elderberry longhorn beetle. Construction activities in riparian corridor and other land covers types (e.g., grassland, developed/landscape) that remove nectar-resources and milkweed could affect Western monarch butterfly through mortality and injury of individual adults, eggs, and larvae, as well as loss of breeding and nectar resources. Disturbance within woodland cover type could also affect nesting migratory birds and roosting bats. Similarly, coast horned lizard and silvery legless lizard could be affected in areas of woodland land cover with sandy soil or thick leaf litter. Disturbance in or near freshwater marsh land cover could affect tricolored blackbird and yellow-headed blackbird. Construction near existing structures, trees, and orchards could also affect migratory and special-status nesting bird and roosting bat species.

The Ceres to Merced Extension Alignment would not be constructed in vernal pool and California annual grassland land cover; therefore, no direct impacts are anticipated to wildlife that could occupy those habitats. However, these landcovers are located immediately adjacent to and/or within 250 feet of the construction area and could be indirectly impacted. Construction of the Ceres to Merced Extension Alignment could indirectly impact vernal pool branchiopod, crotch bumble bee, Western monarch butterfly, California tiger salamander, western spadefoot toad, and coast horned lizard through alteration of hydrology, exposure to toxic chemicals and petroleum, habitat

degradation, and habitat fragmentation. Ground disturbance adjacent to California annual grassland could affect burrowing owl and grasshopper sparrow through visual disturbance and construction noise and vibration. Construction of the Ceres to Merced Extension Alignment would indirectly disturb California annual grassland, which could also affect San Joaquin kit fox and American badger foraging opportunities and movement. Construction of the Ceres to Merced Extension Alignment would affect special-status wildlife species and their habitat and would result in a potentially significant impact.

Turlock Station and Livingston Station

The Turlock Station and Livingston Station would be constructed within developed/landscaped and ruderal land covers. These land covers are characterized by areas where natural vegetation has been removed or significantly degraded by past or current human activity and have a low likelihood to affect special-status wildlife given the lack of suitable habitat and routine human disturbance.

Although developed/landscape and ruderal land cover provides low quality habitat for most special-status wildlife species, some species, such as burrowing owl, can and are known to occupy these land cover types. Ruderal land cover can also provide foraging habitat for migratory nesting birds. Roosting bats may also use built structure for day and night roost and forage over ruderal land cover. Construction of a new surface parking lot would remove and/or disturb ruderal habitat that provides low quality habitat for special-status wildlife species. Construction of the Turlock Station and the Livingston Station could affect nesting migratory bird species and roosting bat species, including loggerhead shrike, burrowing owl, white-tailed kite, hoary bat, and western mastiff bat through noise and vibration generated during construction or vegetation removal. Ground disturbance and removal of natural land cover (e.g., ruderal vegetation) could directly affect burrowing owl if present within burrows or indirectly through foraging habitat loss.

Removal or disturbance of trees that boarder the footprint of the Turlock Station could directly affect roosting bats and nesting migratory bird species. Disturbance of trees that boarder the northeastern footprint of the Livingston Station could directly affect roosting bats and nesting migratory bird species. Due to the proximity of agricultural lands, the Livingston Station could provide potential nesting habitat for Swainson's hawk. Construction noise, visual disturbance, and increased human presence could affect nesting activity of Swainson's hawk, if present. Additionally, construction of the Livingston Station could affect San Joaquin kit fox and American badger directly if individuals are present or indirectly through habitat loss for movement or foraging. Construction of the Turlock Station and the Livingston Station would affect special-status wildlife species and their habitat and would result in a potentially significant impact.

Merced Layover & Maintenance Facility

The Merced Layover & Maintenance Facility would be constructed within an industrial area that is predominately comprised of developed/landscape land cover and two parcels of ruderal land covers. These land covers are characterized by areas where natural vegetation has been removed or significantly degraded by past or current human activity and have a low likelihood to affect special-status wildlife given the general lack of suitable habitat and routine human disturbance.

Although developed/landscape and ruderal land cover provides low quality habitat for most special-status wildlife species, some species such as burrowing owl, can and are known to occupy these land cover types. Ruderal land cover can also provide foraging habitat for migratory nesting birds. Roosting bats may also use built structure for day and night roost and forage over ruderal land

cover. Construction of the Merced Layover & Maintenance Facility could affect nesting migratory bird species and roosting bat species, including loggerhead shrike, burrowing owl, white-tailed kite, Swainson's hawk, and hoary bat through construction activities that generate noise and vibration and removal of vegetation (including trees and ground cover). Ground disturbance and removal of natural, low vegetation could directly affect burrowing owl if present within burrows or indirectly through loss of foraging habitat. Removal or disturbance of trees that boarder the western footprint of the Merced Layover & Maintenance Facility could directly affect nesting birds and tree roosting bat species, such as hoary bat (if present).

Construction noise, visual disturbance, and increased human presence could affect nesting activity of Swainson's hawk. Aquatic pond habitat is located outside of the construction footprint, but within 100 feet of the proposed Merced Layover & Maintenance Facility. Construction activities have the potential to indirectly affect pond habitat and the associated wildlife species, including California tiger salamander, western spadefoot toad, western pond turtle, tricolored blackbird, and yellow-headed blackbird. Airborne fugitive dust and debris generated from construction activity could alter the habitat suitability of pond habitat; increased noise, light, and vibration could alter normal behaviors of wildlife that utilize pond habitat; and wildlife may avoid using the area due to increased human presence. Construction of the Merced Layover & Maintenance Facility would affect special-status wildlife species and their habitat and would result in a potentially significant impact.

Merced Station

The Merced Station would be constructed in developed/landscape land cover. Developed/landscape land cover type is characterized by areas where natural vegetation has been removed or significantly degraded by past or current human activity and has a low likelihood to affect special-status wildlife given the lack of suitable habitat and routine human disturbance.

Although developed/landscape provides low quality habitat for most special-status wildlife species, some species such as burrowing owl, can and are known to occupy developed/landscape land cover. Additionally, roosting bats can use built structures for day and night roosts. Construction of the Merced Station could affect nesting bird species and roosting bat species, including loggerhead shrike, burrowing owl, other nesting migratory birds, pallid bat, and western mastiff bat through noise, vibration, lights, generated during construction or removal of suitable habitat. Ground disturbance and removal of natural land cover (i.e., in a patch of ruderal vegetation located between built structures) could directly affect burrowing owl, if present within burrows, or indirectly through foraging habitat loss. Removal of ruderal vegetation could also affect foraging bats. Construction of the Merced Station would affect special-status wildlife species and their habitat and would result in a potentially significant impact.

Atwater Station Alternative

Golden eagle, short-eared owl, bank swallow, least Bell's vireo, western yellow-billed cuckoo, and mountain plover could forage within suitable habitat of the Atwater Station Alternative; however, these species are not known to nest in the area. Construction of the Atwater Station Alternative would not affect individuals and nests of golden eagle, short-eared owl, bank swallow, least Bell's vireo, western yellow-billed cuckoo, and mountain plover. Thus, impacts to these species would be less than significant.

The Atwater Station Alternative would be constructed within previously disturbed and developed land cover. These land covers are characterized by areas where natural vegetation has been

removed or significantly degraded by past or current human activity and have a low likelihood to affect special-status wildlife given the lack of suitable habitat and routine human disturbance. Although developed/landscape and ruderal land cover provides low quality habitat for most special-status wildlife species, some species such as burrowing owl, can and are known to occupy these land cover types. Ruderal land cover can also provide foraging habitat for migratory nesting birds. Roosting bats may also use built structure for day and night roost and forage over ruderal land cover. Construction of the Atwater Station Alternative would remove and/or disturb developed and ruderal habitat that provides low quality habitat for special status roosting bats and nesting migratory birds. Construction of Atwater Station Alternative would result in impacts on special-status wildlife species and their habitat and would be potentially significant.

Mitigation Measures

Mitigation Measures BIO-2.1 through BIO-2.16 would apply to the Proposed Project for construction impacts on special-status wildlife species and their habitat. Mitigation Measures BIO-2.1 through BIO-2.16 are described in Section 3.4.4.5, *Mitigation Measures for Biological Resources*. Table 3.4-13 in Section 3.4.4.5 identifies which mitigation measures would apply to which specific improvements.

Mitigation Measures BIO-2.1, BIO-2.7, BIO-2.10, BIO-2.11, and BIO-2.13 would apply to the Atwater Station Alternative.

Significance with Application of Mitigation

Implementation of Mitigation Measures BIO-2.1 through BIO-2.16 would reduce the likelihood of wildlife injury or mortality during construction and require compensation for habitat loss through in-kind habitat preservation, enhancement, and/or creation. With implementation of these measures, impacts on special-status wildlife species during construction of the Proposed Project would be less than significant.

Likewise, with the implementation of Mitigation Measures BIO-2.1, BIO-2.7, BIO-2.10, BIO-2.11, and BIO-2.13, impacts on special-status wildlife species during construction of the Atwater Station Alternative would be less than significant.

Comparison of the Proposed Livingston Station and Atwater Station Alternative

Implementation of the Livingston Station could affect six special-status wildlife species, compared to the Atwater Station Alternative, which could affect three special-status wildlife species, if present. Both the Livingston Station and the Atwater Station Alternative could affect migratory nesting birds and roosting bats. The Livingston Station, compared to the Atwater Station Alternative, could result in greater wildlife habitat disturbance. Nonetheless, both the Atwater Station Alternative and the Livingston Station would result in a less-than-significant impact on special-status wildlife species after implementation of mitigation.

Impact BIO-3	Construction of the Proposed Project could injure or kill special-status fish and remove or degrade their habitat.
Level of Impact	**Potentially significant impact** Proposed Project Ceres to Merced Extension Alignment **No impact** Proposed Project Turlock Station Livingston Station Merced Station Merced Layover & Maintenance Facility Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative
Mitigation Measures	BIO-2.1: Conduct a worker environmental training program for construction personnel BIO-3.1: Implement noise reduction measures for pile driving BIO-3.2: Develop and implement a hydroacoustic monitoring plan to minimize noise effects on fish BIO-3.3: Implement seasonal restrictions for in-water work BIO-4.1: Avoid and protect wetlands during construction BIO-4.2: Compensate for impacts on jurisdictional wetlands and non-wetland waters of the United States (aquatic resources) prior to improvements impacts during construction BIO-5.1: Avoid and protect sensitive natural communities, including riparian habitat, during construction BIO-5.2: Compensate for loss of sensitive natural communities (including riparian habitat) HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Construction for the majority of the Proposed Project would occur in the existing UPRR ROW and would disturb areas that were previously disturbed with low-quality habitat for special-status fish species. Special-status fish species have the potential to occur in natural land cover with suitable habitat characteristics (e.g., stream crossings for new bridges). The Merced River and Bear Creek provide habitat for Central Valley steelhead, Chinook salmon, Pacific and Kern Brook lamprey, splittail, and hardhead. The Merced River in the study area provides adult and juvenile salmonid migration habitat and also juvenile salmonid rearing habitat. It provides rearing habitat for the other special-status species. However, both migration habitat and rearing habitat is listed as periodic and poor for salmonids (National Oceanic and Atmospheric Administration 2020). Bear Creek in the study area has slow moving water and likely warm temperatures during the summer months. The creek is highly disturbed and surrounded by invasive terrestrial vegetation and riprapped banks.

Impact Details and Conclusions

Proposed Project

Construction of the Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility would not affect aquatic habitat and, thus, would have no impact on special-status fish species.

Impacts on Habitat

Table 3.4-6 identifies the area of special-status fish habitat that could be affected by the Proposed Project due to the installation of bridges over the Merced River and Bear Creek (as a part of the Ceres to Merced Extension Alignment).

Table 3.4-6. Habitat Impacts on Special-Status Fish Species Due to the Ceres to Merced Extension Alignment

Special-Status Fish Species Habitat (acres)				
Central Valley Steelhead	**Central Valley Fall/ Late-Fall Run Chinook Salmon**	**Pacific and Kern Brook Lamprey**	**Hardhead**	**Sacramento Splittail**
0.2	0.2	0.2	0.2	0.2

Note: The following calculations were conducted to determine the potential impact to habitat for special-status fish species.

- The bridge over the Merced River would have no permanent impact on habitat for special-status fish species because no piles would be permanently placed in the Merced River. The bridge over Bear Creek would permanently affect 81 square feet (0.002 acre) of habitat for special-status fish species habitat. This is due to the placement of 27 H-piles in the water, each of which would affect 3 square feet of Bear Creek.
- The estimated surface area of the temporary work trestle over the Merced River is 5,000 square feet (0.11 acre) and the estimated surface area of the temporary work trestle over Bear Creek is 4,000 square feet (0.09 acre). The temporary impact to the Merced River and Bear Creek is conservatively estimated to be 5,000 square feet and 4,000 square feet, respectively. The actual impacts on this river and creek would be lower because the temporary impact area would be limited to the areas where the piles would be installed within the water for the construction of the temporary work trestle. No dewatering would be required for the installation of a temporary work trestle.
- In summary, the installation of the bridges is expected to result in a 0.002-acre permanent impact and 0.2-acre temporary impact on the habitat of special-status fish species.

Direct impacts on habitat would be limited to the installation of piles in the Merced River and Bear Creek. No piles would be placed in the Merced River; therefore, there would be no permanent direct impact on the Merced River. A total of 27 piles would be placed in Bear Creek, which would result in a permanent direct impact of 81 square feet (0.002 acre). The installation of the bridges over the Merced River and Bear Creek would both require the installation of temporary work trestles over the river and creek. These work trestles would be removed when construction is completed and would, therefore, be considered a temporary impact. The temporary impact on the Merced River and Bear Creek is conservatively estimated to be 5,000 square feet (0.11 acre) and 4,000 square feet (0.09 acre), respectively. The actual impacts on this river and creek would be lower because the temporary impact area would be limited to the areas where the temporary piles would be installed within the water for the construction of the temporary work trestle.

If and where fish species are present, ground-disturbance activities could result in impacts on special-status species through degradation or loss of habitat and reduction in number of available prey. SRA cover, which is defined as nearshore aquatic habitat and adjacent woody riparian habitat

that provides shade and cover in the stream or river, is important habitat for special-status fish species. Construction of new bridges could result in loss of riparian habitat. Riparian vegetation removal along creek and riverbanks affects fish habitat. Removal of SRA can cause an increase in water temperature, decrease in cover, and decrease in invertebrates that are prey for fish. Additionally, there is potential for runoff of sediment and contaminants (i.e., oil, grease, concrete) into waterbodies that may be adjacent to construction activities, which would decrease water quality for aquatic species.

The permanent and temporary impacts on aquatic habitat, the loss of SRA cover, and the potential impacts on water quality due to construction of the bridges over the Merced River and Bear Creek (as a part of the Ceres to Merced Extension Alignment) could result in a potentially significant impact on special-status fish.

Impacts due to Noise from Pile Driving

Construction noise and vibration from pile driving could result in a temporary impact on special-status fish species.

Thresholds for Noise Impacts on Special-Status Fish

The assessment of impacts on special-status fish species due to noise from pile driving was based on consideration of specific noise thresholds and ambient noise levels.

Noise, vibrations, and other physical disturbances can harass fish, disrupt or delay normal activities, or cause injury or mortality. In fish, the hearing structures and swim bladder and surrounding tissues are particularly vulnerable to high-pressure sounds (Popper et al 2006). The type and severity of effects depends on several factors, including the intensity and characteristics of the sound, the distance of the fish from the source, the timing of actions relative to the occurrence of sensitive life stages, and the frequency and duration of the noise-generating activities. The range of effects includes physical injury (including hearing loss), stress, mortality, and behavioral effects. Pile driving could harm fish because of the underwater noise it produces. Sound levels from project-related impact pile driving in or near open water often have the intensity to injure or kill fish within a certain radius. These high sound-pressure levels can rupture the swim bladder and damage other sensitive tissues and organs. Noise from Proposed Project-related pile driving can also damage hearing organs, which can temporarily affect hearing sensitivity, communication, and the ability to detect predators or prey. Pile driving can also produce continuous lower-energy sounds, below the thresholds associated with direct injury, that cause behavioral effects (e.g., startle or avoidance responses) as well as temporary hearing loss or physiological stress, depending on the duration of exposure.

Since 2000, transportation agencies, resource agencies, ports, and other entities have been developing criteria for determining impacts and appropriate mitigation measures to protect fish from substantial harm due to underwater pile-driving sounds. In 2004, the California Department of Transportation (Caltrans) established a Fisheries Hydroacoustic Working Group (FHWG) to facilitate the development of interim criteria, based on best available scientific information. The FHWG includes participants from Caltrans, the Washington Department of Transportation, Oregon Department of Transportation, NMFS, USFWS, CDFW, and USACE. The FHWG is supported by a panel of hydroacoustic and fisheries experts and overseen by a steering committee composed of managers with decision-making authority from each of the members' organizations.

In June 2008, member agencies of the FHWG agreed in principle to interim criteria for assessing injuries to fish from underwater sound pressure caused by in-water use of an impact hammer. The criteria identified thresholds, both for the peak sound-pressure level (i.e., the largest absolute value of instantaneous sound pressure) and the cumulative sound exposure level (SEL) (i.e., the sum of acoustical energy over all pile strikes), for the onset of physical injury to fish. Different cumulative SELs are established for fish that are greater than or equal to 2 grams and fish that are less than 2 grams. This is because smaller fish are more susceptible to injury. Physical injury to fish is expected if either of these thresholds is exceeded. The FHWG thresholds for peak noise levels and accumulated sound levels are identified in Table 3.4-7.

Table 3.4-7. Summary of Impact Pile Driving Noise Thresholds for Fish

Peak Noise Level Injury Evaluation	
Injury Threshold (dB)	206 dB
Peak Noise Level Injury Evaluation	
Injury Thresholds (Cumulative SEL)	Fish ≥ 2 g (187 dB); Fish < 2 g (183 dB)
Peak Noise Level Injury Evaluation	
NMFS Threshold (RMS)	150 dB
Upper Range of Background levels	160 dB

Source: California Department of Transportation 2005.
dB = decibels.
SEL = sound exposure level.
NMFS = National Marine Fisheries Service.
RMS = root mean squared.

The injury thresholds criteria above are not considered appropriate for assessing the effects of Proposed Project-related vibratory pile driving. Vibratory hammers generally produce less sound than impact hammers because they generally produce continuous and lower-intensity sound that is below the levels known to cause injury in fish. Vibratory drivers are often included in mitigation measures to reduce the adverse effects on fish that result from impact pile driving. There are no established injury criteria for fish related to vibratory pile driving, and resource agencies in general are not concerned about vibratory pile driving resulting in adverse effects on fish. (California Department of Transportation 2015).

Little is known about how pile driving and other sources of human-generated noise actually affect behavior in fish. However, it is thought that underwater noise may disrupt or alter essential behavior or activities (e.g., migration, feeding, sheltering) and affect a fish's ability to grow, survive, or reproduce (California Department of Transportation 2015). NMFS recommends a separate threshold of 150 decibels (dB) root mean squared (RMS) for the behavioral effects of listed salmonids when evaluating impact pile driving (California Department of Transportation 2015). However, there is no scientific support for this criterion or evidence to determine its applicability to particular species.

Noise from vibratory pile driving and cast-in place piles, which are drilled, are not expected to result in injury to fish. Noise from pile driving due to the installation of the bridge over the Merced River and Bear Creek for the Ceres to Merced Extension Alignment could, however, affect special-status fish, kill or injure special-status fish and furthermore, riparian vegetation removal along the creek banks due to the Ceres to Merced Extension Alignment would decrease fish habitat quality.

Merced River

For the bridge over the Merced River, an estimated twenty H-piles (16-inch) would be installed 45 to 185 feet away from the water's edge using an impact hammer. The assessment of pile-driving noise from an impact hammer was based on measured sound levels from similar pile-driving projects (California Department of Transportation 2015). The sound analysis considered impact pile driving without the use of an attenuation method to mitigate underwater sound levels as no pile driving would be taking place in the water. Approximately 500 hammer strikes would be required to install each pile. The Project engineer estimated that five H-piles would be driven per day; based on this rate of construction, impact driving would occur over 2 working days. The resultant sound-level estimates for impact hammer pile driving relative to the injury thresholds as well as the behavioral effects threshold are shown in Table 3.4-8.

Peak sound levels (206 dB) generated by impact pile driving would not exceed the injury thresholds for fish within 33 feet from pile driving; such sound levels would be unlikely to result in fish injury. Cumulative sound levels from pile driving for fish both greater than and less than 2 grams exceed the injury thresholds within 141 feet to 223 feet of the piles, respectively (Table 3.4-8).

In addition to potential injury effects on fish, pile driving may also result in behavioral effects if sound levels exceed both the NMFS behavioral threshold (150 dB RMS) and the upper range of background levels (160 dB RMS). The analysis shows that sound levels would exceed 150 dB RMS within 1,213 feet of the pile-driving location (Table 3.4-8). Therefore, behavioral effects could occur in proximity to pile driving. However, as noted, behavioral effects on fish are not well understood; therefore, it is difficult to assess the definitive significance of such effects in the limited area in proximity to impact pile-driving separate from the injury effects. Given the poor quality habitat for listed fish species and the limited construction period, it is not expected that impact pile-driving effects on fish behavior would result in measurable long-term physical effects on listed fish populations, although individual fish may experience temporary stress.

Bear Creek

For the bridge over Bear Creek, an estimated eighteen H-piles (14-inch) would be installed 5 to 35 feet away from the water's edge and 27 H-piles (14-inch) would be installed in the water using an impact hammer. Approximately 500 hammer strikes would be required to install each pile. The Project engineer estimated that five H- piles would be driven per day; based on this rate of construction, impact driving would occur over 9 working days. The resultant sound-level estimates for impact hammer pile driving relative to the injury thresholds as well as the behavioral effects threshold are shown in Table 3.4-9.

Peak sound levels (206 dB) generated by impact pile driving would not exceed the injury thresholds for the protection of fish within 33 feet from pile driving; such sound levels would be unlikely to result in fish injury. Cumulative sounds levels from pile driving for fish both greater than and less than 2 grams exceed the injury thresholds within 305 feet to 482 feet of the piles, respectively (Table 3.4-9).

In addition to potential injury effects on fish, project-related impact pile driving may also result in behavioral effects if sound levels exceed both the NMFS behavioral threshold (150 dB RMS) and the upper range of background levels (160 dB RMS). The analysis shows that sound levels would exceed 150 dB RMS within 2,611 feet of the pile-driving location (Table 3.4-9). Therefore, behavioral effects could occur in proximity to pile driving. However, as noted, behavioral effects on fish are not well

understood; therefore, it is difficult to assess the definitive significance of such effects in the limited area in proximity to impact pile-driving separate from the injury effects. Given the poor quality habitat for listed fish species and the limited construction period, it is not expected that impact pile-driving effects on fish behavior would result in measurable long-term physical effects on listed fish populations, although individual fish may experience temporary stress.

Table 3.4-8. Summary of Effects of Impact Pile Driving from Merced River Bridge on Special-Status Fish

Pile Location	Pile Diameter/ Type	Driver	Piles per Day	Project Engineers Estimate of Strikes per Pile	Estimate of Total Strikes per Day	Underwater Sound Level Assumptions[a]				Cumulative SEL at Reference Distance	Transmission Loss Constant	Distance (feet) to Threshold			
												Onset of Physical Injury			Behavior
												Peak	Cumulative SEL dB		RMS
												dB	Fish ≥ 2 g	Fish < 2 g	dB
						Peak	SEL	RMS	Reference Distance (m)			206 dB	187 dB	183 dB	150 dB
Land - 135 feet from water's edge	14-inch H-pile	Impact Hammer	5	500	2500	181	158	169	20	192	15	**	141	223	1,213
Land - 105 feet from water's edge	14-inch H-pile	Impact Hammer	5	500	2500	181	158	169	20	192	15	**	141	223	1,213
Land - 75 feet from water's edge	14-inch H-pile	Impact Hammer	5	500	2500	181	158	169	20	192	15	**	141	223	1,213
Land - 45 feet from water's edge	14-inch H-pile	Impact Hammer	5	500	2500	181	158	169	20	192	15	**	141	223	1,213
Land - 185 feet from water's edge	14-inch H-pile	Impact Hammer	8	500	2500	181	158	169	20	192	15	**	141	223	1,213

[a] Source: California Department of Transportation 2015. Table I.2-3b. Weiser River Bridge 14-inch H piles driven on land. Reduced by 5 dB for pile driving on land.

** Criterion not exceeded beyond 33 feet.
SEL = sound exposure level.
RMS = root mean square.
m = meters.
dB = decibels.
g = grams.

Table 3.4-9. Summary of Effects of Impact Pile Driving from Bear Creek Bridge on Special-Status Fish

Pile Location	Pile Diameter/ Type	Driver	Piles per Day	Project Engineers Estimate of Strikes per Pile	Estimate of Total Strikes per Day	Underwater Sound Level Assumptions[a]				Cumulative SEL at Reference Distance	Transmission Loss Constant	Distance (feet) to Threshold			
												Onset of Physical Injury			Behavior
												Peak	Cumulative SEL dB		RMS
												dB	Fish ≥ 2 g	Fish < 2 g	dB
						Peak	SEL	RMS	Reference Distance (m)			206 dB	187 dB	183 dB	150 dB
On land 35 feet from water's edge	14-inch H-pile	Impact Hammer	5	500	2500	181	158	169	20	192	15	**	141	223	1,213
On land 20 feet from water's edge[b]	14-inch H-pile	Impact Hammer	5	500	2500	186	163	174	20	197	15	**	305	561	2,611
On land 5 feet from water's edge	14-inch H-pile	Impact Hammer	5	500	2500	186	163	174	20	197	15	**	305	561	2,611
On land 5 feet from water's edge	14-inch H-pile	Impact Hammer	5	500	2500	186	163	174	20	197	15	**	305	561	2,611
On land 20 feet from water's edge	14-inch H-pile	Impact Hammer	5	500	2500	186	163	174	20	197	15	**	305	561	2,611
On land 35 feet from water's edge	14-inch H-pile	Impact Hammer	5	500	2500	181	158	169	20	192	15	**	141	223	1,213
In water	14-inch H-pile	Impact Hammer	5	500	2500	186	163	174	20	197	15	**	305	561	2,611

[a] Source: California Department of Transportation 2015. Caltrans 2015. Table I.2-3b. Weiser River Bridge 14-inch H piles driven on land. Reduced by 5 dB for pile driving on land.
[b] Source levels for H piles are piles driven on land. 5 dB added to source levels for piles driven in water or located 20 feet or less from the water.
** Criterion not exceeded beyond 33 feet.
SEL = sound exposure level.
RMS = root mean squared.
m = meters.
dB = decibels.
g = grams.

Summary of Impacts at Merced River and Bear Creek

Due to the poor quality of habitat and warm water temperatures, it is unlikely that special-status fish species would be present in the pile driving area. Once impact pile driving begins, individual fish that approach the study area are likely to detect the sounds and avoid or bypass the potential injury impact zone. Opportunities for fish to avoid impact pile-driving sounds would also occur during periods when pile driving ceases (e.g., while repositioning equipment) and at night when pile driving would be suspended. Nonetheless, without the implementation of measures to protect special-status fish species, there is the potential for the Proposed Project to significantly impact special-status fish.

Atwater Station Alternative

Construction of the Atwater Station Alternative would not affect aquatic habitat and, thus, would have no impact on special-status fish species. Neither the proposed Livingston Station nor the Atwater Station Alternative would affect special-status fish species as they both lack suitable aquatic habitat to support fish species. Therefore, there would be no difference between the Atwater Station Alternative and the proposed Livingston Station with respect to impacts on special-status fish species because they would both result in no impact on special-status fish species.

Mitigation Measures

Mitigation Measures BIO-2.1, BIO-3.1, BIO-3.2, BIO-3.3, BIO-4.1, BIO-4.2, BIO-5.1, BIO-5.2, and HYD-1.2 would apply to the Ceres to Merced Extension Alignment for impacts on special-status fish species. Mitigation Measures BIO-2.1, BIO-3.1, BIO-3.2, BIO-3.3, BIO-4.1, BIO-4.2, BIO-5.1, and BIO-5.2 are described in Section 3.4.4.5, *Mitigation Measures for Biological Resources*. Mitigation Measure HYD-1.2 is described in Section 3.10, *Hydrology and Water Quality*.

Significance with Application of Mitigation

Mitigation Measure BIO-2.1, BIO-3.1, BIO-3.2, and BIO-3.3 would minimize the potential impacts on special-status fish species due to the noise from pile driving. Mitigation Measure BIO-2.1 would require training of construction personnel, including restrictions and guidelines when working in and near sensitive habitat, such as the Merced River and Bear Creek. Mitigation Measure BIO-3.1 identifies measures that would be implemented to reduce the noise from impact pile driving. Mitigation Measure BIO-3.2 requires monitoring the noise that is generated during pile driving, as well as monitoring for the potential stress, injury, or mortality of the fish species in the area. Mitigation Measure BIO-3.3 requires that pile driving take place between June 15 to October 15, when adult steelhead and Chinook salmon would not be migrating upstream to spawn. Other special-status fish species (Pacific and Kern Brook lamprey, hardhead and splittail) in the study area during the time of impact pile driving (June 15 through October 15) would most likely be large juveniles and adults and would, therefore, be capable of moving out of the potential injury impact zone before harmful sound levels are reached. With implementation of Mitigation Measures BIO-3.1, BIO-3.2, and BIO-3.3, the potential mortality or injury of special-status fish species would be less than significant.

Mitigation Measures BIO-4.1, BIO-4.2, BIO-5.1, BIO-5.2, and HYD-1.2 would minimize the potential impacts on habitat for special-status fish species. Mitigation Measures BIO-4.1, BIO-5.1, and HYD-1.2 would require the protection of nearby riverine habitat not directly affected by the Proposed

Project, the protection of nearby riparian habitat not directly affected by the Proposed Project, and the implementation of measures to protect the water quality of the Merced River and Bear Creek during construction. Implementation of these measures would ensure the protection of nearby aquatic habitat, nearby SRA, and the water quality of habitat. As such, these potential indirect impacts on special-status fish habitat would be less than significant after mitigation. Mitigation Measures BIO-4.2 and BIO-5.2 would require compensation for the loss of aquatic and riparian habitat. As such, implementation of these measures would compensate for the loss of habitat from the Proposed Project, and the impact from the loss of special-status fish species habitat would be less than significant.

In summary, implementation of Mitigation Measures BIO-2.1, BIO-3.1, BIO-3.2, BIO-3.3, BIO-4.1, BIO-4.2, BIO-5.1, BIO-5.2, and HYD-1.2 would reduce impacts associated with the Proposed Project (due to the Ceres to Merced Extension Alignment) to a less-than-significant level by reducing the likelihood of fish mortality or injury during construction and compensating for riparian habitat loss through in-kind habitat preservation, enhancement, and/or creation.

Impact BIO-4	Construction of the Proposed Project could remove or degrade state or federally regulated wetlands and other aquatic resources.
Level of Impact Prior to Mitigation	**Potentially significant impact** Proposed Project Ceres to Merced Extension Alignment **No impact** Proposed Project Turlock Station Livingston Station Merced Station Merced Layover & Maintenance Facility Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative
Mitigation Measures	BIO-4.1: Avoid and protect wetlands during construction BIO-4.2: Compensate for impacts on jurisdictional wetlands and non-wetland waters of the United States (aquatic resources) due to proposed impacts during construction
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

The majority of the Proposed Project would occur within the existing UPRR ROW; thus, for the most part, construction of the Proposed Project would disturb areas of a ruderal and previously disturbed character, the majority of which do not support wetlands or other aquatic resources. Although the majority of the ROW is disturbed or developed, aquatic resources are present in limited portions of the Ceres to Merced Extension Alignment.

Construction activities involving ground disturbance in or near aquatic resources could affect resources through direct fill, restricting layer perforation, grading, degradation through partial

filling of the aquatic resource, or sedimentation resulting from construction-derived erosion and vegetation removal. Removal of vegetation could lead to the introduction of nonnative or invasive plants, changes to inundation duration, and degradation or loss of aquatic resources. Other temporary impacts on wetlands and other aquatic resources resulting from construction activities would include air pollution from dust and construction and removal of vegetation that would regenerate within 1 year. Additionally, there is potential for runoff of sediment and contaminants (i.e., oil, grease, concrete) into upland areas and other aquatic resources adjacent to construction activities, which would decrease the quality of aquatic resources.

Impact Details and Conclusions

Proposed Project

The Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility do not support aquatic or wetland land cover (Table 3.4-1). Thus, these proposed stations and layover & maintenance facility would result in no impact on state or federally regulated wetlands or other aquatic resources.

Most of the Ceres to Merced Extension Alignment is in developed and cropland areas, with small areas of natural land cover primarily associated with aquatic riverine and freshwater wetland habitat along natural waterways or agricultural canals. The Ceres to Merced Extension Alignment would include the construction of new bridges over the Merced River, Canal Creek, Weber Canal, Black Rascal Canal, and Bear Creek, which would impact aquatic riverine and freshwater wetland habitats. Furthermore, the Ceres to Merced Extension Alignment would be constructed within 100 feet of one vernal pool feature adjacent to the environmental footprint.

Table 3.4-10 shows the area of aquatic resources and wetlands that are located within the environmental footprint of the Ceres to Merced Extension Alignment, and that could be directly affected by the Ceres to Merced Extension Alignment. Construction of the Ceres to Merced Extension Alignment could result in impacts on state- and federally regulated wetlands and other aquatic resources shown in Table 3.4-10. Results of the wetlands survey are included in Appendix K, *Supporting Biological Resources Information*. Both state- and federally regulated wetlands and other aquatic resources would be filled, their restricting layer perforated, graded, or a portion of their area eliminated or degraded by construction activities. The water quality of federally and state-regulated wetland resources that are adjacent to the Ceres to Merced Extension Alignment may be indirectly affected during construction. Both direct and indirect impacts on state- and federally regulated wetlands and other aquatic resources would be significant.

Table 3.4-10. Impacts on Wetland and Other Aquatic Resource (acres)

Proposed Facility	Riverine Aquatic Feature	Freshwater Marsh
Ceres to Merced Extension Alignment	0.68	0.70

Notes: Proposed and alternative facilities not listed in this table do not contain wetland or other water resource impacts. The numbers presented in this table provide a conservative estimate of the potential impacts on aquatic resources. The actual impacts might be lower than what is presented here.

Atwater Station Alternative

The Atwater Station Alternative does not support aquatic or wetland land cover (Table 3.4-1). Thus, the Atwater Station Alternative would result in no impact on state or federally regulated wetlands or other aquatic resources. Neither the proposed Livingston Station nor the Atwater Station

Alternative would affect state or federally regulated wetlands. Therefore, there would be no difference between the Atwater Station Alternative and the proposed Livingston Station with respect to impacts because they would both result in no impact on wetlands.

Mitigation Measures

Mitigation Measures BIO-4.1 and BIO-4.2 would apply to the Ceres to Merced Extension Alignment. Mitigation Measures BIO-4.1 and BIO-4.2 are described in Section 3.4.4.5, *Mitigation Measures for Biological Resources*.

Significance with Application of Mitigation

Implementation of Mitigation Measures BIO-4.1 and BIO-4.2 would avoid, minimize, or compensate for impacts on state- and federally regulated wetlands and other aquatic resource. Erosion and sedimentation measures would be employed during construction to minimize impacts on adjacent and downstream resources, and in-kind watershed restoration activities would mitigate for loss of wetland and aquatic resources. As such, impacts on state- and federally regulated wetlands and other aquatic resource from the Proposed Project (due to the Ceres to Merced Extension Alignment) would be reduced to a less-than-significant level.

Impact BIO-5	Construction of the Proposed Project could remove or degrade sensitive natural communities, including riparian habitat, identified in local or regional plans, policies, and regulations or by CDFW or USFWS.
Level of Impact Prior to Mitigation	**Potentially significant impact** Proposed Project Ceres to Merced Extension Alignment **No impact** Proposed Project Turlock Station Livingston Station Merced Station Merced Layover & Maintenance Facility Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative
Mitigation Measures	BIO-4.1: Avoid and protect wetlands during construction BIO-4.2: Compensate for impacts on jurisdictional wetlands and non-wetland waters of the United States (aquatic resources) due to Proposed Project impacts during construction BIO-5.1: Avoid and protect sensitive natural communities, including riparian habitat, during construction BIO-5.2: Compensate for loss of sensitive natural communities (including riparian habitat)
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Table 3.4-11 identifies the potential impacts on riparian habitat and other sensitive natural communities from the Proposed Project. Table 3.4-10 provided under Impact BIO-4 identifies the impacts on aquatic and wetland habitat, which are considered sensitive natural communities. Impacts on aquatic and wetlands, their significance, and mitigation are described in detail under Impact BIO-4.

Impact Details and Conclusions

Proposed Project

The Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility are located within developed, cropland, and ruderal land cover and would not affect sensitive natural communities given the presence of other incompatible land cover types and routine agricultural disturbance (Table 4.4-1). The Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility would not affect sensitive natural communities and would result in no impact.

Most of the Ceres to Merced Extension Alignment is in developed and cropland areas, with small areas of natural land cover primarily associated aquatic riverine, wetlands, and riparian habitat along natural waterways. The Ceres to Merced Extension Alignment would construct new bridges over the Merced River, Canal Creek, Weber Canal, Black Rascal Canal, and Bear Creek, which would impact riparian habitats, including 0.49 acre of the sensitive natural community known as Valley Foothill Riparian and 0.52 acre of mixed riparian forest and woodland (Table 3.4-11).

Construction of the Ceres to Merced Extension Alignment could result in impacts on sensitive natural communities, including aquatic riverine resources, wetland, and riparian habitat. Where present within the affected area, portions of sensitive natural communities, including riparian habitat, would be removed or degraded. Impacts on sensitive natural communities, including riparian habitat, would be significant.

Table 3.4-11. Impacts on Sensitive Natural Communities

Proposed Facility	Valley Foothill Riparian (acres)	Mixed Riparian Forest and Woodland (acres)
Ceres to Merced Extension Alignment	0.49	0.52

Note: Proposed and alternative facilities not listed above would not involve impacts to sensitive natural communities. The numbers presented in this table provide a conservative estimate of the potential impacts on sensitive natural communities. The actual impacts might be lower than what is presented here.

Atwater Station Alternative

The Atwater Station Alternative is located within developed and ruderal land cover and would result in no impact on sensitive natural communities (Table 3.4-1). Neither the proposed Livingston Station nor the Atwater Station Alternative would affect sensitive natural communities and there would be no difference in impacts between the Atwater Station Alternative and the proposed Livingston Station (both would result in no impact).

Mitigation Measures

Mitigation Measures BIO-4.1 BIO-4.2, BIO-5.1, and BIO-5.2 would apply to the Ceres to Merced Extension Alignment. Mitigation Measures BIO-4.1, BIO-4.2, BIO-5.1, and BIO-5.2 are described in Section 3.4.4.5, *Mitigation Measures for Biological Resources*.

Significance with Application of Mitigation

Implementation of Mitigation Measures BIO-4.1, BIO-4.2, BIO-5.1, and BIO-5.2 would avoid or compensate for impacts on sensitive natural communities. Erosion and sedimentation measures would be employed during construction to minimize impacts on adjacent and downstream resources and in-kind riparian restoration activities would mitigate for loss of sensitive natural community resources. As such, impacts associated with the Proposed Project (due to the Ceres to Merced Extension Alignment) would be reduced to a less-than-significant level.

Impact BIO-6	Construction of the Proposed Project could substantially interfere with native resident or migratory fish or wildlife species movement, established migration corridors, or their use of nursery areas.
Level of Impact	**Potentially significant impact** Proposed Project Ceres to Merced Extension Alignment **No impact** Proposed Project Turlock Station Livingston Station Merced Layover & Maintenance Facility Merced Station Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative
Mitigation Measures	BIO-2.3: Avoid valley elderberry longhorn beetle BIO-2.7: Avoid nesting birds BIO-2.8: Avoid Swainson's hawk BIO-2.9: Compensate for Swainson's hawk foraging habitat loss BIO-2.10: Avoid burrowing owl BIO-2.11: Compensate for burrowing owl habitat loss BIO-2.12: Avoid song sparrow (Modesto population), tricolored blackbird, and yellow-headed blackbird BIO-2.13: Avoid roosting bats BIO-3.3: Implement seasonal restrictions for in-water work HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters
Level of Impact after Mitigation	**Less than significant impact**

Impact Details and Conclusions

Proposed Project

Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station

Construction of the Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station are not expected to affect native resident or migratory terrestrial wildlife species movement, because (1) the improvement locations are within a significantly fragmented or developed area, surrounded by human-altered landscape; (2) the location of the improvement locations are immediately adjacent to an existing movement barrier (e.g., State Route 99); and/or (3) the improvements location is not within a known or identified movement corridor or essential connectivity areas as identified by the California Essential Habitat Connectivity Project (California Department of Fish and Wildlife 2020c). Construction of the Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station would not affect riverine and riparian habitat; therefore, construction of these facilities would not have an impact on native and resident fish or wildlife migration or movement corridors.

Ceres to Merced Extension Alignment

CDFW's Areas of Conservation Emphasis (ACE) identifies the lands surrounding the Merced River and Bear Creek as areas that provide conservation planning linkages to the northern Sierra Nevada foothill ecoregion, east of the study area (California Department of Fish and Wildlife 2020d). Riparian corridors are important areas that maintain connectivity throughout California and provide movement opportunities for a variety of terrestrial wildlife species, include gray fox, black-tailed jackrabbit, bobcat, mule deer, wood rat, and western pond turtle. The Merced River is identified as a major east–west corridor (California Department of Fish and Wildlife 2020e). Construction of the Ceres to Merced Extension Alignment could affect native and resident wildlife movement in riverine aquatic habitat and riparian habitat.

Construction in riverine aquatic habitat and associated riparian habitat (i.e., mixed riparian woodland and valley foothill riparian) could directly deter or prevent fish or wildlife movement through vegetation removal or disturbance, which provide cover for fish and wildlife movement; the presence of physical barriers (e.g., coffer dams, dewatering activities), construction equipment, or human presence; visual, noise and vibratory disturbance, changes in water quality (e.g., temperature, dissolved oxygen, siltation etc.); and alteration of hydrology. Construction in these habitats could indirectly deter or prevent fish or wildlife movement through vibration, noise, and light generated by construction; vegetation composition alteration, including loss of elderberry shrubs; and the introduction of invasive plants (e.g., Brazilian Egeria [*Egeria densa*], yellow-star thistle, milk thistle [*Silybum marianum*]) and pests (e.g., red swamp crayfish [*Procambarus clarkia*], quagga mussel [*Dreissena bugensis*], New Zealand mudsnail [*Potamopyrgus antipodarum*].

Most of the Ceres to Merced Extension Alignment would be constructed within developed/landscaped land cover, with multiple parcels of natural land cover associated with ruderal, riverine (irrigation canal, river, stream), cropland (row crops and orchard), pond, annual grassland, woodland, riparian, and freshwater marsh land covers, as shown in Table 3.4-1. These natural land covers offer potential for fish and wildlife movement, however, the potential for terrestrial wildlife movement is limited due to these undeveloped parcels being small and noncontiguous.

The Ceres to Merced Extension Alignment would construct new bridges over rivers, creeks, and canals. The San Joaquin Valley has undergone a high degree of human urbanization and agricultural development and many of the natural streams and rivers in the San Joaquin Valley have been augmented by agricultural drainage and spill flows (CDFW, USFWS, and NMFS 2014); as a result, the remaining natural land cover is of high importance for fish and wildlife migration and movement corridors. Existing UPRR tracks, urban development, and agricultural development significantly limit wildlife movement through the area and limit access to remaining movement corridors, such as rivers and streams. Construction of new tracks for the Ceres to Merced Extension Alignment, which would cross over aquatic habitat, has the potential to disrupt and further limit native and resident fish and wildlife movement at water crossings.

Construction of bridges or tracks over riverine habitat also has the potential to damage and remove riparian forest. The Central Valley's riparian forests have experienced extensive vegetation loss due to expansive agricultural and urban development (Katibah 1984), and in many places have been reduced to discontinuous, narrow corridors. Elderberry shrubs, the host plant of valley elderberry longhorn beetle, can be found on floodplain terraces above the river, along canals, and agricultural ditches (U.S. Fish and Wildlife Service 2017). Because valley elderberry longhorn beetle has limited physical dispersal capability, removal or disturbance of suitable riparian vegetation (whether occupied or unoccupied) can increase the distance between beetle metapopulations. This fragmentation decreases the likelihood of successful colonization of unoccupied habitat, which can result in reduced or eliminated subpopulations (U.S. Fish and Wildlife Service 2017). Removal or disturbance of riparian vegetation could have an adverse impact on the long-term persistence of valley elderberry longhorn beetle (U.S. Fish and Wildlife Service 2017).

Construction of facilities (e.g., culverts) over freshwater marsh and agricultural and irrigations canals could also affect special-status wildlife species, including western pond turtle and giant garter snake movement and dispersal through this natural land cover type. Overall, construction of the Ceres to Merced Extension Alignment would affect riverine or riparian habitat; therefore, construction of these improvements could have an impact on native and resident fish or wildlife migration or movement corridors because riverine and riparian habitat provide natural land cover for fish and wildlife movement. Fish and wildlife movement could be affected by construction-related noise and vibration disturbance, the presence of construction vehicles and machinery, and habitat removal or degradation. Impacts on native resident and migratory fish and wildlife corridors from construction of the Ceres to Merced Extension Alignment would be potentially significant.

Atwater Station Alternative

Construction of the Atwater Station Alternative would not interfere with native resident or migratory fish or wildlife species movement because the Atwater Station Alternative would not be located in a waterway with known fish occurrences, in riverine or riparian habitat, or be surrounded by existing urban development, which currently reduces and/or limits wildlife movement. Construction of the Atwater Station Alternative would not affect riverine and riparian habitat; therefore, construction of this station would not have an impact on native and resident fish or wildlife migration or movement corridors.

Neither the proposed Livingston Station nor the Atwater Station Alternative would affect riverine or riparian habitat. Therefore, there would be no difference between the Atwater Station Alternative and the proposed Livingston Station with respect to impacts on native and resident fish or wildlife migration or movement corridors.

Mitigation Measures

Mitigation Measures BIO-2.3, BIO-2.7 through BIO-2.13, BIO-3.3, and HYD-1.2 would apply to the Ceres to Merced Extension Alignment for impacts on the movement of native resident and migratory fish and wildlife. Mitigation Measures BIO-2.3, BIO-2.7 through BIO-2.13, and BIO-3.3 are described in Section 3.4.4.5, *Mitigation Measures for Biological Resources*. Mitigation Measure HYD-1.2 is described in Section 3.10, *Hydrology and Water Quality*.

Significance with Application of Mitigation

Mitigation Measures BIO-2.3 and BIO-2.7 through BIO-2.13 would include measures (including pre-construction surveys, monitoring, buffers, etc.) to protect elderberry longhorn beetle, nesting and special-status birds, and roosting bats during construction. As such, these measures would avoid or minimize impacts on native and resident wildlife movement and wildlife corridors.

Mitigation Measure BIO-3.3 requires that in-water work at the Merced River and Bear Creek be limited to June 15 to October 15. Native fish species typically use areas of cooler water temperatures during the summer months, and they would not likely occur in the Merced River and Bear Creek during the time in which in-water work is expected to take place. Mitigation Measure HYD-1.2 requires specific procedures for work adjacent to, within, or crossing surface waters, which would limit the amount of sedimentation release into the Merced River and Bear Creek. As such, these measures would avoid or minimize impacts on native and resident fish movement and fish corridors.

In summary, implementation of Mitigation Measures BIO-2.7 through BIO-2.13, BIO-3.3, and HYD-1.2 would avoid or minimize impacts on native and resident fish and wildlife movement and wildlife corridors, reducing impacts associated with the Ceres to Merced Extension Alignment to a less-than-significant level.

Impact BIO-7	Construction of the Proposed Project could conflict with local biological resource policies, including tree preservation policies or ordinances.
Level of Impact Prior to Mitigation	**Potentially significant impact**
Mitigation Measures	BIO-1.1: Conduct preconstruction surveys for special-status plant species BIO-1.2: Prepare a salvage, relocation, or propagation and monitoring plan for special-status plant species BIO-1.3: Document affected special-status plant species BIO-1.4: Prevent introduction or spread of invasive plant species BIO-2.1: Conduct a worker environmental training program for construction personnel BIO-2.2: Avoid vernal pool–endemic species BIO-2.3: Avoid valley elderberry longhorn beetle BIO-2.4: Avoid California tiger salamander and western spadefoot toad BIO-2.5: Avoid western pond turtle and giant garter snake BIO-2.6: Avoid coast horned lizard and Northern California legless lizard BIO-2.7: Avoid nesting birds BIO-2.8: Avoid Swainson's hawk BIO-2.9: Compensate for Swainson's hawk foraging habitat loss BIO-2.10: Avoid burrowing owl BIO-2.12: Avoid Song sparrow (Modesto population), tricolored blackbird, and yellow-headed blackbird BIO-2.13: Avoid roosting bats BIO-2.14: Avoid San Joaquin kit fox and American badger BIO-3.1: Implement noise reduction measures for pile driving BIO-3.2: Develop and implement a hydroacoustic monitoring plan to minimize noise effects on fish BIO-3.3: Implement seasonal restrictions for in-water work BIO-4.1: Avoid and protect wetlands during construction BIO-5.1: Avoid and protect sensitive natural communities, including riparian habitat, during construction HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters BIO-7.1: Compensate for tree removal during construction
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Construction of the Proposed Project and the Atwater Station Alternative could conflict with local biological resource policies (including tree preservation policies and the protection of sensitive plant and wildlife habitat policies or ordinances) by removing locally regulated trees and/or disturbing sensitive plant and wildlife habitat during construction. Appendix G of this EIR, *Regional Plans and Local General Plans*, includes a summary of the local polices related to tree preservation and protection of biological resources.

Tree removal is expected during construction, as part of ground-disturbance activities. As discussed under Section 3.4.2.3, *Regional and Local Plans,* tree regulations do not apply inside or outside the UPRR ROW because UPRR is a federally regulated rail carrier and the SJRRC is a joint powers authority that benefits from the exemption contained in Public Utilities Code Section 103200.

Construction of the Proposed Project and the Atwater Station Alternative would avoid tree removal unless it is necessary. Tree removals would be limited in areas within the existing UPRR ROW because existing UPRR maintenance actions routinely prune and remove trees in the ROW as necessary for safe operation. Tree removals are expected in some portions of the existing ROW and in environmental footprints outside the existing ROW.

The analysis below identifies the potential impacts on trees. Impacts on special-status plants and their habitat are discussed under Impact BIO-1; impacts on special-status wildlife and their habitat are discussed under Impact BIO-2; and impacts on special-status fish and their habitat are discussed under Impact BIO-3.

Impact Details and Conclusions

Proposed Project

The Ceres to Merced Extension Alignment would affect a high number of trees; however, many of these are orchard trees, which are not protected by local ordinances. The number of protected trees to be removed is relatively low (<4.8 per hectare). The Ceres to Merced Extension Alignment would affect approximately 19 native, 25 native-landscaped, and 248 nonnative trees with diameter at breast height (DBH) ranging from 10 to 45 inches. Construction of the Ceres to Merced Extension Alignment would result in the removal of protected trees, which would be considered a potentially significant impact.

The Turlock Station and Merced Layover & Maintenance Facility are located within developed and ruderal land cover and would affect a low number of trees. Construction of the Turlock Station would impact 1 native-landscaped and 19 nonnative trees. Construction of the Merced Layover & Maintenance Facility would remove approximately 19 native-landscaped and 26 nonnative trees. The Turlock Station and Merced Layover & Maintenance Facility would, therefore, result in a potentially significant impact.

The proposed Livingston Station and Merced Station are located within developed and ruderal land cover and would not affect any trees. There would be no impact.

While compliance with local ordinances is not legally required for construction of the Proposed Project, the loss of numerous trees from areas outside the UPRR ROW would be significant and would conflict with local policies or ordinances, such as tree preservation policies or ordinances. Therefore, the impacts from tree removal due to the Ceres to Merced Extension Alignment, Turlock Station, and Merced Layover & Maintenance Facility would be significant.

Table 3.4-12 summarizes the anticipated tree removals due to the Proposed Project.

Table 3.4-12. Proposed Tree Removal Impacts

	Trees [a]			
Proposed Project Facility[b]	**Native**	**Native -Landscaped**	**Nonnative**	**Total**
Ceres to Merced Extension Alignment	19	25	248	292
Turlock Station	0	1	19	20
Merced Layover & Maintenance Facility	0	19	46	65

[a] Trees reported above have a diameter at breast height of 6 inches or more.

[b] Proposed and alternative facilities not listed above would not involve impacts on sensitive natural communities.

In addition, there are local policies related to the protection of plants, wildlife, and fish species. These local policies are identified in Appendix G, *Regional Plans and Local General Plan,* and include policies from the Stanislaus County General Plan, Merced County General Plan, Delhi Community Plan, City of Ceres General Plan, and City of Livingston General Plan. As described in Impact BIO-1, BIO-2, and BIO-3, construction of the Proposed Project would result in a potentially significant impact on special-status plants, wildlife, and fish species. As such, construction of the Proposed Project could conflict with local biological resource policies, resulting in a potentially significant impact.

Atwater Station Alternative

The Atwater Station Alternative is located within developed and ruderal land cover and would not affect any trees. No impact would occur related to conflicts with tree preservation polices.

In addition, there are local policies related to the protection of wildlife species. These local policies are identified in Appendix G and include policies from the City of Atwater General Plan. As described in Impact BIO-2, construction of the Atwater Station Alternative would result in a potentially significant impact on special-status plants, wildlife, and fish species. As such, construction of the Atwater Station Alternative could conflict with local biological resource policies, resulting in a potentially significant impact.

Mitigation Measures

Mitigation Measures BIO-1.1 through BIO-1.4, BIO-2.1 through 2.10, BIO-2.12 through BIO-2.14, BIO-3.1 through BIO-3.3, BIO-4.1, BIO-5.1, and HYD-1.2 would apply to the Proposed Project for construction impacts that could result in an inconsistency with a local policy. Table 3.4-13 in Section 3.4.4.5, *Mitigation Measures for Biological Resources*, identifies which mitigation measures would apply to which specific facilities. Mitigation Measures BIO-1.1 through BIO-1.4, BIO-2.1 through BIO-2.10, BIO-2.12 through BIO-2.14, BIO-3.1 through BIO-3.3, BIO-4.1, BIO-5.1, and HYD-1.2 are described in Section 3.4.4.5, *Mitigation Measures for Biological Resources*. Mitigation Measure HYD-1.2 is described in Section 3.10, *Hydrology and Water Quality*.

Mitigation Measures BIO-2.1, BIO-2.7, BIO-2.10, BIO-2.11, BIO-2.13, and HYD-1.2 would apply to the Atwater Station Alternative for construction impacts that could result in an inconsistency with a local policy.

Significance with Application of Mitigation

Implementation of Mitigation Measures BIO-1.1 through BIO-1.4, BIO-2.1 thorough BIO-2.8, BIO-2.10, BIO-2.12 through BIO-2.14, and HYDRO-1.2 would require the protection of sensitive resources from development and/or disturbance through standard surveys, protection of native habitat through buffers and set-back, and protections of waterways from erosion and siltation. Implementation of these measures would minimize potential conflicts with local biological resource policies for the protection of special-status plant and wildlife habitat and species (e.g., Stanislaus County General Plan Conservation and Open Space Policies; Merced County General Plan Natural Resource Goal NR-1, NR-1.12, NR-1.13, and NR-1.21; Delhi Community Plan Open Space/Conservation Policies; City of Livingston Open Space, Conservation and Recreation Objective). The Proposed Project would be consistent with the Delhi Community Plan Open Space/Conservation

Policies by surveying and identifying special-status species of concern in the Delhi Community Plan through the implementation of mitigation. The Proposed Project would be consistent with the Ceres General Plan Agricultural and Natural Resources Policy 4.D.5 of protecting bird nesting habitat through implementation of Mitigation Measure BIO-2.7. In addition, the Proposed Project would be consistent with the requirements of Ceres General Plan Agricultural and Natural Resource Policy 4.D.6 through the implementation of Mitigation Measure BIO-2.9, which requires Swainson's Hawk habitat compensation. Furthermore, the Proposed Project would be consistent with the Merced Vision 2030 General Plan Goal Area OS-1 through the implementation of Mitigation Measures BIO-3.1 through BIO-3.3, which would protect wildlife corridors that support fish and wildlife species. Implementation of Mitigation Measures BIO-4.1 and BIO-5.1 would provide protection to wetlands and sensitive communities, which would be consistent with the requirements of Merced County General Plan Natural Resource Goals and Stanislaus County General Plan Conservation/Open Space polices. Implementation of Mitigation Measure BIO-7.1 would require the compensation of trees removed using ratios derived from applicable local ordinances. With implementation of these mitigation measures, construction of the Proposed Project would result in a less-than-significant impact related to conflicts with local biological resource policies.

For the Atwater Station Alternative, implementation of Mitigation Measures BIO-2.1, BIO-2.7, BIO-2.10, BIO-2.11, BIO-2.13, and HYD-1.2 would require the protection of sensitive resources from development and/or disturbance through standard surveys, protection of native habitat through buffers and set-back, and protections of waterways from erosion and siltation. The Atwater Station Alternative would conflict with local biological resource policies for the protection of special-status wildlife habitat and species (e.g., City of Atwater Open Space and Conservation Goals) after the implementation of mitigation. With implementation of these mitigation measures, construction of the Atwater Station Alternative would result in a less-than-significant impact related to conflicts with local biological resource policies.

Comparison of the Proposed Livingston Station and Atwater Station Alternative

There would be no difference in the impacts on trees during construction between the Livingston Station and the Atwater Station Alternative (both would result in no impact). As described in Impact BIO-2, the Livingston Station compared to the Atwater Station Alternative could result in greater wildlife habitat disturbance. Nonetheless, both would result in a less-than-significant-impact related to conflicts with local biological resource policies after implementation of mitigation.

Impact BIO-8	Construction of the Proposed Project would not conflict with provisions of adopted habitat conservation plans, natural community conservation plans, or approved local, regional, or state habitat conservation plans.
Level of Impact	**No impact**

Impact Details and Conclusions

No HCPs, natural community conservation plans (NCCPs), or other approved local, regional, or state HCP cover the geographic area where the Proposed Project would be located. Construction of the Proposed Project would, therefore, not conflict with adopted HCPs, NCCPs, or approved local, regional, or state HCP provisions, and there would be no impact.

For the same reasons as the Proposed Project, construction of the Atwater Station Alternative would have no impact related to conflicts with adopted HCPs, NCCPs, or approved local, regional, or state HCP provisions.

Impact BIO-9	Operation of the Proposed Project could injure or kill special-status wildlife species.
Level of Impact	**Potentially significant impact**
Mitigation Measures	BIO-9.1: Avoid nesting bird impacts during operation and maintenance activities BIO-9.2: Avoid roosting bat impacts during operation and maintenance activities BIO-9.3: Conduct pre-activity survey for special-status wildlife species prior to conducting maintenance activities
Level of Impact after Mitigation	**Less than significant impact**

Impact Details and Conclusions

Proposed Project

Ceres to Merced Extension Alignment

Project operations would entail the extension of ACE passenger rail service from Ceres to Merced. With the extension to Merced, ACE trains would operate on new or upgraded tracks within the existing UPRR ROW. With the Ceres to Merced Extension Alignment, ACE trains would be introduced to areas that currently do not experience passenger rail traffic between Ceres and Merced. However, freight trains currently operate on the existing UPRR subdivisions in these areas, and the additional train traffic generated by operation of ACE from Ceres to Merced (i.e., four trains in the morning and four trains in the evening) would not be substantial. Increased passenger train traffic would occur following construction of the Ceres to Merced Extension Alignment, but operational conditions along the UPRR ROW are not expected to be significantly different from existing conditions with respect to special-status wildlife species. Noise and occasional train strikes from operation of the Ceres to Merced Extension Alignment could affect special-status wildlife, including pollinators such as monarch butterfly and individual birds, but these effects are expected to be similar in magnitude to the operational noise and train strikes experienced from existing freight service in this area. There are currently approximately 22 freight trains per day. Operation of the Ceres to Merced Extension Alignment would not significantly change habitat conditions along the corridor after construction is completed. Operations impacts from rail service on sensitive and special-status wildlife species and their associated habitats from increased train service would be less than significant.

The Ceres to Merced Extension Alignment would operate on bridges over Canal Creek, Weber Creek, an irrigation canal at milepost (MP) 147.08 on the Fresno Subdivision, a drainage at MP 148.21 on the Fresno Subdivision, Black Rascal Canal, Bear Creek, and Merced River. The presence of the new bridges over these water features could likely contribute to predation on aquatic wildlife (e.g., California tiger salamander, western pond turtle hatchlings, juvenile giant garter snake); however, existing bridges are in operation at these locations. The operation of the new bridges immediately adjacent to existing bridges would not significantly alter environmental predation pressures at these locations because the area is already developed and disturbed. The level of predation is not expected

to substantially change from existing conditions. Therefore, the new bridge structures would not significantly increase predation on wildlife species above existing levels.

Operation of bridges would also require maintenance. Maintenance of bridges would include routine removal of woody debris, sediment, and other materials that accumulate near the piers of the bridges. Special-status species, such as western pond turtle and giant garter snake, could take refuge on river and canal banks below bridges, as well as forage, hunt, and bask near the piers of bridges. Maintenance activities that would occur as a result of bridge maintenance could affect special-status wildlife species. This impact would be potentially significant.

The Ceres to Merced Extension Alignment would include construction and operation of new culvert structures on the Ceres Main Canal, multiple irrigation canals (as listed in Chapter 2 *Project Description*, Table 2-3), and a cross-swale drainage. Irrigation canals, ditches, and agricultural drainages can provide habitat for special-status wildlife species, including western pond turtle, giant garter snake, tricolored-black bird, song sparrow (Modesto population), other migratory nesting birds, and valley elderberry longhorn beetle (where elderberry shrubs are present). Maintenance activities (vegetation management as well as ground disturbing activities, like grading) that would occur as a result of operation and maintenance of culvert structures could affect special-status wildlife species. This impact would be potentially significant.

Vegetation management and herbicide/insecticide application on the Ceres to Merced Extension Alignment within the UPRR ROW could affect nesting birds, if management activities are conducted during the bird nesting season (February 1 to August 31). Destruction of an active bird nest would violate the MBTA and California Fish & Game Code and would, therefore, be a significant impact. Vegetation management and application of herbicide/insecticide could degrade or kill host and nectar plants for invertebrates such as monarch butterfly. Additionally, vegetation management activities could affect roosting bats. Destruction of bat roosts, including roosts for pallid bat, western mastiff bat, western red bat, and Townsend's big-eared bat—all state species of special concern and relevant under CEQA—would be a significant impact. Vegetation management could affect valley elderberry longhorn beetle through the removal of host plants and direct impacts to individual beetles. Impacts on special-status species and their habitat from vegetation management would be potentially significant.

Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station

Maintenance activities conducted as part of standard operational procedures at the Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Stations could include vegetation management and herbicide, insecticide or pesticide application. Vegetation management and application of chemicals could affect nesting birds, if management activities are conducted during the bird nesting season (February 1 to August 31). Destruction of an active bird nest would violate the MBTA and California Fish & Game Code and would, therefore, be a significant impact. Vegetation management and application of herbicide/insecticide could degrade or kill host and nectar plants for invertebrates such as monarch butterfly. Additionally, vegetation management activities could affect roosting bats. Destruction of bat roosts, including roosts for pallid bat, western mastiff bat, western red bat, and Townsend's big-eared bat—all state species of special concern and relevant under CEQA—would be a significant impact.

Atwater Station Alternative

Vegetation management and herbicide or pesticide application implemented as standard operation and maintenance activities for the Atwater Station Alternative could affect nesting birds, if management activities are conducted during the bird nesting season (February 1 to August 31). Destruction of an active bird nest would violate the MBTA and California Fish & Game Code and would, therefore, be a significant impact. Vegetation management and application of herbicide/insecticide could degrade or kill host and nectar plants for invertebrates such as monarch butterfly. Additionally, vegetation management activities could affect roosting bats. Destruction of bat roosts, including roosts for pallid bat, western mastiff bat, western red bat, and Townsend's big-eared bat—all state species of special concern and relevant under CEQA—would be a significant impact.

Mitigation Measures

Operation of the Proposed Project could injure or kill special-status wildlife species. Mitigation Measure BIO-9.1, BIO-9.2 and BIO-9.3 would apply to operation of the Proposed Project.

In addition, operation of the Atwater Station Alternative could injure or kill special-status wildlife species. Mitigation Measure BIO-9.1, BIO-9.2 and BIO-9.3 would apply to operation of the Atwater Station Alternative.

Significance with Application of Mitigation Measures

Implementation of Mitigation Measure BIO-9.1, BIO-9.2, and BIO-9.3 would reduce and/or avoid impacts associated with maintenance activities of the Proposed Project through conducting maintenance activities outside of sensitive timeframes (e.g. the general bird nesting season [Feb 1 to Aug 31] and bat maternity and pupping season [Sep 15 to Oct 31]). Where avoidance is not feasible, Mitigation Measure BIO-9.3 requires conducting pre-activity surveys for special-status species prior to conducting maintenance activities. With the implementation of Mitigation Measures BIO-9.1, BIO-9.2, and BIO-9.3, impacts on special-status wildlife species from the operation of the Proposed Project would be less than significant.

For the same reasons as the Proposed Project, maintenance of the Atwater Station Alternative would be less than significant after implementation of Mitigation Measures BIO-9.1, BIO-9.2, and BIO-9.3.

Comparison of the Proposed Livingston Station and Atwater Station Alternative

Operation impacts on special-status wildlife species due to the Atwater Station Alternative would not significantly differ compared to the Livingston Station. Both would result in less-than-significant impacts after application of mitigation.

Impact BIO-10	Operation of the Proposed Project could injure or kill special-status fish and remove or degrade their habitat.
Level of Impact	**Potentially significant impact** Proposed Project Ceres to Merced Extension Alignment **No impact** Proposed Project Turlock Station Livingston Station Merced Layover & Maintenance Facility Merced Station Alternative Analyzed at an Equal Level of Detail Atwater Station Alternative
Mitigation Measures	BIO-10.1: Model hydraulics of new bridges before construction
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Operation of new bridge crossings can affect fish habitat. Anadromous fish migratory habitat could change as a result of the installation of new piles in the waterbodies. New structures could cause shading and changes to channel morphology and hydraulics.

Channel morphology describes the linear, aerial, and volumetric features of a channel, including depth, length, width, and the shape or configuration of the channel (e.g., the characteristics of secondary channels, riffles, runs, pools, backwaters, and sloughs). Channel morphology, along with flow, affects stream hydraulics, which refers to a stream's depth, surface elevation, velocity, and turbulence. Together, channel morphology and hydraulics influence the conditions that support fish migration and movement. Channel morphology and hydraulics have a major effect on cover and water temperature. River lamprey, Central Valley steelhead, Central Valley Chinook salmon, and hardhead migration could be affected if water velocities exceed swimming speeds of each fish species.

In-water structures can alter local channel hydraulics and underwater light conditions and provide potentially favorable holding conditions for juvenile and adult fish and species that prey on small or juvenile fishes. Permanent shading from the new bridges could potentially reduce primary productivity of affected habitats and increase the number of predatory fishes in the study area and/or their ability to prey on juvenile fishes.

Impact Details and Conclusions

Proposed Project

The Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station would not include any bridges over water and would not affect suitable fish habitat. No impact

would occur from the Turlock Station, Livingston Station, Merced Layover & Maintenance Facility, and Merced Station.

The Ceres to Merced Extension Alignment would include new bridges over the Merced River and Bear Creek. Special-status fish species that could be affected by the new bridges include Central Valley steelhead, Central Valley Chinook salmon, hardhead, Pacific and Kern Brook lamprey, and Sacramento splittail.

The new Merced River Bridge would be approximately 17 feet wide and supported by two abutments on each end of the bridge and six piers located along the length of the structure. The 390-foot-long bridge would consist of seven total spans with four 30-foot spans on the northern end approaching the Merced River, as well as three 90-foot spans crossing the Merced River for the remaining portions of the structure. Three supporting piers for the bridge would be placed on land outside of the active river channel in the Merced River. As a result, the addition of these three piers is not expected to result in any substantial change in river velocities or to affect the ability of special-status fish species to migrate past the new bridge.

The new Bear Creek Bridge would be a new 225-foot, single-track concrete bridge that would be 17 feet wide with two abutments at each end and 13 piers located between the span sections in the creek. At this bridge crossing, the pilings in the water could affect stream velocities, which could affect special-status fish or degrade their habitat within or outside of the study area. Operation of the Proposed Project (due to the Ceres to Merced Extension Alignment) could result in potentially significant impacts on Pacific and Kern Brook lamprey, Central Valley steelhead, Central Valley Chinook salmon, hardhead, and Sacramento splittail. The increased number of in-water structures due to the new bridge over Bear Creek could affect channel velocities and affect fish movement, as well as instream erosion. Given the bridge designs, this is unlikely to result in substantial change in velocities or erosion, but pending further evaluation, is considered potentially significant.

Furthermore, shading would occur from the new bridges, which could increase predation. However, since the bridges are only 17 feet wide, shading would be minimal. shading would not occur all day in any particular location and, therefore, is not expected to strongly affect juvenile native and special-status fish species. Additionally, because of the height of the bridges over the water, ambient light levels generally would be expected to penetrate into the water, thereby minimizing the effects of bridge shading on aquatic habitats. Thus, shading is considered a less-than-significant impact on special-status fish species.

Atwater Station Alternative

The Atwater Station Alternative would not include any bridges over water and would not affect suitable fish habitat. There would be no impact resulting from the Atwater Station Alternative. There would be no difference in operations impacts on special-status fish species between the proposed Livingston Station and Atwater Station Alternative (both would result in no impact).

Mitigation Measures

Mitigation Measure BIO-10.1 would apply to the Ceres to Merced Extension Alignment for impacts on special-status fish species. Mitigation Measure BIO-10.1 is described in Section 3.4.4.5, *Mitigation Measures for Biological Resources*.

Significance with Application of Mitigation Measures

New piles in the channel may increase velocities in the bridge area, preventing steelhead and Chinook salmon from accessing upper spawning areas during the winter and spring, especially in Bear Creek. Modeling expected hydraulics from the new bridge structure and revising the bridge design if necessary, will ensure salmonids are able to pass upstream unimpeded. Implementation of Mitigation Measures BIO-10.1 would reduce operations impacts of new bridge associated with the Proposed Project (due to the Ceres to Merced Extension Alignment) to a less-than-significant level by verifying water velocities and allowing migration of anadromous fish.

Impact BIO-11	Operation of the Proposed Project would not substantially interfere with native resident or migratory fish or wildlife species movement, established migration corridors, or their use of nursery areas.
Level of Impact	**Less than significant impact**

Impact Characterization and Significance Conclusion

This impact addresses fish or wildlife movement impacts other than those related to new bridges, which are discussed under Impact BIO-10.

Proposed Project

Ceres to Merced Extension Alignment

The Proposed Project would increase train traffic along the UPRR ROW but the increased traffic is not expected to have significantly different effects on wildlife species from existing operational conditions. This is because the Ceres to Merced Extension Alignment would add only limited additional rail traffic (i.e., four trains in the morning and four trains in the evening) to existing railroad lines and existing railroad traffic. The greatest extent of disturbance that could interfere with fish and wildlife movement would occur during the construction of the Ceres to Merced Extension Alignment. Once construction is completed, operations would occur entirely within areas previously disturbed and cleared of natural landcover during construction. Apart from the special-status fish and wildlife species impacts related to new bridges and culverts (discussed under Impact BIO-10), operation of the Ceres to Merced Extension Alignment is not expected to be significantly different from existing operations with regard to fish or wildlife movement along stream corridors, riparian habitat, or wetland complexes, and thus would have a less-than-significant impact on fish or wildlife movement, migration corridors, or nursery areas.

Merced Layover & Maintenance Facility, Turlock Station, Livingston Station, and Merced Station

Increased noise, vehicle traffic, lighting and presence of humans would result from operation of the Merced Layover & Maintenance Facility, Turlock Station, Livingston Station, and the Merced Station. However, these facilities would be operated in an area that already has routine human activity from prior development, is generally devoid of natural vegetation cover, and is not connected to large areas of contiguous natural land cover or aquatic features; thus, this area currently provides little to no opportunity for wildlife movement. Vegetation management activities that occur as a result of operation of the Merced Layover & Maintenance Facility, Turlock Station, Livingston Station and the Merced Station could affect nesting birds and roosting bats; however, these impacts are described

and addressed under Impact BIO-9. Apart from vegetation maintenance and herbicide/pesticide application activities required for operation of these facilities, operation and maintenance activities associated with the Merced Layover & Maintenance Facility, Turlock Station, Livingston Station, and the Merced Station would not substantially affect wildlife movement, and the impact would be less than significant. The Merced Layover & Maintenance Facility, Turlock Station, Livingston Station, and the Merced Station are not located within riverine habitat; therefore, the operation of these facilities would not impact resident or migratory fish movement.

Atwater Station Alternative

Increased noise, vehicle traffic, lighting, and presence of humans would result from operation of the Atwater Station Alternative. However, the station would be operated in an area that already has routine human activity from prior development, is generally devoid of natural vegetation cover, and is not connected to large areas of contiguous natural land cover or aquatic features; thus, the area provides little to no opportunity for wildlife movement. Apart from vegetation maintenance and herbicide/pesticide application activities required for operation of the Atwater Station Alternatives, as described and addressed under Impact BIO-9, operations and maintenance activities associated with the Atwater Station Alternative would not substantially affect wildlife movement, and the impact would be less than significant. The Atwater Station Alternative is not located within riverine habitat; therefore, the operation of the station would not impact resident or migratory fish movement.

Operation of the Atwater Station Alternative instead of the proposed Livingston Station would have a similar less-than-significant impact on fish or wildlife movement, migration corridors, or nursery areas.

Impact BIO-12	Operation of the Proposed Project could conflict with local biological resource policies, including tree preservation policies or ordinances.
Level of Impact	**Potentially significant impact**
Mitigation Measures	BIO-9.1: Avoid nesting bird impacts during operation and maintenance activities BIO-9.2: Avoid roosting bat impacts during operation and maintenance activities BIO-9.3: Conduct pre-activity survey for special-status wildlife species prior to conducting maintenance activities
Level of Impact after Mitigation	**Less than significant impact**

Impact Details and Conclusions

Proposed Project

Operation of the Proposed Project is not expected to affect trees regulated by local tree preservation policies or ordinances because tree removal would occur during construction of the Proposed Project. Routine vegetation management, including tree pruning for ROW clearance associated with operations would occur entirely within areas previously disturbed and cleared during construction of the Proposed Project. As noted in Impact BIO-7, local tree regulations do not apply within the UPRR ROW. Local tree ordinances would not legally apply to tree removal or pruning associated with the operation of the Proposed Project. Furthermore, operational tree removal would be limited because tree removals necessary for the Proposed Project would be removed during construction;

operations effects would be limited to pruning to maintain clearance zones established during construction. Thus, operation of the Proposed Project would not conflict with tree preservation policies or ordinances, and this impact would be less than significant.

In addition, there are local policies related to the protection of special-status species. These local policies are identified in Appendix G of this EIR, *Regional Plans and Local General Plans*, and include policies from the Merced County General Plan and Turlock General Plan. Pertinent policies include the Merced County General Plan (Natural Resource Policy NR-1.2.1, *Special Status Species Surveys and Mitigation*) and Turlock General Plan (Conservation Policy 7.4-3, *Identify and protect nesting habitat*). As described in Impact BIO-9, operation of the Proposed Project could result in a potentially significant impact on special-status plants, wildlife, and fish species. As such, operation of the Proposed Project could conflict with local biological resource policies, resulting in a potentially significant impact.

Atwater Station Alternative

Operation of the Atwater Station Alternative could conflict with City of Atwater General Plan (Open Space and Conservation Goals CO-5 and CO-6, as identified in Appendix G). As described in Impact BIO-9, operation of Atwater Station Alternative could result in a potentially significant impact to special-status wildlife species. As such, operation of the Atwater Station Alternative could conflict with local biological resource policies, resulting in a potentially significant impact.

Mitigation Measures

Mitigation Measures BIO-9.1, BIO-9.2 and BIO-9.3 would apply to the operation of the Proposed Project. In addition, Mitigation Measures BIO-9.1, BIO-9.2 and BIO-9.3 would apply to the operation of the Atwater Station Alternative. Mitigation Measures BIO-9.1, BIO-9.2, and BIO-9.3 are described in Section 3.4.4.5, *Mitigation Measures for Biological Resources*.

Significance with Application of Mitigation Measures

Implementation of Mitigation Measure BIO-9.1, BIO-9.2, and BIO-9.3 would ensure operation of the Proposed Project is consistent with local biological resource polices protecting special-status wildlife habitat and species by incorporation of survey standards and mitigation requirements that protect resources, identify and protect nesting habitat prior to disturbance, and protect wildlife habitat (e.g. bat roosting habitat). With the implementation of Mitigation Measures BIO-9.1, BIO-9.2 and BIO-9.3, operation of the Proposed Project would be less than significant.

For the same reasons as the Proposed Project, operation of the Atwater Station Alternative would be consistent with local biological resource policies protecting special-status wildlife habitat and species after implementation of Mitigation Measures BIO-9.1, BIO-9.2, and BIO-9.3, and the operations impacts would be less-than-significant.

Comparison of the Proposed Livingston Station and Atwater Station Alternative

Operations impacts related to conflicts with local biological resources due to impacts on special-status wildlife species due to the Atwater Station Alternative would not significantly differ compared to the Livingston Station. Both would result in less-than-significant impacts after application of mitigation.

Impact BIO-13	Operation of the Proposed Project would not conflict with provisions of adopted Habitat Conservation Plans, Natural Community Conservation Plans, or approved local, regional, or state habitat conservation plans.
Level of Impact	**No impact**

Impact Details and Conclusions

No HCPs, NCCPs, or other approved local regional, or state HCPs cover the area where the Proposed Project would be located. Operation of the Proposed Project would, therefore, not conflict with adopted HCPs, NCCPs, or approved local, regional, or state HCP provisions, and there would be no impact.

For the same reasons as the Proposed Project, operation of the Atwater Station Alternative would have no impact due to conflicts with adopted HCPs, NCCPs, or approved local, regional, or state HCP provisions.

3.4.4.4 Overall Comparison of the Proposed Livingston Station and Atwater Station Alternative

The Atwater Station Alternative and the proposed Livingston Station contain the same land cover (developed/landscaped and ruderal). As such, both are expected to have a similar impact on biological resources. The main difference between the Atwater Station Alternative and the proposed Livingston Station is identified in Impact BIO-2. Implementation of the Livingston Station could affect six special-status wildlife species, compared to the Atwater Station Alternative, which could affect three special-status wildlife species, if present.

Overall, both the Atwater Station Alternative and the proposed Livingston Station would result in similar impacts on biological resources. However, overall, the proposed Livingston Station would have slightly greater impacts on biological resources than the Atwater Station Alternative.

3.4.4.5 Mitigation Measures for Biological Resources

Table 3.4-13 identifies which mitigation measures would apply to the Proposed Project and the Atwater Station Alternative. The description of the mitigation measures identified for the Proposed Project and the Atwater Station Alternative are identified and described in detail following the table.

Table 3.4-13. Applicability of Mitigation Measures for the Proposed Project and the Atwater Station Alternative

	BIO-1.1: Conduct preconstruction surveys for special-status plant species	BIO-1.2: Prepare a salvage, relocation, or propagation and monitoring plan for special-status plant species	BIO-1.3: Document affected special-status plant species	BIO-1.4: Prevent introduction or spread of invasive plant species	BIO-2.1: Conduct a worker environmental training program for construction personnel	BIO-2.2: Avoid vernal pool-endemic species	BIO-2.3: Avoid valley elderberry longhorn beetle	BIO-2.4: Avoid California tiger salamander and western spadefoot toad	BIO-2.5: Avoid western pond turtle and giant garter snake	BIO-2.6: Avoid coast horned lizard and Northern California legless lizard	BIO-2.7: Avoid nesting birds	BIO-2.8: Avoid Swain son's hawk	BIO-2.9: Compensate for Swainson's hawk foraging habitat loss	BIO-2.10: Avoid burrowing owl	BIO-2.11: Compensate for burrowing owl habitat loss	BIO-2.12: Avoid Song sparrow (Modesto population), tricolored blackbird and yellow-headed blackbird	BIO-2.13: Avoid roosting bats	BIO-2.14: Avoid San Joaquin kit fox and American badger	BIO-2.15: Compensate for San Joaquin kit fox and American badger habitat loss	BIO-2.16: Avoid Direct Impacts on Monarch Butterfly Host Plants & Provide Compensatory Mitigation for Impacts on Monarch Butterfly Habitat	BIO-3.1: Implement noise reduction measures for pile driving	BIO-3.2: Develop and implement a hydroacoustic monitoring plan to minimize noise effects on fish	BIO-3.3: Implement seasonal restrictions for in-water work	BIO-4.1: Avoid and protect wetlands during construction	BIO-4.2: Compensate for impacts on jurisdictional wetlands and non-wetland waters of the United States (aquatic resources) prior to impacts during construction	BIO-5.1: Avoid and protect sensitive natural communities, including riparian habitat, during construction	BIO-5.2: Compensate for loss of sensitive natural communities (including riparian habitat)	BIO-7.1: Compensate for tree removal during construction.	BIO-9.1: Avoid nesting bird impacts during operational vegetation management	BIO-9.2: Avoid roosting bat impacts during operational vegetation management	BIO-9.3: Conduct pre-activity survey for special-status wildlife species prior to conducting maintenance activities	BIO-10.1: Model hydraulics of new bridges before construction	HYD-1.2: Avoid water quality impacts from construction adjacent to, within, and crossing over surface waters
Ceres to Merced Extension Alignment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Turlock Station	--	--	--	--	X	--	--	--	--	--	X			X	X	--	X	--	--	--	--	--	--	--	--	--	--	--	X	X	X	X	--	--
Merced Layover & Maintenance Facility	--	--	--	--	X	--	--	X	X	--	X	X	X	X	X	--	X	--	--	--	--	--	--	--	--	--	--	--	X	X	X	X	--	--
Livingston Station	--	--	--	--	X	--	--	--	--	--	X	X	X	X	X	--	X	X	X	--	--	--	--	--	--	--	--	--	--	X	X	X	--	--
Merced Station	--	--	--	--	X	--	--	--	--	--	X	--	--	X	X	--	X	--	--	--	--	--	--	--	--	--	--	--	--	X	X	X	--	--
Atwater Station Alternative	--	--	--	--	X	--	--	--	--	--	X	--	--	X	X	--	X	--	--	--	--	--	--	--	--	--	--	--	--	X	X	X	--	--

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Mitigation Measure BIO-1.1: Conduct preconstruction surveys for special-status plant species

The San Joaquin Regional Rail Commission (SJRRC) will retain a qualified botanist to conduct preconstruction surveys for special-status plant species in suitable habitat. During appropriate species-specific identification periods prior to the initiation of construction, the qualified botanist will survey suitable habitat in the environmental footprint for the species below in accordance with California Department of Fish and Wildlife (CDFW) protocols (California Department of Fish and Wildlife 2018b). The results of the surveys, which will require multiple visits due to varying blooming periods and differences in the construction initiation, will be documented in brief reports or technical memoranda. If the survey demonstrates absence of special-status plant species in the environmental footprint, no further actions will be required.

Special-Status Plant Species to Be Surveyed
Sanford's arrowhead
Delta button-celery
Watershield

Mitigation Measure BIO-1.2: Prepare a salvage, relocation, or propagation and monitoring plan for special-status plant species

If the protocol-level botanical survey reveals the presence of special-status plant species in the study area, the SJRRC or its contractor(s) will notify the U.S. Fish and Wildlife Service (USFWS) and/or CDFW. A qualified botanist or restoration ecologist will prepare a salvage, relocation, or propagation and monitoring plan in coordination with USFWS and/or CDFW prior to construction to address affected special-status plant species. The plan will include provisions that address the techniques, location, and procedures required for the successful establishment of the plant populations. The plan will include provisions for performance that address survivability requirements, maintenance, monitoring, implementation, and the annual reporting requirements. The following performance standards will apply.

Monitoring and success criteria applicable to special-status plant salvage, relocation, or propagation will require the following.

- At least two surveys by a qualified botanist or ecologist per monitoring year.
- At least 80 percent of the planted area must support vegetation composition and density consistent with reference population conditions.
- At least 80 percent of the planted area must support target species amounts similar to reference feature conditions.
- A minimum of 5 consecutive years of monitoring to ensure success criteria are met.
- Remedial actions to restore intended ecological function of planted areas that fail to meet the success criteria for 3 consecutive years.

Mitigation Measure BIO-1.3: Document affected special-status plant species

All directly affected areas of special-status plants will be documented by a qualified botanist or ecologist retained by SJRRC or its contractor(s) prior to impacts. Documentation will include

density and percent cover; key habitat characteristics, including soil type, associated species, hydrology, and topography; and photographs of preconstruction conditions.

Mitigation Measure BIO-1.4: Prevent introduction or spread of invasive plant species

SJRRC's contractor(s) will implement the following actions to avoid and minimize the spread or introduction of invasive plant species.

- Clean construction equipment and vehicles in a designated wash area prior to entering and exiting the construction site.
- Educate construction supervisors and managers about invasive plant identification and the importance of controlling and preventing the spread of invasive plant infestations.
- Treat small, isolated infestations with eradication methods that have been approved by or developed in conjunction with CDFW and USFWS to prevent or destroy viable plant parts or seeds.
- Minimize surface disturbance to the greatest extent feasible to complete the work.
- Use native, noninvasive species or nonpersistent hybrids in erosion-control plantings to stabilize site conditions and prevent invasive plant species from colonizing.
- Use weed-free imported erosion-control materials (or rice straw) in upland areas.

One year after construction, conduct a monitoring visit to each active or previously active (within 1 year) environmental footprint to ensure that no new occurrences of invasive plant species not previously present have become established.

Mitigation Measure BIO-2.1: Conduct a worker environmental training program for construction personnel

Before any equipment staging, grading, or vegetation removal in areas supporting or potentially supporting sensitive biological resources (e.g., aquatic, cropland, developed/landscape, grassland, riparian, ruderal and wetlands habitat; habitat for special-status wildlife species; active bird nests, active bat roosts), SJRRC's contractor(s) will prepare and implement a worker environmental awareness training program. The training program will be provided to all construction personnel (contractors and subcontractors) to brief them on the need to avoid effects on sensitive biological resources and penalties for not complying with applicable state and federal laws and permit requirements. The training program will be delivered by a biologist and will include information on the life history and habitat requirements of special-status species potentially occurring in or adjacent to the environmental footprint, the importance of protecting habitat, and the terms and conditions of resource protection measures from applicable permits for the project. The training program will also cover general restrictions and guidelines that must be followed by all construction personnel to reduce or avoid effects on sensitive biological resources during construction.

Mitigation Measure BIO-2.2: Avoid vernal pool-endemic species

If any construction work remains to be completed after the start of the rainy season (October 15 to June 1), SJRRC or its contractor(s) will install exclusion fencing and erosion control measures prior to any ground disturbance within 50 feet of wetlands and vernal pools under the guidance of a qualified biologist. The fencing will be installed around the perimeter of grassland landcover

containing vernal pools and other seasonal wetlands. The contractor, under the supervision of a qualified biologist, will erect and maintain the exclusion fencing for the duration of the construction activity. Fencing will be removed as soon as construction activities are completed.

Mitigation Measure BIO-2.3: Avoid valley elderberry longhorn beetle

Before ground disturbance within 100 feet of upland and riparian habitat with potential to support valley elderberry longhorn beetle (unless disturbance is unavoidable), a qualified biologist will identify any shrubs in and along improvement areas with potential to support valley elderberry longhorn beetle. SJRRC or its contractor(s) will comply with the following avoidance and minimization measures from the 2017 USFWS' Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle:

- Areas with elderberry shrubs will be avoided during construction activities. Areas with elderberry shrubs will be fenced, flagged, or both. Fencing and/or flagging will be placed as close to the construction limits as feasible.
- Activities that may damage or kill an elderberry shrub (e.g., trenching, paving, pile driving), may need an avoidance area of at least 20 feet from the drip line.
- A qualified biologist will provide training for all contractors and any on-site personnel on the status of the valley elderberry longhorn beetle, its host plant and habitat, the need to avoid damaging elderberry shrubs, and the possible penalties for noncompliance.
- A qualified biologist will monitor the work area at Project-appropriate intervals to verify that all avoidance and minimization measures are implemented.
- To the extent feasible, all activities that could occur within 65 feet of an elderberry shrub would be conducted outside the flight season of the valley elderberry longhorn beetle (March-July).
- Trimming of elderberry shrubs would occur between November and February and would avoid the removal of any branches or stems that are 1 inch or more in diameter.
- Herbicides would not be used within the drip line of elderberry shrubs. All chemicals would be applied using a backpack sprayer or similar direct application method.
- Mechanical vegetation removal within the drip line of elderberry shrubs would be limited to the season when adults are not active (August-February) and would avoid damaging elderberry shrubs.

SJRRC's contractor(s) will be responsible for ensuring that the contractor maintains the buffer area fences around elderberry shrubs throughout construction. SJRRC's contractor(s) will ensure that the environmental footprint is watered down as necessary to prevent fugitive dust from becoming airborne and accumulating on elderberry shrubs in environmental footprints and adjacent to construction areas activities (including unpaved access routes).

Where avoidance of elderberry shrubs is not feasible, SJRRC will provide compensatory mitigation for impacts on valley elderberry longhorn beetle habitat, including through transplantation and replacement of elderberry shrubs and maintenance of replacement shrubs, consistent with the 2017 USFWS' Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle as follows:

- Suitable riparian habitat would be replaced at a minimum of 3:1 (acres of mitigation to acres of impact).
- Suitable non-riparian habitat would be replaced at a minimum of 1:1 (acres of mitigation to acres of impact).
- Individual elderberry shrubs in riparian areas would be replaced through a purchase of two credits at a USFWS-approved bank for each shrub that would be trimmed or removed regardless of the presence of exit holes.
- Individual elderberry shrubs in non-riparian areas would be replaced through a purchase of one credit at a USFWS-approved bank for each shrub that would be trimmed if exit holes have been found in any shrub in or within 165 feet of the work area.
- If an elderberry shrub is to be completely removed by the activity, the entire shrub would be transplanted to a USFWS-approved location in addition to the specified credit purchase.
- For transplanted elderberry plants, a survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants must be maintained throughout the 10-year monitoring period. If survival rates drop below 60 percent during the monitoring period, failed plantings would be replaced and maintained until the 60 percent survival rate is achieved.

Mitigation Measure BIO-2.4: Avoid California tiger salamander and western spadefoot toad

SJRRC will retain a USFWS and/or CDFW-approved biologist (as appropriate) to identify and flag (pin flags or 4-foot lath) all suitable aquatic habitat for California tiger salamander and western spadefoot toad outside of but adjacent to environmental footprints and ground-disturbance areas prior to staging, vegetation clearing, grading, or other construction activities.

Prior to any ground-disturbing activity, SJRRC's construction contractor(s), under the direction of a qualified biologist will install wildlife exclusion fence along the boundary of the work area containing California tiger salamander and Western spadefoot toad habitat or would implement similar measures as otherwise required pursuant to regulatory authorizations issued under the FESA or CESA. The wildlife exclusion fence must be trenched into the soil at least 4 inches in depth, with the soil compacted against both sides of the fence for its entire length to prevent tiger salamanders from passing under the fence, and must have must have intermittent exit points. During the dry season (June 1–October 15), the qualified biologist will inspect the wildlife exclusion fence at least twice weekly on nonconsecutive days and on a daily basis between October 15 and June 1 or following any rain event. The wildlife exclusion fence will be installed with turn-arounds at access points to direct California tiger salamander or Western spadefoot toad away from gaps in the fencing.

During the dry season (June 1-October 15), and prior to any ground-disturbing activity, a qualified biologist will conduct a preconstruction survey of suitable upland habitat within the construction work area and extending out 100 feet from the boundary of the work area, where accessible, to determine if California tiger salamander and western spadefoot toad are present.

When ground-disturbing activities take place during the rainy season (October 15- June 1), in addition to upland surveys, the qualified biologist would survey work areas that are adjacent to

potential breeding habitat for the presence of California tiger salamander and western spadefoot toad.

With approval from USFWS and/or CDFW, an approved biologist will relocate individual salamanders or toads if found within the construction footprint. Individuals will be moved immediately to a relocation site that is a minimum of 330 feet from the construction boundary. The relocation site will be determined in coordination with USFWS and/or CDFW prior to the commencement of construction activities.

If feasible, construction activities near drainages and wetland complexes identified as potential movement corridors will take place between July 1 and October 1, when the California tiger salamander and western spadefoot toad are least likely to be present in the construction areas.

To discourage California tiger salamander and western spadefoot toad from entering the construction areas via ditches, the ditches will be equipped with lightweight, one-way flow gates. These will be designed so that water can easily pass from the construction site to the ditches, but small vertebrates such as salamanders, toads, or frogs cannot move upstream from ditches to the construction areas.

To the extent feasible, construction activities would not be conducted within 250 feet of areas identified as occupied California tiger salamander breeding habitat during the rainy season (October 15–June 1). However, construction activities may begin within such areas after April 15 if the breeding habitat is no longer inundated.

If California tiger salamander are discovered within the construction area and full impact avoidance of California tiger salamander habitat is not possible, SJRRC will provide compensatory mitigation for occupied habitat at a ratio of 3:1, unless higher ratios are required through regulatory authorizations issued under FESA or CESA. Compensatory mitigation will be provided using an agreed upon method during permit consultation.

Mitigation Measure BIO-2.5: Avoid western pond turtle and giant garter snake

SJRRC's contractors(s) will implement the following measures to avoid impacts on western pond turtle and giant garter snake during construction.

Giant garter snake

- To reduce the likelihood of snakes entering construction areas within or adjacent to freshwater wetlands, slow-moving riverine aquatic habitat, marshes, ditches, and canals in the environmental footprint, SJRRC or its contractor(s) will install exclusion fencing along the freshwater marsh, aquatic riverine features, and open water areas outside of the environmental footprint (areas within 200 feet of suitable habitat). The exclusion fencing will be installed and maintained by SJRRC and its construction contractor(s) for the duration of construction within or adjacent to these features. The fencing will consist of 3- to 4-foot-tall erosion fencing buried at least 6 to 8 inches below-ground. To ensure that construction equipment and personnel do not affect aquatic habitat for giant garter snake outside the construction corridor, orange barrier fencing or other high-visibility flagging (such as t-post and rope) will be erected in addition to the exclusion fencing to clearly define the aquatic habitat to be avoided.

- Prior to construction each morning, construction personnel will inspect exclusion and orange barrier fencing to ensure they are in good condition. Observations of snakes within the environmental footprint and access routes will be immediately reported to the biologist, and all activities will cease until appropriate corrective measures have been completed, the snake leaves the construction site under its own volition, or the biologist determines that the snake will not be harmed.
- A qualified biologist will conduct a preconstruction survey in suitable habitat no more than 24 hours before groundbreaking construction. The survey will take place within each construction footprint, as well as 200 feet outside of each footprint. If construction stops for a period of two weeks or more, a new preconstruction survey will be completed no more than 24 hours prior to preinitiation of work.
- Vegetation clearing within 200 feet of the banks of potential giant garter snake aquatic habitat will be limited to the minimum area necessary. Giant garter snake habitat outside but adjacent to the construction area will be flagged and designated as an environmentally sensitive area, to be avoided by all construction personnel.
- The movement of heavy equipment within 200 feet of the banks of potential giant garter snake aquatic habitat will be confined to designated access and haul routes to minimize habitat disturbance.
- Prior to moving vehicles or equipment, all construction personnel will check under the vehicle/equipment for any sensitive wildlife, including giant garter snake. If an animal is observed, the vehicle/equipment will not be moved until the individual has vacated the area of its own accord.
- Time construction activities in giant garter snake habitat to occur within the active season for giant garter snake (approximately May 1 to October 1) when the species is more likely to be moving around and can more easily avoid being disturbed. For any work that needs to occur outside of the active season in giant garter snake habitat, ground-disturbing activities must first be initiated during the active season (prior to September 15). This way no habitat within the construction areas will be available for giant garter snake to sue as refugia during the inactive season and will deter individuals from moving into active construction zones.
- Any dewatered habitat will remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling the dewater habitat.
- A qualified biologist will be present onsite to monitor for giant garter snake during initial groundbreaking construction activities in giant garter snake habitat. If giant garter snake is detected during preconstruction surveys, the biologist may remain on-site during construction; in such an event SJRRC will coordinate with wildlife agencies on establishing a monitoring schedule.
- To prevent inadvertent entrapment of giant garter snake, or other wildlife during construction, all excavated, steep-walled holes or trenches measuring more than 6 inches deep either will be covered at the close of each working day using plywood or similar material. If holes/trenches cannot be fully covered, at least one escape ramp will be constructed of earth fill or wooden planks. All holes or trenches will be checked daily for trapped wildlife. Before holes or trenches are filled, they will be thoroughly inspected for trapped wildlife.

- All construction pipes, culverts, or similar structures on the construction site for one or more overnight periods will be capped or sealed with tape (or similar material) or stored at least 3 feet above ground. They will be inspected thoroughly for special-status wildlife before capping, burying or otherwise using the structures. If an individual is discovered during this inspection, the structure will not be disturbed until the individual leaves on its own accord.
- To avoid entangling giant garter snake, erosion control methods will not utilize plastic, monofilament or other woven fiber netting.
- If a live giant garter snake is encountered during preconstruction or construction activities, work will stop in the vicinity of the individual and the qualified biologist will monitor the snake an allow it to move away unharmed, and of its own accord without being disturbed.

Western pond turtle

- Prior to the start of construction within western pond turtle habitat (i.e., any undeveloped areas within 400 feet of riverine aquatic habitat, ponds, vernal pools, or seasonal wetlands) during the nesting or overwintering season, SJRRC will retain a qualified biologist (one who is familiar with different species of turtles) to conduct preconstruction surveys 1 week before and within 24 hours of beginning work. The surveys will be time to coincide with the time of day when turtles are most likely to be active (i.e., during the cooler part of the day between 8:00 a.m. and 12:00 p.m. during spring and summer). Prior to conducting the surveys, the biologist will locate the microhabitats for turtle basking (logs, rocks, brush thickets) and determine a location to observe turtles. Each survey will include a 30-minute wait time after arriving onsite to allow startled turtles to return to open basking areas. The survey will consist of a minimum 15-minute observation time per area where turtles could be observed. If western pond turtle is observed during either survey, a biological monitor will be present during construction activities in the aquatic habitat where the turtle was observed and will capture and relocate, if possible, any entrapped turtles.
- The biological monitor will also be mindful of suitable nesting and overwintering areas in proximity to suitable aquatic habitat and periodically inspect these areas for nests and turtles. If preconstruction surveys identify active nests, the biologist will establish 50-foot no-disturbance buffer zones around each nest using temporary orange construction fencing with a 4-inch-tall gap below the fence. The fencing will be permeable to young turtles and allow them to move away from the nest following hatching. The buffer zones and fencing will remain in place until the biologist has confirmed that the young have left the nest.
- If western pond turtles are found in the construction footprint, construction will cease until the turtle has left the work area. If approved by CDFW, the biological monitor will remove and relocate the turtle to suitable habitat outside the construction footprint. Relocation sites will be subject to CDFW approval.

Mitigation Measure BIO-2.6: Avoid coast horned lizard and Northern California legless lizard

SJRRC's contractors(s) will implement the following measures to avoid impacts on coast horned lizard and silvery legless lizard during construction activities.

A qualified biologist will conduct preconstruction surveys (within 24 hours prior to starting project activities) and construction monitoring of work in suitable habitat (i.e., grassland and

scrub with sandy, friable soils) to protect coast horned lizard and Northern California legless lizard. Prior to construction or restoration activities in California annual grassland and riparian habitat with sandy soils or dense leaf litter, the biologist will conduct a preconstruction survey for coast horned and Northern California legless lizard. This survey will include the following steps.

- Systematic subsurface searching (coast horned lizard and Northern California legless lizard are fossorial [burrowing]). Subsurface searching will include hank raking litter or duff to a depth of two inches and inspecting the ground surface in work areas for litter and loose soil burrowing species.
- Staking the limits of the survey areas and fencing them with small-mesh construction fencing, buried to a minimum depth of 6 to 10 inches below-ground, to reduce the likelihood of lizards reentering the active construction area.
- Capture and release of found coast horned lizards and Northern California legless lizards into nearby similar habitat areas designated by the biologist.
- Removal of the lizard exclusion fence following completion of construction.

During construction in coast horned lizard and Northern California legless lizard habitat, a qualified biologist will be present and have the authority to temporarily stop construction activities if they find coast horned lizards or Northern California legless lizards in the environmental footprint. Work will not resume until the biologist has successfully relocated the animals and determined that they would not be harmed by construction.

Mitigation Measure BIO-2.7: Avoid nesting birds

SJRRC or its contractor(s) will conduct construction activities near nesting areas outside of the bird nesting season (February 1 to August 31) to the extent feasible. If construction in the nesting season is unavoidable, SJRRC or its contractor(s) will retain a qualified biologist with demonstrated nest-searching experience to conduct preconstruction surveys for nesting birds (including raptors, but excluding Swainson's hawk and burrowing owl) within 300 feet and including the environmental footprints. Adjacent lands outside the environmental footprints will be scanned with binoculars from the limit of ground disturbance, the Union Pacific Railroad (UPRR) right-of-way (ROW), and publicly accessible areas. Preconstruction surveys will occur no more than 3 days prior to the onset of ground-disturbing activities (including clearing, grubbing, and staging) at each improvement area. If active nests are found in the environmental footprints, the biologist will establish a no-disturbance buffer around the nest and mark the buffer perimeter with high-visibility fencing, flagging, or pin flags. The size of the buffer will be based on the species' sensitivity to disturbance and planned work activities in the vicinity; typical buffer sizes are 250 feet for raptors and 50 feet for other birds. The buffer will remain in place until the nest is no longer active, as determined by the biologist. Buffers for any nests found outside but within 300 feet of environmental footprints will be established based on the biologist's best professional judgment whether the work would result in nest abandonment. If a lapse in construction activities of 15 days or longer at a previously surveyed environmental footprint occurs, another preconstruction survey will be conducted.

To the extent possible, SJRRC or its contractor(s) will initiate structure demolition/modification outside of the nesting season to avoid impacts on active nests affixed to structures before they become active during the nesting season (February 1 to August 31). If structure demolition

activities cannot occur outside of the nesting season, SJRRC or its contractor(s) will remove inactive nests from the structure to be demolished and install nest exclusion measures (e.g., fine mesh netting, panels, or metal projectors) outside of the nesting season. All exclusionary devices will be monitored and maintained throughout the breeding season to ensure that they are successful in preventing the birds from accessing the cavities or nest sites. No more than 3 days prior to structure demolition activities, a qualified biologist will conduct a preconstruction survey of all potential nesting habitat on the structures to be demolished/modified and the surrounding areas for the presence of active nests. If active nests are found on the structures or in the affected area, then demolition/modification activities will not proceed until the biologist verifies that all nests on the structures are inactive.

After all surveys and/or nest deterrence activities are completed at the environmental footprint, the biologist will complete a memorandum detailing the survey effort and results and submit the memorandum to SJRRC within 7 days of survey completion.

Mitigation Measure BIO-2.8: Avoid Swainson's hawk

To protect Swainson's hawk nesting habitat inside the Ceres General Plan coverage area, SJRRC or its contractor(s) will implement Ceres General Plan Agricultural and Natural Resources Policy 4.D.5, *Swainson's Hawk Protection* (City of Ceres 2018) (see Appendix G of this environmental impact report (EIR), Section G.5.2.1).

To protect Swainson's hawk nesting habitat outside of the Ceres General Plan coverage area (e.g., Stanislaus County, City of Turlock, City of Atwater etc.), SJRRC or its contractor(s) will conduct focus surveys for Swainson's hawk and Swainson's hawk nests. Surveys will be conducted prior to construction activities occurring from March 1 to August 31. Surveys will be conducted by a qualified biologist within 0.5 mile and inclusive of the construction areas. The survey buffer may be smaller in areas where topography (e.g., hills) obstructs the line of sight from the construction area. Survey buffer areas lacking suitable nest trees or with an obstructed line of sight will not be surveyed. Biologists will focus on suitable nest trees within and immediately adjacent to the construction areas that have the highest likelihood for disturbance. The number of surveys needed to determine the status of nesting will be dependent on the conditions during the surveys and observed Swainson's hawk behavior. Survey methods will follow those prescribed in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (2000 Swainson's Hawk Survey Protocol) (Swainson's Hawk Technical Advisory Committee 2000), and generally be conducted between February and July. Survey methods and results will be reported to CDFW.

If active nests are found, SJRRC or its contractor(s) will maintain a 0.5-mile buffer between construction activities and the active nest(s) until it has been determined that young have fledged. The buffer may be reduced in consultation with CDFW if the biologist demonstrates via daily observations (minimum of 2 hours before and during construction activity) that adults tending the nest (on eggs or feeding nestlings) are not disturbed by construction noise. If the biologist observes signs of adult agitation or stress from construction (e.g., alarm-calling, flying away from nest when construction starts), construction activities will cease until the qualified biologist, in consultation with CDFW, determines that young have fledged.

Mitigation Measure BIO-2.9: Compensate for Swainson's hawk foraging habitat loss

Inside the Ceres General Plan coverage area (City of Ceres 2018), SJRRC will provide compensatory mitigation for Swainson's hawk foraging habitat loss (i.e., replacement of existing grassland or agricultural field with new structures and ballast) through or in an amount consistent with the Ceres General Plan Agricultural and Natural Resources Policy 4.D.6., *Swainson's Hawk Habitat Mitigation* (City of Ceres 2018) (see Appendix G of this EIR, Section G.5.2.1).

To compensate for impacts on Swainson's hawk foraging habitat outside of the Ceres General Plan coverage area (e.g., Stanislaus County, City of Turlock, City of Atwater), SJRRC or its contractor(s) will preserve offsite habitat management lands as described in California Department of Fish and Game's (now CDFW) *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (California Department of Fish and Game 1994) at a 1:1 to 0.25:1 ratio (acreage preserved: acreage affected), depending on the distance between the construction areas and the nearest active nest. The location of the closest nest to where construction will occur will be identified during Swainson's hawk surveys conducted under Mitigation Measure BIO-2.8. If acceptable to CDFW, SJRRC may alternatively or additionally purchase mitigation credits for Swainson's hawk foraging habitat from a CDFW-approved mitigation or conservation bank that offers service coverage for the impact location. If no active nests are found during the surveys, a search of the CNDDB will be conducted, and CDFW will be contacted to determine the nearest active nest in relation to each construction site.

Mitigation Measure BIO-2.10: Avoid burrowing owl

Prior to any construction activity planned during the fall and winter non-nesting season (September 1 through January 31) or at any time during the construction process, SJRRC will retain a qualified wildlife biologist to conduct non-breeding season surveys for burrowing owls. Survey methodology will follow the guidance provided by CDFW's *Staff Report on Burrowing Owl Mitigation, Appendix D* (California Department of Fish and Game 2012). Surveys will be conducted at each area of suitable habitat that will be disturbed. The survey area will cover all suitable burrowing owl habitat subject to disturbance pursuant to CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012). If any burrowing owls are found within the disturbance area, SJRRC or its contractor(s) will notify CDFW and will proceed under CDFW direction.

If construction is planned to occur during the nesting season (February 1 through August 31), SJRRC will retain a qualified wildlife biologist to conduct breeding season burrowing owl surveys prior to construction. The survey will be conducted to determine if there is a breeding pair within approximately 500 feet of the construction footprint, unless the biologist determines that a smaller survey buffer around the construction footprint is warranted based on preexisting background disturbance and conditions. Survey visits will be timed in accordance with CDFW's *Staff Report on Burrowing Owl Mitigation, Appendix D, Breeding and Non-Breeding Season Surveys and Reports* (California Department of Fish and Game 2012). This will provide the project team advance notice of nesting owls and allow ample time to discuss appropriate avoidance measures with CDFW.

In addition, take avoidance surveys will be conducted no less than 14 days prior to ground-disturbing activities and a final survey will be conducted within 24 hours prior to ground

disturbance in all areas of the environmental footprint supporting burrowing owl habitat. If the biologist identifies the presence of a burrowing owl nest in an area scheduled to be disturbed by construction, a 660-foot (~200 meter) no-activity buffer will be established and maintained around the nest while it is active. Surveys and buffer establishment will be performed by qualified wildlife biologists, will be coordinated with CDFW, and will be subject to CDFW review and oversight.

Mitigation Measure BIO-2.11: Compensate for burrowing owl habitat loss

SJRRC will provide compensatory mitigation for the loss of occupied owl habitat before construction impacts occur. Occupancy of owl habitat will be determined during implementation of Mitigation Measure BIO-2.10, in the environmental footprints that will be permanently affected. Burrows within areas that will undergo temporary impacts will be avoided. Compensatory mitigation may occur in the form of mitigation credit purchase from a CDFW-approved bank with burrowing owl habitat credits and/or preservation of suitable habitat. Mitigation credit purchase or habitat preservation will occur at a 3:1 ratio (compensation area: habitat loss area).

Habitat preservation will require the development and implementation of a management plan to ensure the preserved area is managed as suitable burrowing owl habitat in perpetuity. The details and specifications of a management plan will be developed in consultation with CDFW, prior to impact on burrowing owl habitat, and will at minimum include the following success criteria.

- Perform routine mowing or grazing to maintain vegetation height consistent with burrowing owl habitat requirements.
- Conduct biological monitoring surveys to confirm suitable owl habitat conditions and document ground squirrel and burrowing owl presence for a minimum of 5 years.
- Restrict deeds to maintain and manage the preserve for burrowing owl in perpetuity, with the ability to grant the preserve to a conservation entity.
- Preserve maintenance and funding reserves.

Mitigation Measure BIO-2.12: Avoid song sparrow (Modesto population), tricolored blackbird, and yellow-headed blackbird

To the extent possible, SJRRC or its contractor(s) will conduct construction within 300 feet of freshwater marsh or streambank habitat during the bird non-breeding season (September 1 through January 31). The construction window will avoid disturbance-related effects on tricolored blackbirds and yellow-headed blackbirds potentially breeding in or near streambanks and freshwater marsh.

If construction activities in or within 300 feet of freshwater marsh or streambank habitat occur during the bird breeding season (February 1 through August 31), SJRRC will retain a qualified biologist to conduct surveys for the presence of tricolored blackbird and yellow-headed blackbird nesting colony or nests. If an active nest colony or nest is observed by the qualified biologist, then a no-disturbance buffer of 250 feet will be established until the end of the breeding season or until the nesting colony or nest is determined inactive by the qualified biologist. Nest buffers may be reduced if site-specific conditions reduce the possibility of disturbance, as determined by the qualified biologist in coordination with CDFW.

Mitigation Measure BIO-2.13: Avoid roosting bats

Where feasible, construction activities that have potential to affect bats with potential to occur within the construction site (i.e., pallid bat, Townsend's big-eared bat, western mastiff bat, hoary bat, other common species of bats) will be conducted outside of the maternity season of bats (April 1 to September 15) and prior to the beginning of the hibernation period (November 1).

Measures to avoid and minimize impacts on sensitive bats species will be determined in coordination with CDFW and may include the following.

Trees

- To avoid and minimize impacts on maternity roosts and hibernating bat species, trees will be removed or trimmed between September 1 and October 30. Tree removal conducted between September 15 and October 30 corresponds to a time period when bats have not yet entered torpor or would be caring for nonvolant young.
- If tree removal and trimming cannot be conducted between September 15 and October 30, a qualified biologist (i.e., a biologist with experience with tree-roosting habitats and life histories of local bats) will examine trees for suitable bat roosting habitat (e.g., large tree cavities, loose or peeling bark, basal hollows, large snags, palm trees with intact thatch) 7 to 14 days before tree removal or trimming. Trees will also be evaluated to determine if they provide suitable habitat for foliage-roosting bats. Riparian woodland, orchards, and stands of mature broadleaf trees should be considered potential habitat for solitary foliage-roosting bat species.
- If the biologist determines that trees to be removed or trimmed provide suitable bat roosting habitat, the biologist will monitor tree removal/trimming.
- The biologist will make recommendations to implement measures to avoid and minimize disturbance or mortality of bats, such as conducting trimming and removal in the late afternoon or evening when it is closer to the time that bats would normally arouse, removing the tree in pieces rather than felling an entire tree, and gently shaking each tree with construction equipment and waiting several minutes before felling trees or removing limbs to allow bats time to arouse and leave the tree. The biologist will search downed vegetation for dead and injured bats. The presence of dead or injured bats that are species of special concern will be reported to CDFW. The biologist will prepare a biological monitoring report, which will be provided to the SJRRC and CDFW.
- Passive monitoring using full spectrum bat detectors may be needed if identification of bat species is required. Survey methods will be discussed with CDFW prior to the start of surveys.
- If a maternity roost is located, whether solitary or colonial, that roost will remain undisturbed until September 15 or a qualified biologist has determined the roost is no longer active.

Human-Made Structure and Natural Structures

- At least 30 days prior to structure removal or disturbance, a qualified biologist will conduct an initial daytime survey to assess the structure for potential bat roosting habitat and look for bat sign (e.g., guano, urine staining). The biologist will examine the entire structure

(i.e., inside and outside for human-made structure and all cracks, seams, and fissures for natural structures) for potential roosting habitat as well as routes of entry to the structure.

- If no habitat or limited habitat for roosting bats is present and no signs of bat use are present, a preconstruction survey of the entire structure by a qualified biologist will be conducted within 24 hours of demolition.
- If signs of bat use are found or if all areas of the structure cannot be examined and the structure provides moderate or high potential habitat, the biologist will prepare a memo with recommended measures to exclude bats from using the structure as a roost site. The memo will include recommendations for excluding bats from using the structure to roost, such as sealing off entry points or using lights and other means to deter bats. The memo will include specifications on when and how exclusion measures should be implemented and will be provided to the SJRRC and CDFW.

Mitigation Measure BIO-2.14: Avoid San Joaquin kit fox and American badger

Within 1 year but no less than 3 months prior to initiating construction for the Ceres to Merced Extension Alignment, SJRRC will retain qualified biologists to identify potential San Joaquin kit fox dens in the construction footprints and surrounding 200 feet in accordance with the *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (2011 USFWS Standard Recommendations) (U.S. Fish and Wildlife Service 2011). USFWS and CDFW will be consulted in the final survey design and methods given the large environmental footprints. This survey will also identify potential American badger dens. The biologists will prepare a report summarizing the survey observations and results, including maps depicting the locations of potential kit fox dens and badger dens and, if possible, occupancy. The report will be submitted to SJRRC, USFWS, and CDFW.

Different San Joaquin kit fox den types are defined per the 2011 USFWS Guidance.

- Known Den—Any existing natural den or built structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records, past or current radiotelemetry or spotlighting data, kit fox sign such as tracks, scat, and/or prey remains, or other reasonable proof that a given den is being or has been used by a kit fox. USFWS discourages use of the terms “active” and “inactive” when referring to any kit fox den because a great percentage of occupied dens show no evidence of use, and because kit foxes change dens often, with the result that the status of a given den may change frequently and abruptly.
- Potential Den—Any subterranean hole within the species’ range that has entrances of appropriate dimensions for which available evidence is insufficient to conclude that it is being used or has been used by a kit fox. Potential dens will include the following: (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise has appropriate characteristics for kit fox use.
- Natal or Pupping Den—Any den used by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually

whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two; therefore, for purposes of this definition either term applies.

Prior to construction, SJRRC will retain qualified biologists to implement preconstruction surveys of previously identified potential kit fox dens to determine if they are known dens or natal or pupping kit fox dens or American badger dens per the 2011 USFWS Standard Recommendations, no less than 14 days and no more than 30 days before the initiation of construction at each environmental footprint). Construction activities will not occur within 100 feet of a potential den during the natal period (February 1 to September 30). If a known den or natal or pupping den is present and is located 100 feet outside of the permanent construction footprint, then a 200-foot no-disturbance exclusion zone during the natal period (100-foot buffer during the non-natal period) will be established around the den with orange construction fence at the edge of the disturbance limits nearest the den. If a known den or natal or pupping den is present within the construction footprint or within 200 feet of the construction footprint during the natal period (100-foot buffer during the non-natal period), the foxes or badger(s) will be excluded outside of the natal period (from November 1 to January 31). A summary report will be prepared by the biologists and submitted to SJRRC, CDFW, and USFWS following completion of all fox and badger avoidance and exclusion activities.

Mitigation Measure BIO-2.15: Compensate for San Joaquin kit fox and American badger habitat loss

SJRRC will provide compensatory mitigation for the loss of occupied San Joaquin kit fox and American badger habitat before construction impacts occur. The occupancy of suitable habitat will be determined during implementation of Mitigation Measure BIO-2.14. Compensatory mitigation may occur in the form of mitigation credit purchase from a USFWS- and CDFW-approved bank with San Joaquin kit fox habitat credits or preservation and enhancement of suitable habitat. Mitigation credit purchase or habitat preservation and enhancement will occur at a 3:1 ratio (compensation area: habitat loss area).

Habitat preservation and enhancement will require the development and implementation of a management plan with the following success criteria to ensure the preserved area is managed as suitable San Joaquin kit fox and American badger habitat in perpetuity.

- Conduct routine eradication of invasive species to maintain the intended vegetation diversity, density, and height consistent with San Joaquin kit fox and American badger habitat requirements for a minimum of 5 years.
- Conduct biological monitoring surveys to confirm suitable San Joaquin kit fox and American badger habitat conditions and document ground squirrel presence.
- Restrict deeds to maintain and manage the preserve for San Joaquin kit fox and American badger in perpetuity, with the ability to grant the preserve to a Habitat Conservancy, public agency, or other local habitat management entity.
- Preserve maintenance and funding reserves.

Mitigation Measure BIO-2.16: Avoid Direct Impacts on Monarch Butterfly Host Plants & Provide Compensatory Mitigation for Impacts on Monarch Butterfly Habitat

Prior to construction, a qualified biologist will survey for Western monarch butterfly egg and larvae host plant – native and non-native milkweed species —within suitable habitat. If host plants are found, the qualified biologist will conduct surveys for adult butterflies during the peak of the flight period to determine presence/absence. Where adult butterflies are present, construction personnel would avoid host plants outside permanent impact areas, by establishing a no-work buffer around host plants. The size and configuration of the no-work buffer would be based on best professional judgement of a qualified biologist and, at minimum, provide 20 feet of clearance around the resources and maintain a disturbance-free airspace. No herbicides/insecticides will be applied within the no-work buffer.

To the extent feasible, SJRRC's contractor(s) will implement pollinator conservation measures in the Xerces Society Best Management Practice for Pollinators in Rangelands (Xerces Society 2018), conservation measures in the Nationwide Candidate Conservation Agreement for Monarch Butterfly on Energy and Transportation Lands (Cardno 2020), or other applicable sources.

If full avoidance of monarch habitat is not feasible, SJRRC will provide compensatory mitigation at a minimum of 1:1 ratio for occupied breeding and foraging habitat unless a higher ratio is required by FESA. SJRRC, in accordance with authorizations issued under FESA, will determine the compensatory mitigation required to offset impacts on habitat for monarch butterfly. Mitigation for monarch butterfly will prioritized any areas with existing monarch butterfly populations and suitable milkweed populations to support breeding.

Mitigation Measure BIO-3.1: Implement noise reduction measures for pile driving

Potential injury and mortality associated with pile driving, which may be required for the pile installation for the new and replacement bridges, will be minimized by implementing the following measures. SJRRC's contractor(s) will implement the following measures, developed in coordination with project design engineers, to minimize the exposure of special-status fish species to potentially harmful underwater sounds.

- If feasible, SJRRC's contractor(s) will vibrate all piles to the maximum depth possible before using an impact hammer.
- During impact driving, SJRRC's contractor(s) will limit the number of strikes per day to the minimum necessary to complete the work.
- The smallest pile driver and minimum force necessary will be used to complete the work.
- During impact driving, SJRRC's contractor(s) will use a bubble ring or similar device to minimize the extent to which the interim peak and cumulative sound exposure level (SEL) thresholds are exceeded.
- No pile driving activity will occur at night.
- A "soft start" technique shall be employed upon initial pile-driving activities every day to allow fish an opportunity to vacate the area. Soft starts require an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period between subsequent three-strike sets. Soft starts for vibratory hammers will initiate noise at

15 seconds at reduced energy, followed by a 1-minute waiting period between subsequent starts. This process should continue for a period of no less than 20 minutes.

Mitigation Measure BIO-3.2: Develop and implement a hydroacoustic monitoring plan to minimize noise effects on fish

SJRRC's contractor(s) will develop and implement a hydroacoustic monitoring plan. The monitoring plan will be submitted to the resource agencies (i.e., CDFW, NMFS, USFWS) for approval at least 60 days before the start construction. The plan will include the following requirements.

- SJRRC's contractor(s) will monitor underwater noise levels during all impact pile driving activities on land and in water to ensure that that peak and cumulative SELs do not exceed estimated values.
- The monitoring plan will describe the methods and equipment that will be used to document the extent of underwater sounds produced by pile driving, including the number, location, distances, and depths of the hydrophones and associated monitoring equipment.
- The monitoring plan will include a reporting schedule that includes provision of daily summaries of the hydroacoustic monitoring results to the resource agencies and more comprehensive reports on a monthly basis during the pile driving season.
- The reports will include the number of piles installed per day, the number of strikes per pile, the interval between strikes, the peak sound pressure level, SEL, root mean square per strike, and accumulated SEL per day at each monitoring station.
- SJRRC's contractor(s) will ensure that a qualified fish biologist is on site during impact pile driving to document any occurrences of stressed, injured, or dead fish. If stressed, injured, or dead fish are observed during pile driving, SJRRC's construction contractor(s) will reduce the number of strikes per day to ensure that fish are no longer showing signs of stress, injury, or mortality.

Mitigation Measure BIO-3.3: Implement seasonal restrictions for in-water work

There will be a construction work window of June 15 to October 15 for all work within creek and river channels. This time period will minimize impacts on migrating special-status fish species, such as adult steelhead and Chinook salmon. In-water work within flowing streams will only dewater up to half of the wetted stream at any time to allow fish passage.

Mitigation Measure BIO-4.1: Avoid and protect wetlands during construction

SJRRC will ensure that a qualified resource specialist (i.e., wetland biologist, ecologist, or soil scientist) will clearly identify wetland areas to be preserved abutting the Project areas and wetland areas outside of the direct construction area with high-visibility construction fencing or markers (e.g., lath or pin flags) before site preparation. Construction will not encroach upon jurisdictional wetlands identified by the resource specialist. A formal wetland delineation will be completed prior to construction and the resource specialist will use the verified wetland delineation to confirm the location of wetland boundaries based on existing conditions at the time of the avoidance marking. Exclusion fencing or markers will be installed before construction activities are initiated, and the fencing will be maintained throughout the construction period. No construction activity, traffic, equipment, or materials will be permitted

in fenced wetland areas. Exclusion fencing and markers will be removed following the completion of construction activities.

All conditions imposed by the state and federal permits will be implemented as part of the Project. The conditions will be clearly identified in the construction plans and specifications and monitored during and after construction to ensure compliance.

Mitigation Measure BIO-4.2: Compensate for impacts on jurisdictional wetlands and non-wetland waters of the United States (aquatic resources) prior to improvements impacts during construction

SJRRC and/or its contractor(s) will develop an aquatic resource (wetlands and non-wetland waters of the United States) mitigation plan, subject to approval by USACE, which will ensure no net loss of wetlands from Project impacts. The plan will detail the amount and type of wetlands (based on the verified wetland delineation) that will be compensated for (through preservation, creation, or restoration) for impacts on existing wetlands and non-wetland waters of the United States (aquatic resources) and outline the monitoring and success criteria for the compensation of wetlands and non-wetland waters of the United States. Additional enhancement options include fish barrier removal, riparian restoration, floodplain restoration, and streambank layback to improve overall ecologic function and connectivity of wetland and non-wetland waters. Enhancement sites will be located as near the impact location as possible but, in the event that local enhancement opportunities are not available, such activities will occur within the same stream system or watershed to provide improved ecologic function and connectivity of wetlands and non-wetland waters affected by the Project.

Monitoring and success criteria applicable to created or restored wetlands will require the following.

- At least two surveys by a qualified wetland biologist, botanist, or ecologist per monitoring year.
- At least 80 percent of the created or restored features support vegetation consistent with reference feature conditions.
- At least 80 percent of the created or restored features support hydrologic regimes similar to reference feature conditions.
- A minimum of 5 consecutive years of monitoring to ensure success criteria are met.
- Remedial actions to restore intended ecological function of created or restored features that fail to meet the success criteria for 3 consecutive years.

Once the plan is approved, SJRRC will implement the aquatic resource compensation measures prior to the initiation of Project construction. SJRRC will be responsible for funding compensatory mitigation, monitoring of the created or restored features per the mitigation plan, and any remedial actions necessary. All conditions that are attached to the state and federal permits will be implemented as part of the Project. The conditions will be clearly identified in the construction plans and specifications and monitored during and after construction to ensure compliance.

Mitigation Measure BIO-5.1: Avoid and protect sensitive natural communities, including riparian habitat, during construction

SJRRC will ensure that a qualified resource specialist (i.e., biologist, botanist, ecologist, or soil scientist) will clearly identify sensitive natural communities, including riparian habitat, to be preserved abutting the Project areas and outside of the direct construction area with high-visibility construction fencing or markers (e.g., lath or pin flags) before site preparation. Construction will not encroach upon sensitive natural communities identified by the resource specialist. The resource specialist will use the verified wetland delineation, soils data, and land cover data to confirm the location of sensitive natural community boundaries based on existing conditions at the time of the avoidance marking. Exclusion fencing or markers will be installed before construction activities are initiated, and the fencing will be maintained throughout the construction period. No construction activity, traffic, equipment, or materials will be permitted in fenced sensitive natural community areas. Exclusion fencing and markers will be removed following completion of construction activities.

All conditions imposed by the state and federal permits will be implemented as part of the Project. The conditions will be clearly identified in the construction plans and specifications and monitored during and after construction to ensure compliance.

Mitigation Measure BIO-5.2: Compensate for loss of sensitive natural communities (including riparian habitat)

For direct effects on sensitive natural communities (including riparian habitat) that cannot be avoided, SJRRC will compensate for the loss of sensitive natural communities to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with the appropriate state and federal agencies during the permitting process. At a minimum, the compensation ratio will be 2:1 (e.g., 2 acres restored/created/enhanced or credits purchased for every 1 acre removed) for permanent impacts and 1:1 for temporary impacts (where riparian habitat will regenerate to pre-activity character within 1 year). Compensation may be a combination of offsite restoration or mitigation credits. SJRRC or its contractor(s) will develop a restoration and monitoring plan that describes how riparian habitat will be enhanced or recreated and monitored over at least 5 years, or as determined by the appropriate state and federal agencies.

If SJRRC or its contractor(s) identifies suitable onsite areas (adjacent to the permanent construction footprint) that are outside the ROW vegetation management zone and chooses to compensate onsite or in the Project vicinity, a revegetation plan will be prepared. The revegetation plan will be developed prior to the removal of existing riparian vegetation and will be conducted onsite or in the Project vicinity to the extent feasible; however, mitigation site selection will avoid areas where future improvements are likely. The revegetation plan will be prepared by a qualified botanist or restoration specialist with experience in riparian restoration and reviewed by the appropriate agencies. The revegetation plan will specify the planting stock appropriate for each riparian land cover type and each mitigation site, ensuring the use of genetic stock from the corresponding Project area. The plan will employ the most successful techniques available at the time of planting. Success criteria will be established as part of the plan and will include a minimum of 70 percent revegetation success after 3 years, 80 percent revegetation success at the end of 5 years, and 75 percent vegetative coverage after 5 years.

SJRRC or its contractor(s) will retain a qualified botanist, restoration ecologist, or biologist with experience in riparian restoration to monitor the plantings as necessary for 5 years. SJRRC or its contractor(s) will be responsible for maintaining the plantings, including managing invasive plants (as defined by the California Invasive Plant Council) and other weeds, and implementing irrigation and plant protection if necessary. SJRRC or its contractor(s) will submit annual monitoring reports to the regulatory agencies issuing permits related to habitat effects, including CDFW, the U.S. Army Corps of Engineers (USACE), the National Marine Fisheries Service (NMFS), and USFWS. Replanting will be necessary if success criteria are not met, and replacement plants subsequently will be monitored and maintained to meet the success criteria. The riparian habitat mitigation will be considered successful when the sapling trees established meet the success criteria, the habitat no longer requires substantial active management, and vegetation is arranged in groups that, when mature, replicate the area, natural structure, stratification, and species composition of similar riparian habitats in the region.

Mitigation Measure BIO-7.1: Compensate for tree removal during construction

A tree avoidance, minimization, and replacement plan will be developed in consultation with a certified arborist and in consultation with cities, counties, and affected property owners along the Project route.

The plan will contain the following provisions.

- The definition of what is and is not a tree for the purposes of this mitigation will be the same as the tree definition used in each municipality (Table 3.4-14).
- Prior to the construction phase, SJRRC and/or its contractor(s) will assess the potential to modify the construction methods and access of stations and other facilities to avoid or minimize the amount of tree removal or pruning necessary to be consistent with maintenance, operational, and safety requirements. SJRRC or its contractor(s) will consult with each jurisdiction along the route to identify where tree removals can and cannot be avoided with Project design measures.
- Tree pruning during construction will be done in accordance with arboricultural industry recommended practices.
- If pruning will result in the loss of 25 percent or more of an individual tree's canopy, then SJRRC and/or its contractor(s) will consider the tree removed and it will be replaced in a manner consistent with the following replacement requirements.
    - For trees removed outside of the UPRR ROW, the following requirements will apply.
        - Where specific replacement ratios or specifications are provided in the local tree ordinance or guidance (cities of Ceres, Turlock, Livingston, Atwater, and Merced, and Stanislaus and Merced Counties), SJRRC will replace protected trees using the local requirements (Table 3.4-14).
        - Where specific replacement ratios or specifications are not provided in local tree ordinances (cities of Ceres, Turlock, Livingston, Atwater, Merced, and Stanislaus and Merced Counties, as specifically described in Table 3.4-14), SJRRC and/or its contractor(s) will replace protected trees on a 2:1 basis using 15-gallon trees (i.e., two 15-gallon trees would be planted for each protected tree removed).

- For unprotected trees in all locations outside the ROW, SJRRC and/or its contractor(s) will replace trees on a 1:1 basis using 15-gallon trees (i.e., one 15-gallon tree would be planted for each unprotected tree removed).

- For trees within the UPRR ROW, the following requirements will apply.
  - Protected trees will be replaced on a 1:1 basis using 15-gallon trees (i.e., one 15-gallon tree will be planted for every tree removed), where feasible. Unprotected trees will be replaced on the same basis, where feasible in nonindustrial areas. Unprotected trees in industrial areas will not be replaced.
  - Trees will be replaced with a tree of the same species wherever possible, unless that species in a nonnative, invasive, or undesirable species. Alternative species to the tree removed may be planted with concurrence of the landowner and local municipality.
  - If onsite tree replacement cannot occur on the UPRR ROW (where trees are removed from the ROW) or on adjacent property (where trees are removed outside of the ROW), then tree replacement may occur on other parts of the affected property (with concurrence of the landowner) or other parts of the local area (with concurrence of the local municipality). Alternatively, SJRRC may pay into a local urban forestry fund to support local tree planting programs, provided SJRRC and local municipalities can agree on the appropriate fund and amount. The replacement requirements described above will apply in determining the equivalent funding amount.

Mitigation Measure BIO-9.1: Avoid nesting bird impacts during operation and maintenance activities

SJRRC or its contractor(s) will conduct vegetation and structural maintenance activities outside of the general bird nesting season (February 1 to August 31) to the extent feasible. If vegetation and structural maintenance during the nesting season is unavoidable, SJRRC or its contractor(s) will retain a qualified wildlife biologist with demonstrated nest-searching experience to conduct pre-activity surveys for nesting birds within 300 feet of the vegetation removal location. Adjacent lands outside the ROW will be scanned with binoculars from Project operations areas, the ROW, and publicly accessible areas. The preconstruction surveys will occur no more than 3 days prior to vegetation removal activities (including removing or trimming vegetation, modifying structures that provide nesting habitat, clearing, grubbing, and staging) at each contiguous vegetation removal area.

If active nests are found in the area to undergo maintenance activities, no-disturbance species-specific buffer zones will be established by the biologist and marked with high-visibility fencing, flagging, or pin flags. No maintenance activities will be allowed within the buffer zones. The size of the buffer will be based on the species' sensitivity to disturbance and planned work activities in the vicinity; typical buffer sizes are 250 feet for raptors and 50 feet for other birds (i.e., passerines). The buffer will remain in effect until the nest is no longer active, as determined by the biologist. Buffers for any nests found outside of the area to undergo vegetation removal but within 250 feet of the vegetation removal location will be established based on the biologist's best professional judgment whether the work would result in nest abandonment. If a lapse in vegetation removal activities of 3 days or longer at a previously surveyed area occurs, another preconstruction survey will be conducted.

After all surveys activities are completed at each continuous vegetation removal area, the biologist will complete a memorandum detailing the survey effort and results and submit the memorandum to SJRRC within 7 days of survey completion.

Mitigation Measure BIO-9.2: Avoid roosting bat impacts during operation and maintenance activities

SJRRC or its contractor(s) will conduct maintenance activities (e.g., operational tree removal and trimming, structure modification or removal) in roosting bat habitat from September 15 to October 30 to the extent feasible to avoid maternity bat roosts, roosting bats in torpor (reduced metabolic function similar to hibernation), or nonvolant (flightless) young. If operational maintenance activities cannot be conducted between September 15 and October 30, SJRRC or its contractor(s) will retain qualified biologists who will examine trees and structures to be removed, trimmed, or modified for suitable bat roosting habitat no more than 2 weeks before conducting the maintenance activity. High-quality habitat features (e.g., large tree cavities, basal hollows, loose or peeling bark, larger snags, palm trees with intact thatch, etc.) will be identified and the area around these features searched for bats and bat signs (e.g., guano, culled insect parts, urine staining, etc.). Riparian woodland, orchards, and stands of mature broadleaf trees should be considered potential habitat for solitary foliage-roosting bat species. Survey methods will be discussed with CDFW prior to the start of surveys.

Measures to avoid and minimize impacts on sensitive bats species will be determined in coordination with CDFW and may include the following.

- Tree removal will be avoided between April 1 and September 15 (the maternity period) to avoid effects on pregnant females and active maternity roosts (whether colonial or solitary).
- Tree removal, tree trimming, structure modification, or removal of trees that provide suitable habitat for bats will be conducted between September 15 and October 30, which corresponds to a time period when bats have not yet entered torpor or caring for nonvolant young.
- Each tree will be removed in pieces rather than felling the entire tree.
- Trees and tree limbs that do not provide habitat will be removed prior to removing trees and limbs that do provide roosting habitat.
- If a maternity roost is located, whether solitary or colonial, that roost will remain undisturbed until September 15 or a qualified biologist has determined the roost is no longer active.
- Passive monitoring using full spectrum bat detectors may be needed if identification of bat species is required.

If avoidance of nonmaternity roost trees is not possible, and tree removal or trimming must occur between October 30 and September 15, qualified biologists will monitor tree trimming and removal. If possible, tree trimming and removal should occur in the late afternoon or evening when it is closer to the time that bats would normally arouse. Prior to removal and trimming, each tree will be shaken gently and several minutes should pass before felling trees or limbs to allow bats time to arouse and leave the tree. The biologists will search downed vegetation for dead and injured bats. The presence of dead or injured bats that are species of special concern, or candidate threatened or endangered species, will be reported to CDFW. The

biologist will prepare a biological monitoring report, which will be provided to the SJRRC and CDFW no more than 30 days following completion of all bat surveys.

Mitigation Measure BIO-9.3: Conduct pre-activity surveys for special-status wildlife species prior to conducting maintenance activities.

SJRRC or its contractor(s) will retain a qualified biologist to conduct a pre-activity survey for special-status wildlife species prior to conducting maintenance activities within suitable habitat for special-status wildlife (i.e., within any undeveloped natural land cover). The pre-activity survey will be conducted immediately prior to the start of maintenance activities. The survey area will include all suitable habitat within the work area boundary plus a 250-foot buffer zone around the work area boundary.

If special-status wildlife species, nest colonies, or floral resources are observed, maintenance activities will not begin until the special-status species passively moves out of the work area and a no-work buffer around nest colonies and floral resources identified during surveys has been established. The size and configuration of the no-work buffer would be based on best professional judgement of a qualified biologist and, at minimum, provide 20 feet of clearance around the resources and maintain a disturbance-free airspace. No herbicides/insecticides will be applied within the no-work buffer, except when applied to cut stumps. Biological monitoring may be required for the duration of the maintenance activity and will be determined by the discretion of the qualified biologist. If special-status wildlife species are observed, the biologist will notify USFWS and CDFW. Following completion of the pre-activity survey, the surveying biologist will prepare a memo describing the survey methods and conditions, summarize the survey effort and results. The memorandum will include any survey data form and or map showing the location of special-status wildlife species observed. The survey memo will be provided to SJRRC.

If special-status wildlife species are not observed, maintenance activities can begin upon completion of the pre-activity survey.

Mitigation Measure BIO-10.1: Model hydraulics of new bridges before construction

SJRRC or its contractor(s) will perform a hydraulic analysis for all new bridge crossings that expand in-water footprints to determine if changes in velocities will occur and identify the most feasible option with the least impact on the geomorphic integrity of the creek. Any change in velocities will be compared to the swimming velocities of the special-status fish species that are present in the waterbody to determine if upstream migration can still occur after the installation of the piles. If velocities would impede fish migration, the bridge design(s) will be changed to reduce velocities that allow migration by reducing the bulk or number of pier structures within stream margins. Additionally, SJRRC or its contractor(s) will involve Regional Water Boards, CDFW, USACE, USFWS, and NMFS in development of scope of work and methodology, analysis of the options, and development of a draft report.

Consistent with Federal Executive Order 13112 on invasive species, when SJRRC or its contractor replaces trees, SJRRC will use native tree species insofar as it is practicable. Within the UPRR ROW, SJRRC will not plant invasive tree species as defined by the California Invasive Plant Council. For replacement of trees outside the UPRR ROW, SJRRC will replant or pay for others to replant trees that are desired by the landowner or local municipality. Landowners may prefer that replacement trees be nonnative trees to match nonnative trees that were removed or to match surrounding vegetation.

Table 3.4-14. Regulated Trees, Relevant Activities, Replacement Requirements, and Recommended Tree Replacement Ratios

Jurisdiction	Definition of Protected Trees	Removal Permit Needed?	Pruning Permit Needed?	Replacement Requirement	Recommended Replacement Ratios
Stanislaus County Code Ordinance CS 442 Section 1 (Stanislaus County 1991)	Any tree within a street (right-of-way).	Yes for protected (street) trees	Yes for protected (street) trees	Not stated, at discretion of Director of Public Works	Inside UPRR ROW: 1:1 for all trees Outside UPRR ROW: 5:1 for protected tree 1:1 for unprotected tree
Street Tree Ordinance of the City of Ceres (City of Ceres 1995)	Any street tree (single upright woody trunk exceeding 15 feet tall when mature with a canopy of 12 feet) in a right-of-way or planting easement.	Yes for protected (street) trees	Yes for protected (street) trees	Replacement trees at a 1:1 ratio, no smaller than 15-gallon	Inside UPRR ROW: 1:1 for all trees Outside UPRR ROW: 1:1 for protected tree 1:1 for unprotected tree
City of Turlock Tree Municipal Code Chapter 7-7 (City of Turlock 2000)	Any street tree in a right-of-way or planting easement (5 feet of parcel frontage).	Yes for protected (street) trees	Yes for protected (street) trees	Replacement trees at a 1:1 ratio of tree on the Street Tree List	Inside UPRR ROW: 1:1 for all trees Outside UPRR ROW: 1:1 for protected tree 1:1 for unprotected tree
County of Merced Code 13.30.040 (Merced County 1999)	Any roadside (street) tree in a road right-of-way.	Yes for protected (street) trees	Yes for protected (street) trees	Not stated, at discretion of Director of Director of Public Works	Inside UPRR ROW: 1:1 for all trees Outside UPRR ROW: 1:1 for protected tree 1:1 for unprotected tree

Jurisdiction	Definition of Protected Trees	Removal Permit Needed?	Pruning Permit Needed?	Replacement Requirement	Recommended Replacement Ratios
City of Livingston Street Tree Regulations Chapter 2 (City of Livingston 2016)	Any street tree in a right-of-way or planting easement (5 feet on either side of right-of-way).	Yes for protected (street) trees	Yes for protected (street) trees	5:1 replacement for protected tree removal with each replacement tree 24-inch box size	Inside UPRR ROW: 1:1 for all trees Outside UPRR ROW: 5:1 for protected tree 1:1 for unprotected tree
City of Atwater Trees Chapter 12.32 (City of Atwater 1991)	Any street tree in a right-of-way or planting easement.	Yes for protected (street) trees	Yes for protected (street) trees	1:1 replacement for protected tree removal with each replacement tree 15-gallon size	Inside UPRR ROW: 1:1 for all trees Outside UPRR ROW: 2:1 for protected tree 1:1 for unprotected tree
Street Tree Ordinance of the City of Merced: Chapter 14.12 (City of Merced 1983)	Any street tree in the road right-of-way of the City or in easements adjacent thereto.	Yes for protected (street) trees	Yes for protected (street) trees	Not stated, at discretion of Director of Recreation and Parks	Inside UPRR ROW: 1:1 for all trees Outside UPRR ROW: 1:1 for protected tree 1:1 for unprotected tree

Notes:
The City of Ripon does not have a tree protection or tree removal ordinance; therefore, the County of San Joaquin Tree Ordinance would be applicable to areas within the City of Ripon.
UPRR = Union Pacific Railroad
ROW = right-of-way

3.5 Cultural Resources and Tribal Cultural Resources

3.5.1 Introduction

This section describes the regulatory and environmental setting for cultural resources in the vicinity of the Proposed Project and the Atwater Station Alternative. It also describes the impacts on cultural resources that would result from implementation of the Proposed Project and the Atwater Station Alternative and mitigation measures that would reduce significant impacts, where feasible and appropriate. Appendix L-1, *Historical Resources Inventory and Evaluation Report*, and Appendix L-2, *Archaeological Inventory Report*, contain additional technical information for this section.

Cultural resources include historic buildings and structures, historic districts, historic sites, prehistoric and historic archaeological sites, and other precontact or historic-aged buildings, districts, objects, sites, and structures and artifacts.[1] *Historical resource* is a California Environmental Quality Act (CEQA) term that includes both archaeological and built cultural resources (described in Section 3.5.4.1, *Methods for Analysis*). Section 3.5.2, *Regulatory Setting,* further defines *historical resources* in relation to their recognition under CEQA. Cumulative impacts on cultural resources, in combination with planned, approved, and reasonably foreseeable projects, are discussed in Chapter 4, *Other CEQA-Required Analysis.*

3.5.2 Regulatory Setting

This section summarizes federal, state, regional, and local regulations related to cultural resources and applicable to the Proposed Project and the Atwater Station Alternative.

3.5.2.1 Federal

Because federal permits would be required for the Proposed Project and the Atwater Station Alternative, compliance with the following applicable laws are required.

- Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code [U.S.C.] 470 et seq.)
- Archaeological and Historic Preservation Act (16 U.S.C. 469–469(c)-2)
- Archaeological Resources Protection Act (16 U.S.C. 470(a)-11)
- American Indian Religious Freedom Act (42 U.S.C. 1996)
- Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3001–3013)
- American Antiquities Act (16 U.S.C. 431–433)

[1] Impacts on paleontological resources, such as vertebrate, invertebrate, or plant fossils, are discussed in Section 7, *Geology and Soils*.

3.5.2.2 State

California Public Resources Code

Archaeological and historical sites are protected pursuant to a wide variety of state policies and regulations, as enumerated under the California Public Resources Code (Cal. Public Res. Code). Cultural resources are recognized as nonrenewable resources and receive additional protection under the Cal. Public Res. Code and CEQA.

- Cal. Public Res. Code Sections 5020–5029.5 continued the former Historical Landmarks Advisory Committee as the State Historical Resources Commission. The commission oversees the administration of the California Register of Historical Resources (CRHR) and is responsible for the designation of State Historical Landmarks and Historical Points of Interest.
- Cal. Public Res. Code Sections 5079–5079.65 define the functions and duties of the Office of Historic Preservation (OHP). The OHP is responsible for the administration of federally and state-mandated historic preservation programs in California and the California Heritage Fund.
- Cal. Public Res. Code Sections 5097.9–5097.991 provide protection to Native American historical and cultural resources and sacred sites and identify the powers and duties of the Native American Heritage Commission (NAHC). These sections also require notification to descendants of discoveries of Native American human remains and provide for treatment and disposition of human remains and associated grave goods.

If Native American human remains are identified within the cultural resources study area (also known as the *CEQA study area*, as defined in Section 3.5.3, *Environmental Setting*) and located on non-federal lands (including private lands), the project must follow the procedures set forth under Section 5097.98.

California Environmental Quality Act

Guidelines for the implementation of CEQA define procedures, types of activities, persons, and public agencies required to comply with CEQA. State CEQA Guidelines Section 15064.5(b) prescribes that project effects that would "cause a substantial adverse change in the significance of an historical resource" are significant effects on the environment. Substantial adverse changes include physical changes to both the historical resource and its immediate surroundings. State CEQA Guidelines Section 15064.5 provides specific guidance for determining the significance of impacts on historical resources (CEQA Guidelines § 15064.5(b)) and unique archaeological resources (CEQA Guidelines § 15064.5(c) and Pub. Resources Code § 21083.2). Under CEQA, these two categories of resources are called "historical resources" whether they are of post-contact or pre-contact age.

CEQA Guidelines define three ways that a property may qualify as a historical resource for the purposes of CEQA review:

1. The resource is listed in or determined eligible for listing in the CRHR. Properties that are listed in or eligible for listing in the NRHP are considered eligible for listing in the CRHR and thus are significant historical resources for the purpose of CEQA (Cal. Public Res. Code 5024.1(d)(1)).
2. The resource is included in a local register of historical resources, as defined in Cal. Public Res. Code Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of Cal. Public Res. Code Section 5024.1(g), unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

3. The lead agency determines the resource to be significant, as supported by substantial evidence in light of the whole record (14 Cal. Code Regs., Division 6, Chapter 3, 15064.5(a)).

California Register of Historical Resources

Cal. Public Res. Code Section 5024.1 establishes the CRHR, which is a list of all California properties considered by CEQA to be significant historical resources. The CRHR also includes all properties listed or determined eligible for listing in the National Register of Historic Places (NRHP), including properties evaluated under Section 106 of the NHPA.

The CRHR regulations govern the nomination of resources to the CRHR (Title 14 of the California Code of Regulations [Cal. Code Regs.] § 4850). The regulations set forth the criteria for eligibility, as well as guidelines for assessing historical integrity and resources that have special considerations. The criteria for listing in the CRHR are similar to those of the NRHP. A historical resource may be determined to be significant at the local, state, or national level under one or more of the following four criteria to be eligible:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage
2. Is associated with lives of persons important in our past
3. 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
4. Has yielded, or may be likely to yield, information important in prehistory

Aside from meeting at least one CRHR criterion, a potential historical resource must also retain its historic integrity. The CRHR definition of "integrity" and its special considerations for certain properties are slightly different than those for the NRHP. Integrity is "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance." The CRHR further states that eligible resources must "retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance," and lists the same seven aspects of integrity used for evaluating properties under the NRHP criteria (Office of Historic Preservation 2001).

California Health and Safety Code—Treatment of Human Remains

Under Section 8100 of the California Health and Safety Code (Health & Saf. Code), six or more human burials at one location constitute a cemetery. Disturbance of Native American cemeteries is a felony (Health & Saf. Code 7052).

Section 7050.5 of the Health & Saf. Code requires that construction or excavation be stopped in the vicinity of discovered human remains until the county coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must then contact the NAHC, which has jurisdiction pursuant to Cal. Public Res. Code Section 5097.

Assembly Bill 52

AB 52 (Chapter 532, Statutes of 2014) establishes a formal consultation process for California Native American tribes as part of CEQA and equates significant impacts on tribal cultural resources with

significant environmental impacts (Public Resources Code [PRC] Section 21084.2). PRC Section 21074 defines tribal cultural resources as follows:

- Sites, features, places, sacred places, and objects with cultural value to descendant communities or cultural landscapes defined in size and scope that are:
    - Included in or eligible for listing in the California Register of Historical Resources (CRHR); or,
    - Included in a local register of historical resources.
- 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 PRC Section 5024.1.

Sacred places can include Native American sanctified cemeteries, places of worship, religious or ceremonial sites, and sacred shrines. In addition, both unique and non-unique archaeological resources, as defined in PRC Section 21083.2, can be tribal cultural resources if they meet the criteria detailed above. The lead agency relies upon substantial evidence to make the determination that a resource qualifies as a tribal cultural resource when it is not already listed in the CRHR or a local register.

AB 52 defines a "California Native American Tribe" (Tribe) as a Native American tribe located in California that is on the contact list maintained by the Native American Heritage Commission (PRC Section 21073). Under AB 52, formal consultation with Tribes is required if a Tribe has previously requested to be informed by the lead agency of proposed projects and if the Tribe, upon receiving notice of the project, accepts the opportunity to consult within 30 days of receipt of the notice. AB 52 also requires that consultation, address project alternatives and mitigation measures for significant effects, if specifically requested by the Tribe. Any information submitted by a Tribe during the consultation process is considered confidential and is not subject to public review or disclosure. It will be published in a confidential appendix to the environmental document unless the Tribe consents to disclosure of all or some of the information to the public.

The notice of preparation (NOP) for the Proposed Project was issued on January 10, 2018, as such this project is subject to the requirements of AB 52.

3.5.2.3 Regional and Local

SJRRC, a state joint powers agency, proposes improvements located within and outside of the Union Pacific Railroad (UPRR) right-of-way (ROW). The Interstate Commerce Commission Termination Act (ICCTA) affords railroads engaged in interstate commerce considerable flexibility in making necessary improvements and modifications to rail infrastructure, subject to the requirements of the Surface Transportation Board.[2] ICCTA broadly preempts state and local regulation of railroads and this preemption extends to the construction and operation of rail lines. As such, activities within the UPRR ROW are clearly exempt from local building and zoning codes and other land use ordinances. The Proposed Project outside of the UPRR ROW and the Atwater Station Alternative, however, would be subject to regional and local plans and regulations. Though ICCTA does broadly preempt state and local regulation of railroads, SJRRC intends to obtain local agency permits for construction

[2] ACE operates within a ROW and on tracks owned by the UPRR, which operates interstate freight rail service in the same ROW and on the same tracks.

of facilities that fall outside of the UPRR ROW even though SJRRC has not determined that such permits are legally necessary and such permits may not be required.

Appendix G of this EIR, *Regional Plans and Local General Plans*, provides a list of applicable goals, policies, and objectives from regional and local plans of the jurisdictions in which the Proposed Project and the Atwater Station Alternative are located. Section 15125(d) of the CEQA Guidelines requires an environmental impact report to discuss "any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans." These plans were considered during the preparation of this analysis and were reviewed to assess whether the Proposed Project and the Atwater Station Alternative would be consistent[3] with the plans of relevant jurisdictions. The Proposed Project and the Atwater Station Alternative would be generally consistent with the applicable goals, policies, and objectives related to cultural resources identified in Appendix G.

3.5.3 Environmental Setting

This section describes the environmental setting related to cultural resources by geographic segment for the Proposed Project and the Atwater Station Alternative. For the purposes of this analysis, the CEQA study area for cultural resources is referred to the *study area* for both archaeological resources and built environment resources. The information presented in this section is summarized from Appendix L-1 and Appendix L-2.

The study area for cultural resources is defined as follows.

- The study area for archaeological resources is the environmental footprint of the Proposed Project and the Atwater Station Alternative and consists of those areas affected by physical changes, including both horizontal surface disturbance and vertical subsurface disturbance.
- The built environment resources study area primarily falls within an existing railroad right of way that connects the cities of Ceres, Turlock, Livingston, Atwater, and Merced through predominantly agricultural land.

  The area of direct impact was delineated to include all impacts on built-environment historical resources that may result from construction and operation of the Proposed Project and the Atwater Station Alternative. Physical, visual, auditory, and vibrational impacts are considered potential direct impacts because these all have the potential to alter the resource or its immediate surroundings such that its historical significance would be impaired.

  The area of direct impact includes the environmental footprint for the Proposed Project and the Atwater Station Alternative, which includes all of the demolition and construction activities.

  In addition to the environmental footprint, the area of direct impact generally extends one parcel around proposed above-grade features to account for potential visual, atmospheric, or audible impacts. The exceptions to the one parcel buffer around new proposed project facilities include the following conditions:

  - Where substantial linear features, such as waterways, roadways, or railroad tracks separate project features from nearby built-environment resources, the area of direct impact does

[3] An inconsistency with regional or local plans is not necessarily considered a significant impact under CEQA, unless it is related to a physical impact on the environment that is significant in its own right.

not extend the one parcel buffer from the facility, unless there was a compelling reason to do so.

- The installation of new railroad tracks, within the existing railroad right of way, does not require a one-parcel buffer surrounding the project area to account for potential impacts. The installation of an additional parallel track within the existing right of way does not have the potential to impact built-environment cultural resources that already have an extant railroad within the setting because such changes would be consistent with the visual, atmospheric, or audible setting that existed during the historic period.
- The one-parcel boundary does not extend around all proposed built features where the existing setting was already altered and the proposed changes are consistent with the existing setting. Specifically, the built-environment study area does not include a one-parcel boundary around new parking lots where the proposed parking lot replaces existing paved areas or modern buildings and where the setting is already significantly altered.

The study areas for archaeological resources and built environment resources for the Proposed Project and the Atwater Station Alternative are provided in Appendices L-1 and L-2.

This section also includes a general discussion of the research conducted and methods employed for the technical reports (Appendices L-1 and L-2) that aid in the analysis of cultural resources. The records search conducted for the technical reports included a review of previously conducted cultural resources studies and recorded archaeological and built environment resources. This research also informed the prehistoric, ethnographic, and historic settings for cultural resources within the region where the Proposed Project and the Atwater Station Alternative are located. Detailed descriptions of known archaeological and built environment CEQA resources within the study area are presented in Section 3.5.3.3, *Summary of Known CEQA Historical Resources and Unevaluated Resources*.

3.5.3.1 Cultural Resource Data Sources

Archaeological Resources

Records Search

ICF cultural resources staff performed an on-site records search at the California Historical Resources Information System (CHRIS) at the Central Coast Information Center (CCIC) on February 7, 2018. An updated records search was conducted by CCIC staff on July 7, 2020. For the purposes of this analysis the records search study area was defined as the environmental footprint for Proposed Project and the Atwater Station Alternative, plus a 0.25-mile search radius.

The archaeological study area has been subject to 56 cultural resources studies. Two of these studies identified archaeological resources within the archaeological study area and are included in Table 3.5-1.

Table 3.5-1. Cultural Resources Studies that Identified Archaeological Resources in the Archaeological Study Area.

Study Number	Author	Date	Title	Findings
ME-02759	B. Hatoff, B. Voss, S. Waechter, S. Wee, and V. Bente	1995	*Cultural Resources Inventory Report for the Proposed Mojave Northward Expansion Project; Final. [multivolume report]*	This study identified P-24-000087 adjacent to the APE.
ST-03995	W.J. Nelson	2000	*Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project; Segment WS04: Sacramento to Bakersfield.*	This study identified P-50-001923 (CA-STA-420H) within the study area

Two resources with archeological components were identified within or immediately adjacent to the APE (Appendix L-2). These resources are included in the Table 3.5-2.

Table 3.5-2. Archaeological Resources within or Adjacent to the Archaeological Study Area.

Primary	Trinomial	Significance (as per record)
P-24-000087	N/A	This resource has been determined ineligible for listing to either the CRHR or the NRHP.
P-50-001923	CA-STA-420H	This resource has not been formally evaluated for listing to either the CRHR or the NRHP.

An additional four resources with archaeological resources were identified within 0.25-mile of the archaeological study area. These resources consist of concrete foundations associated with residential and agricultural buildings. All four resources have been heavily impacted and partially removed by the expansion of the Highway 99.

Desktop Geoarchaeological Review

Geoarchaeological research was performed through a geologic and archaeological literature review. The purpose of the geoarchaeological sensitivity model was to identify portions of the archaeological study area with elevated archaeological sensitivity. Two models were developed that represent where Project-related ground disturbance has the potential to encounter previously undocumented archaeological sites. The buried site potential model focuses on the landform age and depositional context. This model indicated that those portions of the archaeological study area that were located on Holocene-aged depositional landforms or located in areas within 1,000 meters of a fresh water source and on a relatively level gradient were considered to have elevated buried archaeological sensitivity.

The geoarchaeological model indicates that 15 percent of the archaeological study area has elevated sensitivity for containing buried archaeological resources, and 28 percent of the archaeological study area has elevated potential to contain archaeological resources regardless of whether they are surface exposed or buried.

The majority of the archaeological study area maintains moderate sensitivity for buried archaeological resources. In a few areas, the archaeological study area—particularly in the vicinity of the Merced River, Bear Creek, the Jordan Canal in Atwater, and areas between Atwater and Merced—retains both general sensitivity for the presence of prehistoric archaeological resources

(i.e., close to fresh water, flat to gently sloping topography) and sensitivity for buried archaeological resources (i.e., presence of Holocene-aged alluvial landforms).

A detailed description and geoarchaeological sensitivity figures are included in Appendix L-2.

Pedestrian Survey

To complete the identification of archaeological resources in the study area, reconnaissance surveys were completed by ICF archaeologists. A pedestrian survey was conducted during the periods of June 8-11 and 15-17, 2020. Due to the location of portions of the Proposed Project on active rail lines, the survey was conducted outside of the active track with special care taken not to affect the track. The survey was not conducted in areas that were inaccessible in this manner. Outside of the UPRR ROW, these area were surveyed from public ROW, where possible.

During survey, the ground surface was examined for indications of archaeological resources. The general morphological characteristics of the ground surface were inspected for indications of subsurface deposits that may be manifest on the surface, such as ditch banks and road cuts. Whenever possible, the locations of subsurface exposures caused by such factors as rodent activity, water or soil erosion, or vegetation disturbances were examined for artifacts or for indications of buried deposits. Ground visibility was generally poor, with much of the Proposed Project area covered by railroad ballast. No subsurface investigations or artifact collections were undertaken during the pedestrian survey. The survey did not result in the identification of archaeological resources.

Native American Consultation

SJRRC is not aware of any notification submitted to the agency from local California Native Americans tribes requesting consultation on individual projects. However, the agency recognizes that the tribal communication and input important for identifying archaeological and tribal cultural resources. Out of an abundance of caution, the SJRRC requested a list of local California Native American tribal groups with cultural affiliation with the geographic region of the Project. On June 9, 2020, ICF contacted the NAHC to request a review of the Sacred Lands File and a list of individuals who may have information or interest regarding the Project. The request contained location details, Project maps, a general description of the Project, and a request for any additional information they may have about potential archaeological resources or sensitive areas within the archaeological study area. The NAHC responded on June 10, 2020, with a list of four Native American contacts. The NAHC also noted that a search of the Sacred Lands File did not indicate the presence of sacred lands in the vicinity of the archaeological study area.

Letters containing Project details and a location map were sent to the following individuals:

- William Leonard, Chairperson – Southern Sierra Miwuk Nation
- Valentin Lopez – Amah Mutsun Tribal Band
- Timothy Perez, MLD Contact – North Valley Yokuts Tribe
- Katherine Perez, Chairperson – North Valley Yokuts Tribe

Letters were sent via email to Mr. Lopez, Mr. Perez, and Ms. Perez and via certified letter to Mr. Leonard. These letters are considered formal notification of a proposed project as required under CEQA, specifically Public Res. Code Section 21080.3.1 and Chapter 532 Statutes of 2014 (Assembly

Bill 52). None of the tribal groups notified requested to consult of the project. A record of this correspondence can be found in Appendix L-2.

Built Environment Resources

Cultural resources staff conducted background research to identify known, previously recorded, or evaluated historic-period properties in the built-environment study area. Staff reviewed the records search results from the CCIC as well as previously completed surveys and reports, historic maps, and historic property databases/historical resource inventories. Additional background research included a review of listed historical resources on the OHP website (such as the listings of the California Historical Landmarks, Points of Historical Interest, and CRHR listings), California Department of Transportation Historic Bridge Inventory, local agency register listings, State Historical Resource Commission minutes, and NRHP listings on file with the National Park Service.

Cultural resources staff sent letters requesting information concerning historical resources located in or near the built-environment study area to various groups, including local special interest groups, historical societies, preservation groups, archives, and genealogical organizations in January 2020. One response was received requesting additional mapping and cultural resources staff provided the requested mapping. No other responses have been received. Archival and historic research was conducted using published literature on local and regional history, cultural resource databases, archive and library collections, and online resources regarding the history of the built-environment study area and Central Valley region. Due to the constraints associated with the COVID-19 pandemic, no in-person research was conducted at any archival repositories.

Built environment reconnaissance surveys for the Proposed Project and the Atwater Station Alternative were completed by individuals who meet the professional qualifications under the SOI's Standards for Architectural History and History. Built environment surveys were completed on June 12, 2020 and January 19, 2021.

3.5.3.2 Prehistoric, Ethnographic, and Historic Conditions

The following prehistoric and ethnographic sections are summarized from Appendix L-2. Historic overview sections are summarized from Appendix L-1. The Proposed Project traverses and is located in two counties (Stanislaus and Merced Counties), five incorporated cities (Ceres, Turlock, Livingston, Atwater, Merced), and unincorporated county areas within the Central Valley.

Prehistoric Setting

The Central Valley is a very large and flat valley located between the Siskiyou Mountains on the north and Tehachapi Mountains on the south. It extends approximately 430 miles from north to south and averages around 50 miles in width. It is divided into two major physiographic provinces, which are separated by the Delta. The Sacramento Valley, drained by the southward-flowing Sacramento River, lies to the north, and the San Joaquin Valley, drained by the northward-flowing San Joaquin River, lies to the south (Alt et al. 2016). The presence of this abundant fresh water has resulted in a well-watered region, one of the most diverse and productive environmental zones in California (Rosenthal et al. 2007:147).

The archaeology of the Central Valley is as varied as the area is extensive, including a full range of hunter-gatherer adaptations from the earliest, technologically conservative, low-density colonizers to the most recent, technologically elaborate, and densely packed populations that were present at

historic contact (Rosenthal et al. 2007:147). While the comparative framework for Central Valley archaeology established by Bennyhoff and Fredrickson (1994) and Fredrickson (1973, 1974) is designed to incorporate a wide range of local and regional traditions, it has not been systematically applied outside the Sacramento Valley. As a result, the following discussion uses a simple classification based on Fredrickson's (1973, 1974) California adaptation of the Willey and Phillips (1958) period and stage integrative scheme, which includes the Paleo-Indian, Lower Archaic, Middle Archaic, Upper Archaic, and Emergent periods.

Archaeological deposits associated with the Paleo-Indian (cal 11,550–8500 B.C.) Pleistocene landscape have been either destroyed or buried beneath more recent alluvial deposits (Rosenthal et al. 2007:151; White 2003b), but basally thinned and fluted projectile points (cal 11,500 and 9550 B.C.) found at scattered surface locations offer evidence of human occupation in the Central Valley (Rosenthal et al. 2007:151). Following the Paleo-Indian Period, the Lower Archaic (cal 8500–5550 B.C) was characterized by mostly isolated finds, including stemmed points, chipped stone crescents, and early concave base points found along ancient shores (Fenenga 1992; Wallace and Riddell 1991), but few sites dating to this period have been identified in the Central Valley. During the Middle Archaic (cal 5550–550 B.C.) the climate became warmer and drier (Rosenthal et al. 2007:152), and sites suggest sedentism, as indicated by refined and specialized tool assemblages and a wide range of non-utilitarian artifacts, abundant trade objects, and plant and animal remains indicative of year-round occupation (Moratto 1984; Ragir 1972; Schulz 1970, 1981; White 2003a, 2003b). The Upper Archaic (cal 550 B.C–A.D. 1100) is characterized by another change in climate conditions—this time to a cooler, wetter, and more stable climate, and the subsequent development of new technologies, including new types of bone tools and bone implements, and widespread manufactured goods such as Haliotis (abalone) ornaments and ceremonial blades (Bennyhoff and Fredrickson 1994; Fredrickson 1974; Moratto 1984).

During the Emergent Period (cal A.D. 1000 to historic) a relatively stable climate compared to the earlier periods emerged and is associated with the use of the bow and arrow over the dart and atlatl (Bennyhoff 1994). Increased variation in burial types and furnishings suggests more complex social developments (Atchley 1994; Bennyhoff and Fredrickson 1994; Milliken and Bennyhoff 1993). Other characteristics of the Emergent Period include increasingly varied subsistence practices, a greater distribution of raw obsidian cobbles (as opposed to central biface manufacturing facilities), and a decentralization in the production of shell beads (Rosenthal et al. 2007:159).

Ethnographic Setting

The Northern Valley Yokuts are the historical occupants of the central and northern San Joaquin Valley, and their territory extended from near where the San Joaquin River makes a big bend northward to a line midway between the Calaveras and Mokelumne Rivers (Wallace 1978:462). Villages were typically located along primary water sources, such as the San Joaquin River, and the Northern Valley Yokuts gained much of their livelihood through fishing, hunting waterfowl, and harvesting of acorns, tule root, and seeds (Wallace 1978:464). Most settlements, or at least the principal ones, were built atop low mounds, on or near the banks of large watercourses, for protection against spring flooding (Schenck 1926:132; Schenck and Dawson 1929:308; Cook 1960:242, 259, 285). Each tribe had a headman, and populations averaged around 300 people. Family houses were round or oval, with a conically shaped pole frame sunk into the ground and covered with tule mats, and each village typically had a community lodge and a sweathouse (Wallace 1978:465).

The Northern Valley Yokuts suffered great population decline and cultural breakdown when they were drawn into the mission system. Compelled to work at unfamiliar tasks and subjected to the severe discipline of mission life, many of the neophytes deserted the missions and returned to their traditional homes, from which they were usually brought back, by force when necessary (Wallace 1978:468). The Northern Valley Yokuts population were nearly decimated due to exposure to European-borne diseases and harsh living conditions. Descendants of these groups are active in maintaining their traditions and advocating for Native American issues today.

San Joaquin Valley Historic Overview

Early European exploration of the coastal and inland trade routes of what became California began in the 1500s, but more than a century passed before Spain mounted a concerted colonization effort. The historical era in California begins with Spanish colonization and is often divided into three distinctive chronological and historical periods: the Spanish or Mission Period (1542–1821), the Mexican or Rancho Period (1821–1848), and the American Period (1848 to the present). After Mexican independence in 1821, rule transitioned to the newly established country of Mexico. The United States took control of California after the Mexican-American War in 1848 with the signing of the Treaty of Guadalupe Hidalgo. California became a state in 1850, and the development patterns in the state during the late nineteenth century were characterized by increases in agricultural ventures, ranching, mining, and settlement.

Explorers, soldiers, missionaries, and ranchers characterized Spain's colonization effort, although the realities of settling a remote region repeatedly undermined Spain's theory and official policy on colonization (Rice et al. 1988). The Spanish government and subsequently the Mexican government issued rancho land grants to reward soldiers, promote settlement in California, and encourage agricultural and ranching enterprises. However, as late as the 1840s, after almost a century of effort, the region's economy remained colonial, its institutions fragmented, its military power negligible, and its population sparse (Rice et al. 1988). The bulk of the more than 800 rancho grants were bestowed during the Mexican Period (Perez 1996).

Although exploration of the San Joaquin Valley occurred in the latter half of the Spanish period between 1772 and 1817, it was not until the Mexican Period that Europeans and Euroamericans began settling in the region (U.S. Bureau of Land Management 2011). Within the study area, there are no built environment features that still exist in the San Joaquin Valley overlaps with the study area. Rancho Pescadero-Grimes, established in 1843, is in San Joaquin County near the present-day community of Tracy from the Spanish or Mission Period (1542–1821) or the Mexican or Rancho Period (1821–1848).

Railroads

At the start of the American Period, development and new settlement in California were concentrated north of the San Joaquin Valley as a result of the Gold Rush, which began in 1848. Settlement increased in the San Joaquin Valley when the Transcontinental Railroad was constructed through the area in 1869. The railroad provided easy passenger travel and efficient commercial transport of goods to and from large urban centers such as San Francisco and Sacramento. In San Joaquin County, Lathrop and Manteca were major railroad stops by 1871 and 1873, respectively, and Tracy, located west of the CEQA study area, was established in 1882 around the junction of three rail lines—the San Francisco Bay Area (Bay Area) to San Joaquin County line, the northern line to Martinez County, and the southern line to Los Angeles. In Stanislaus County, several communities

developed along the railroad, including Salida (1869), Modesto (1870), Turlock (1871), and Ceres (1874).

Construction of the San Joaquin Valley mainline of the Southern Pacific Railroad (SPRR), which was originally known as the San Joaquin Valley Railroad, began in 1869. The railroad branched off the transcontinental line at the newly established town of Lathrop in San Joaquin County. From 1870 to 1880, the population of the San Joaquin Valley increased by 40 percent (U.S. Census Bureau 1900), and the SPRR established 50 stations in the San Joaquin Valley, 24 of which became town sites. Eight of those sites became major towns, including Modesto, Turlock, and Merced (Carothers 1934; Angermeier 1968; Smith 1976). Other railroads also were important to the area including the Tidewater Southern Railway, the Western Pacific Railroad, and the Central Pacific Railroad. The emerging rail networks enabled the San Joaquin Valley communities to expand and thrive, although the shift from locomotive to truck transport during the mid-1900s caused a decline in growth. However, beginning in the 1970s, growth from the Bay Area spurred another wave of development for the region.

Agriculture and Irrigation

Several irrigation districts were established in the San Joaquin Valley throughout the late nineteenth and early twentieth centuries. Irrigation districts during this time were cooperative public and private entities with large geographic territories established to overcome water distribution problems and boundary limitations established by cities and municipalities. Several of those districts are relevant to this study, including the South San Joaquin Irrigation District in San Joaquin County; the Turlock Irrigation District (TID) and Modesto Irrigation District (MID) in Stanislaus and Merced Counties; and the Merced Irrigation District in Merced County.

Local farmers established the South San Joaquin Irrigation District in 1909 (South San Joaquin Irrigation District 2016). The district serviced the surrounding communities of Escalon, Manteca, and Ripon, and sought to secure additional water resources and further develop the irrigation and water supply system.

The TID and MID were formed to serve the northern portion of the San Joaquin Valley in Stanislaus and Merced Counties. The TID principally supplied Turlock and the MID primarily served Modesto. Construction of canals, dams, and other ditches were undertaken following the districts' formation in 1887; however, building the entire system was a slow process. By 1909, over 100,000 acres were irrigated within the TID (Truth Publishing Company 1909). Similarly, with obstacles to development removed, the MID was able to complete construction of the Modesto Dam in 1911 and create 152 miles of canals and 44 miles of drainages between 1904 and 1919 (Adams and Bedford 1921).

The Merced Irrigation District was created in 1919, although irrigation in southern Merced County began nearly 25 years earlier. Under the ownership of C.H. Huffman, a prominent local farmer, and Charles F. Crocker, a banker and railroad magnate, miles of canals were constructed, and irrigation was provided from Livingston to Merced, totaling almost 50,000 acres (Merced Irrigation District 2016). In 1922, the Merced Irrigation District purchased the current system from the Crocker-Huffman Land and Water Company. After the purchase, the district began several projects, including the construction of the district's first dam, the Exchequer Dam (completed in 1926), providing hydroelectric power, and extending the canal system (Merced Irrigation District 2016; Office of the Federal Registrar 1970). During the 1960s, the district was able to secure a license from the Federal Power Commission to expand power and irrigation networks along the Merced River, resulting in

the construction of the second Exchequer Dam in 1964 and the McSwain Dam in 1967 (Merced Irrigation District 2016).

Early Manteca farmers grew melons from the sandy soils until the South San Joaquin Irrigation District diverted water from the Stanislaus River in 1914, which enabled crop diversity with almonds, walnuts, alfalfa, grapes, and pumpkins. In Stanislaus County, wheat production in Turlock was declining at the turn of the century because grain production had exhausted the once-fertile soil. With the completion of new dams and system of canals, different crops were grown and renewed the region's agricultural success. Similarly, Modesto farmers transitioned from alfalfa fields to fruit orchards and vineyards, many of which still dominate the landscape today as a result of the 1904 construction of several laterals (drainage canals and irrigation canals) by the MID. Irrigation in Merced County enabled expansion of its grain-heavy agricultural industry to the cultivation of grapes, peaches, plums, citrus fruits, olives, figs, nuts, and a variety of vegetables.

The diversification and intensification of farming in the San Joaquin Valley led to large agricultural communities being established during the twentieth century. In addition to being able to grow a wide variety of crops in the state, California was also quickly becoming the cattle and dairy hub of the American West.

Highways and Roads

Several early-twentieth-century state highways were important to the development and growth of the San Joaquin Valley. Perhaps the most important is State Route (SR) 99, designated in 1926. During the early twentieth century, plans were made to connect different parts of California with a state highway system, which included a route from the Oregon state line through the Sacramento and San Joaquin Valleys to Los Angeles. The adoption of the interstate system and construction of Interstate (I-) 5 and other interstate routes during the 1960s truncated SR 99, which now runs from near Wheeler Ridge in Kern County to Red Bluff in Tehama County.

Automobiles and the construction of state highways, particularly SR 99 and later I-5, were contributing factors to the growth and development of the San Joaquin Valley during the twentieth century. SR 99 was a major roadway that connected San Joaquin Valley agricultural towns to larger urban markets. This roadway became especially important when the transportation of goods transitioned from freight to refrigerated trucks. By the 1960s, I-5 offered a more direct route through the state between San Diego and the Oregon border (California Highways 2016b).

As part of the state highway system, a road connecting Oakland in the Bay Area with Stockton in the San Joaquin Valley was planned via Altamont Pass. In 1957, the Bureau of Public Roads approved plans for the North Tracy Bypass connecting I-5 and I-580 along the northern border of Tracy west of the study area (California Highways 2016a). Construction of the new I-205 freeway was completed and opened to traffic in 1970.

World War II–Era Industry and Postwar Development

Transit networks connected the San Joaquin Valley to the rest of the nation and the world, enabling the region to play a major role in World War II efforts. War-related industries and activities brought thousands of people to the San Joaquin Valley. Established in 1942, the San Joaquin Depot had distribution facilities at three separate locations—Tracy, Sharpe (Lathrop), and Stockton's Rough and Ready Island (California Military Department 2016). The depots received, stored, and shipped supplies throughout the United States and the Pacific overseas combat areas.

During World War II, the government-ordered wartime internment of Japanese Americans depleted Japanese-American communities across the United States. Japanese-American internees were evacuated and taken to temporary assembly centers where they were processed and later relocated to larger internment camps. Temporary assembly centers for Japanese-American internees were established throughout the San Joaquin Valley in Stockton, Turlock, Salinas, Merced, Fresno, and Tulare, one of which overlaps with the study area in Turlock. The Stanislaus County Fairgrounds in Turlock operated as a temporary assembly center from April to August 1942. Over 3,500 detainees from the Sacramento River Delta and Los Angeles areas were held at this location before being transported to a permanent internment camp in Gila, New Mexico (Burton et al. 2000).

New agricultural, industrial, and real estate industries emerged in San Joaquin, Stanislaus, and Merced Counties after the war and resulted in residential and population growth. Since then, the San Joaquin Valley has experienced sporadic periods of residential development; however, the landscape has generally maintained its rural character since the 1960s.

House Trailers, Mobile Homes, and Manufactured Homes

House trailers, mobile homes, and manufactured homes reflect various forms of prefabricated or site-fabricated housing that collectively emerged as viable, affordable alternatives to permanent homeownership in the post-World War II era. Although popular and manufactured in high volumes in California from the 1940s through the 1970s, these forms of housing were an outgrowth of the moveable recreational dwellings that have enjoyed popularity since the 1930s. Such "house trailers" had metal chassis that allowed them to be towed from place to place. Although they had modest amenities compared to permanent houses, housing demand after World War II—the time in which Minimal Traditional and Ranch homes were built en masse across California—prompted families to consider temporarily living in house trailers. House trailers were inexpensive compared to even the lower end of the permanent housing market spectrum, but their primary appeal during this time was the transitional residential option they offered. House trailers formed "camps" or "parks" in undesirable locations on the outskirts of cities and towns, where zoning regulations allowed. The resulting boom of trailer construction through the 1950s led to the state Division of Housing establishing guidelines for the organization and operation of trailer parks, which the Division of Housing hoped would inform municipal standards for permitting such developments (SurveyLA 2016:4–8, 10).

As such developments proliferated across California, the house trailer began to gain legitimacy as a permanent housing option. Trailer manufacturers updated their designs to reflect more of the trappings of a permanent home. Trailer homes of the 1950s had porches, integrated restrooms, and more sophisticated doors and windows. To provide additional living space, designers expanded the standard 8-foot length for some models to 10 feet. This significant shift coincided with a new "mobile home" classification—a distinct form of housing manufactured with wheels connected to a chassis but intended to be moved only to its receiving site and not relocated further. Accordingly, mobile home parks increased their available lot sizes, provided basic utilities, introduced curvilinear streets, and promoted landscaping to better replicate the feeling of a contemporaneous, more traditional housing tract (SurveyLA 2016:9–11).

By the late 1960s, mobile homes housed more than 6 million Americans. Despite their popularity and affordability, a social stigma against mobile homes persisted. Manufacturers developed designs for a new housing type, the "modular home" or "manufactured home," intended to remain on a single site, rather than be conveyed behind a vehicle. Manufactured homes lacked wheels. The

components of each home were generally shipped to the owner's parcel and quickly assembled on-site (SurveyLA 2016:11–12).

Auto-Oriented Roadside Commercial Architecture

The automobile's arrival permanently transformed the landscape of the United States. Quick expansion of roadway systems changed both the way the country's residents and visitors traveled as well as how they shopped. From shopping malls to highway attractions with 50-foot-tall signage, auto-oriented commercial architecture evolved in concert with transportation development to become a ubiquitous building type throughout the United States.

The commercial architecture positioned near roadways changed rapidly in the twentieth century. Influential lobbying groups encouraged lawmakers to enhance auto-oriented infrastructure and move away from rail lines—a decision that gave travelers the ability to stop and go at their leisure, making them an emergent target demographic for advertisers and business owners. Municipal governments began privileging the automobile over pedestrians through widening streets and installing directional lights. Dense, walkable "Main Streets" gave way to large thoroughfares, which changed how people traveled and where they shopped (Liebs 1995:16–17).

Once roadway improvements made automobile travel more feasible, roadside businesses targeting this traffic proved their viability during the 1920s and into the Great Depression. Commercial development persisted in areas like the Miracle Mile in Los Angeles—an iconic strip running from downtown Los Angeles to Santa Monica—while roadside shacks offered cross-country migrants places to rest, eat, and service their vehicles (Liebs 1995:20–21). Sizeable postwar investment into the interstate system and suburbanization solidified the nation's relationship to the automobile and its role in commercial activities. In the words of landscape historian Chester H. Liebs: "By the early 1950s, almost anything could be bought along the roadside" (Liebs 1995:5).

As roads and highways proliferated in the first decades of the twentieth century, they connected communities and encouraged longer-range travel. Alongside this expansion came the growth of roadside commercial enterprises. Within this environment, businesses had defined land use and siting criteria, including setbacks, driveways, and parking lots to ensure drivers could easily and safely access them. Along cluttered frontage roads, programmatic architecture became advantageous. Although few examples remain, California, in particular, was once home to buildings shaped like hats, shoes, and animals to advertise a service or a product or to simply attract attention (Society for Architectural Historians 2020; Novak 2012).

Consumers' increased reliance on the automobile resulted in architects creating elongated building forms utilizing architectural elements from Art Deco. Designers stretched shops, motels, gas stations, and restaurants along blocks and incorporated large bay windows to make goods visible from roadways. Dramatic rooflines, unique building massing, bright color palettes, and large expanses of glass became common along roadways, notably embodied in mid-century Googie architecture. Highly stylized Googie restaurants and coffee shops with large, bright signs attracted automobiles from highways and roadways throughout the country (Society of Architectural Historians 2020; Novak 2012).

In remote areas alongside interstate highways small groupings of auto-oriented modern architecture are ubiquitous, contributing to the character of roadsides across the United States. These buildings vary in mass and shape and rely on both building form and conspicuous signage to attract drivers. Business chains use uniformity across the country to ensure passing travelers

quickly recognize a familiar restaurant or gas station. Roadside outdoor attractions use classic campground architectural tropes, such as wooden A-frame buildings, whereas novelty gift shops or museums use programmatic buildings or large statues to advertise their goods or present travelers with a photo opportunity. In thinly inhabited regions, property owners still use such buildings formerly located along two-lane highways that predate the interstate system.

Gas and Service Stations

Like gas stations, automobile service stations evolved during the early twentieth century. First referred to as service stations in 1910 and operated by large automobile companies, blacksmiths, or independent shop owners, these auto repair stations were initially separate from gas fueling stations. By the 1920s, as automobile ownership increased, service stations could not keep up with demand. Gas filling stations incorporated auto repair elements like grease pits, flat tire repairs, and replacement parts, to their available services. At the end of the 1920s, "the gas station was evolving into a hybrid of filling station and repair garage, and the neighborhood service station was born" (Liebs 1995:102). In the late 1920s, hybrid gas-and-service stations often contained two buildings, forming an L- or U-shaped station surrounding a central gas pump station, a short-lived layout. By the start of the Depression, the gas and service station format was condensed into one building, with pumps on the building's exterior. Often, these buildings had a rectangular footprint and included an office, utility room, restroom, and space for auto servicing. Shortly after, pumps were moved away from the main building and onto an adjacent island to shift cars away from the building's exterior and provide more space. By the late 1930s, gas and service stations, such as Texaco, utilized both the Streamline Moderne and International architectural styles to display services to motorists through large storefront windows, with service bays located within a box station or oblong box building. Large windows allowed motorists to view auto repair supplies, such as cans of oil and stacks of tires, and service bays displayed car maintenance in action. Signage also played a notable role in advertising gas-and-service station services. Stations often labeled bays with signage for washing or lubrication or the names of other services. Stations of this era typically contained parallel streamlines that wrapped around the building's upper façades or parapets. Although the popular gas and service stations included full automobile services, some were built without pumps; these office-only stations cost less to construct (Liebs 1995:102–106).

Starting in the 1950s, a stepped design for service stations came into fashion. With these designs, the service station was taller than the office portion of the building. This architectural development served a utilitarian function; the greater height of the service station accommodated a hydraulic car lift—a system first patented in 1925. Similar to gas stations, many of the service stations of the post-World War II era were designed in the Mid-Century Modern and International styles, including concrete blocks, flat rooflines with extended overhangs, large canopies with thin metal post supports, wide expanses of glass windows, horizontal bands that wrapped around the rooflines of the stepped service station, and tall, stand-alone signage. Steel and white porcelain enamel was another typical Mid-Century Modern cladding material, used from the 1950s-1970s. Service stations with ranch-inspired elements emerged in the 1950s, featuring front-gabled, low-pitched rooflines and extended eaves, metal-framed windows, wood and brick wall cladding, and large canopies (Texas Department of Transportation 2016:7-3, 7-5, 7-8; Rotary Lift 2020).

In the late 1960s and early 1970s, auto repair became a popular at-home pastime, making service stations less important. Specialty shops, too, began selling auto repair items, causing the gas stations' service-related lines of business to decline. In the 1970s, the popularity of Urich's design for the self-service station steadily rose as new independent gas stations emerged. The older gas-

and-service stations struggled, but updated their stations to meet changing consumer needs, slowly adding a few self-service islands. By the mid-1970s, many gas-and-service stations transformed their out-of-date auto service buildings into a variety of commercial and service businesses, including shops, restaurants, offices, and convenience stores. This design has come to be known as the "store with gas" concept or "dual fuel depot" (Liebs 1995:113–115).

City of Livingston

The first settler of Livingston was David Baldwin Chedester, a wagon master, who settled in the area in 1862. After Chedester, a trickle of additional settlers came to area and it started out life as a railway station named Cressy after one of the local large landowners. With a saloon, clothing store, and grain warehouse, the small community supported an adventurous group of railway workers, gold seekers and farmers. Cressy was renamed Livingston in 1872 after a famous African explorer, Dr. Livingston, and the first plat of the town was also filed at this time. In the year following, local boosters made an unsuccessful attempt to make the Livingston the county seat of Merced (City of Livingston n.d.).

The town grew slowly until a combination of land speculation and irrigation improvements enticed more people to move to the area in the early 20th century. Since then, agricultural has been the prime industry of the community. The town was incorporated in 1922 and has served as a commercial hub for farms in the immediate vicinity. As of 2010, it had a population of 13,058 (Outcalt 1925:366, 376; City of Livingston N.D.).

Spanish Revival Style

The Spanish Revival style was popular in California from about 1915-1940. The style was popularized by the 1915 Panama-California Exposition in San Diego, and its popularity peaked in the 1920s and early 1930s. Defining elements of the style include a low-pitched roof with little or no eave overhang, red tile roofing, wall cladding that is typically stucco. Typical elaborations include carved low-relief window and door surrounds, decorative tile wall or floor treatments, chimneys, often tiled roofs, and decorative iron hardware including sconces, door handles, and knockers (McAlester 2017:520-534).

Craftsman Architecture

The peak construction period of the National style of Folk Houses dates to c. 1850 through c. 1930, reflective of expanding railroad networks that distributed regional (mainly Northeastern American) architectural styles and building materials across the country. The gable-front house in the National style benefitted from this expanded communication and transportation network, becoming a dominant folk form through the early 20th century. Two principal forms dominate, influenced by the location of the home, with many urban examples including a narrow two-story footprint with steeply pitched roofs. A related inspiration, and one more common to rural areas, came with the Craftsman movement (particularly c. 1910-c. 1930), which commonly employed this form for the style. Elements of Craftsman-inspired National houses include a double-width, single-story form and low-pitched roofs, narrow columns on a covered porch, sometimes reaching across the full building width. National-styled homes often omitted some of the tell-tale signs of high-style Craftsman homes, lacking decorative false brackets under the gable and wide square columns or piers with an unbroken line into the ground (McAlester 2013:474-476, 483).

3.5.3.3 Summary of Known CEQA Historical Resources and Unevaluated Resources

Archaeological Resources

As described in Section 3.5.3.1, the record search conducted at the CCIC identified two previously recorded archaeological resources within and directly adjacent to the archaeological study area. Both of the resources consist of historic-era resources. One resource (P-24-000087) was previously determined ineligible for listing to either the CRHR or the NRHP. The other resource [P-50-001923 (CA-STA-420H)] has not been subject to formal evaluation.

An intensive archaeological inventory of the study area was performed in June 2020. The railroad alignment is heavily disturbed and covered over by ballast, and no new or previously recorded archaeological resources were identified during survey. However, there remains the potential for previously unrecorded resources to be present beneath the railroad grade, specifically in areas determined to retain high sensitivity for buried archaeological resources as depicted in Appendix L-2.

P-50-001923 (CA-STA-420H) was revisited during pedestrian survey and found to be heavily disturbed with all diagnostic artifacts removed. While this resource may have minimal surface constituents, it is unknown whether this resource has a subsurface component. Although this resource may have previously been disturbed, this resource has not been evaluated and construction in the area could disturb this archaeological resource.

Built Environment

A built environment reconnaissance survey of the built-environment study area for the Proposed Project and the Atwater Station Alternative was conducted in June 2020 and January 2021. The built-environment study area contains historic-period buildings and structures related to transportation, irrigation and agriculture, auto-oriented commercial development, commercial buildings (including theaters, gas and service stations, light industrial buildings, warehouses), municipal development, and residential development. In addition, the survey identified a World War II-era temporary detention camp for Japanese Americans. Railroad-related properties throughout the built-environment study area include segments of the SPRR's San Joaquin Valley Railroad mainline. An in-depth discussion of these historical resources, including their locations (assigned Map ID numbers), is provided in Appendix L-1.

Overall, 65 historic-period built-environment resources were identified in the built-environment study area. Historic-period resources were defined as properties 45 years old or older at the time of the built environment reconnaissance survey and properties less than 45 years old with exceptional significance.

- 33 resources were previously recorded
    - 26 resources were identified by CHRIS records searches
    - 7 resources were identified through supplemental research
- 32 resources were newly recorded as part of the Proposed Project and the Atwater Station Alternative

Of the 65 historic-period resources in the built-environment study area:

- 4 resources are listed in or eligible for the NRHP, CRHR, and/or local registers, either as individual resources or contributors to a district, and are considered historical resources for the purposes of CEQA.
- 61 resources are ineligible for the NRHP, CRHR, and/or local registers.
    - 2 of those resources were demolished after their original recording and are no longer extant.

Table 3.5-3 provides information on the four built-environment historical resources located within the built-environment study area for the Project.

Table 3.5-3. CEQA Historical Resources (Built Environment) in the CEQA Study Area

Map ID#[a]	Resource Identifier	Address/Resource Name, Type, Description	City, County	Period of Significance	Current Evaluation CHR Status Code	Applicable Criteria	Nearest Project Facility
2018-67	P-24-000097	SPRR Mainline	Multiple	1868-1874	3S, 3CS	NRHP A CRHR 1	Ceres to Merced Extension Alignment
2018-47	P-50-000527 CHL No. 934	Temporary Detention Camps for Japanese Americans-Turlock Assembly Center	Turlock, Stanislaus County	1942	1CL	NRHP A CRHR 1	Turlock Station
2018-43	P-50-000073; CA-STA-4226H	Turlock Irrigation District – Lateral No. 5	Stanislaus and Merced Counties	1887-1925	3S, 3CS	NRHP A, C CRHR 1, 3	Ceres to Merced Extension Alignment
2018-50	P-24-001909	Merced Irrigation District System (ditches, canals, laterals, wells, pumping plants, dams, reservoirs, and hydroelectric facilities throughout Merced County), district and contributor: Martin Lateral	Merced County	1919-1957	3D, 3CD	NRHP A CRHR 1	Ceres to Merced Extension Alignment

Notes:
[a] Map ID#s correspond to location of resources provided in Appendix L-1.
NRHP = National Register of Historic Places
CRHR = California Register of Historical Resources
CHR = California Historical Resource
CHR Status Codes (California Office of Historic Preservation 2003)
1CL = Automatically listed in the CRHR—Includes State Historic Landmarks 770 and above
2S = Individual property determined eligible for NRHP by the Keeper. Listed in CRHR.
2D2 = Contributor to a district determined eligible for NRHP by consensus through Section 106 process. Listed in the CRHR.
2S2 = Individual property determined eligible for NRHP by a consensus through Section 106 process. Listed in CRHR.
3S = Appears eligible for NRHP as an individual property through survey evaluation.
3CS = Appears eligible for CRHR as an individual property through survey evaluation.
5S1 = Individual property that is listed or designated locally.

One resource is located within the built-environment study area near the Turlock Station.

- **Temporary Detention Camps for Japanese Americans-Turlock Assembly Center; P-50-000527; CHL No. 934; Map ID# 2018-47**

  The Stanislaus County Fairgrounds in Turlock were the site of a temporary detention camp for Japanese Americans in 1942. It was one of 12 camps or "assembly centers" established in California after President Franklin D. Roosevelt signed Executive Order 9066, which authorized the evacuation of all persons of Japanese ancestry from the West Coast to inland relocation centers. Because these relocation centers were not yet ready for occupation in 1942, the U.S. government established temporary detention camps at existing facilities, such as racetracks, fairgrounds, and labor camps, that had open space for housing, immediate availability of water and power, and central locations with access to major roadways and railroads for the eventual transfer to the relocation centers. Existing structures were adapted for camp use and temporary barracks buildings and barbed wire perimeter fences were hastily constructed. For the remainder of World War II, the fairgrounds were used by the U.S. Army as a rehabilitation center. After the war, the property was once again used as the county fairgrounds (Burton et al. 2000; Okamura 1980).

  The Turlock camp is one of nine camps in California that were located at existing fairgrounds (the Stanislaus County Fairgrounds were established in1927). A comparison of a historic map of the Turlock camp and historic and current aerial photos indicates that almost all the buildings and structures that were present on the site in the 1940s were demolished by the late 1950s. One building in the southern part of the fairgrounds may date to the detention camp era but it is located nearly 0.25 mile from the Turlock Station. The fairground's arched main entry gate, which was constructed in 1929 with steel and river boulders, is not directly associated with the temporary detention camp. Historic photos indicate that the Army modified the steel arch of the gate when the facility was used as a rehabilitation center, and current photographs indicate that the steel arch was later replaced (Burton et al. 2000; Okamura 1980; Stanislaus County Fair 2018).

  The Temporary Detention Camps for Japanese Americans-Turlock Assembly Center is registered as California Historical Landmark No. 934 and is significant under CRHR Criterion 1 as one of the sites of the first phase of Japanese American internment in California during World War II. However, only one building that may date to the 1940s appears to remain extant on the fairgrounds. The resource retains integrity of location, which is the key aspect of integrity for the historical resource to convey its significance. The subsequent changes have diminished its integrity of design, materials, workmanship, feeling, association, and setting. However, the property remains largely unchanged since nomination as a California Historical Landmark in 1980. The character-defining features include its proximity to railroad transportation, its open spaces embodying desirable locations for establishing temporary detention centers, and its relative isolation from other large population centers within California. The Period of Significance for the property is April 1942-August 1942.

Three built environment historical resources were identified within the built-environment study area for the Ceres to Merced Extension Alignment.

- **Central Pacific Railroad (San Joaquin Valley Main Line or Eastern Line)/ Southern Pacific Railroad San Joaquin Valley Main Line; P-24-000097; Map ID #2018-67[4]**

  The previous studies of the San Joaquin Valley Main Line have noted the important role the line played not just in the commerce of the region but the broad role the railroad played in the pioneering era of settlement, with the Southern Pacific creating towns wholesale that today serve as major population centers in the San Joaquin Valley, such as Merced. The San Joaquin Valley Main Line served as the first all-weather transportation system within the valley, and eventually connected Southern California with both the San Joaquin Valley and Sacramento, as well as points east. The importance of this first line in the area is therefore of premier importance to the agricultural, commercial, and community development of this region. Without it, many towns, other rail lines, industries, and agriculture within the valley would not have developed in the same way.

  The Southern Pacific San Joaquin Valley Main Line is eligible for listing in the NRHP and CRHR as an individual resource under Criterion A/1, at the local level of significance, as the premier pioneer railroad throughout the eastern San Joaquin Valley. Character-defining features for the resource include the railroad's alignment through the San Joaquin Valley, its continued function as a railroad, its heavy-gauge single track, and its setting within the rural and urban areas of the eastern San Joaquin Valley. The resource retains sufficient integrity to its period of significance. The resource retains its key aspects of integrity; its alignment (location), use (association), and setting are intact. The rail line remains a single track through the Proposed Project area and extending into studied portions of the line. The period of significance dates to the construction of the line throughout the San Joaquin Valley, 1868-1874, when the line's current alignment was built.

- **Turlock Irrigation District, Lateral No. 5 as a district contributor; P-50-000073; Map ID # 2018-43**

  The TID system is significant under Criteria A/1 as an early canal system built under the Wright Act of 1887 that was pivotal for Stanislaus County's water development, agricultural development, and water conveyance development. As a contributor to the multi-component system, Lateral No. 5 is significant at the local level under NRHP Criterion A and CRHR Criterion 1. The period of significance is 1887-1925. The character-defining features of the Lateral No. 5 segment in the built-environment study area are the lateral's consistent alignment relative to its earliest construction, its setting within a rural, agricultural environment, and the lateral's function as a working water conveyance system within the wider TID System. The boundary for the canal segment follows the footprint of the canal and its banks.

- **Merced Irrigation District System, Martin Lateral segment as a district contributor; P-24-001909; Map ID# 2018-50**

  MID System is significant under NRHP Criterion A or CRHR Criterion 1, at the local level of significance, as an early canal system built within the context of the Wright Act of 1887 and for its associations with Merced County's water development, agricultural development, and water conveyance development. The MID System is significant under NRHP Criterion A and CRHR Criterion 1. The evaluation of the whole system to determine which components are contributors to the district is outside the scope of this Project. However, of the 12 potential

[4] This is the historic name for the existing Union Pacific Railroad (UPRR) Fresno subdivision railroad.

contributors that intersect the built-environment study area, the Martin Lateral was identified as a contributor.

The Martin Lateral is a contributor to the MID System, which is significant at the local level under NRHP Criterion A and CRHR Criterion 1, with a period of significance of c. 1876-1957. The character-defining features of the Martin Lateral segment are the lateral's consistent alignment relative to with its earliest construction its setting within a rural, agricultural environment, and the lateral's function as a working water conveyance system within the wider MID System. The boundary for the canal segment follows the footprint of the canal and its banks.

3.5.4 Impact Analysis

This section describes the environmental impacts of the Proposed Project and the Atwater Station Alternative on CEQA historical resources. It describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. Measures to mitigate significant impacts are provided, where appropriate.

3.5.4.1 Methods for Analysis

Existing data pertaining to both historic built resources and archaeological resources were studied to determine the presence of cultural resources within the study area and to assess the impacts of the Proposed Project and the Atwater Station Alternative on those resources. Impacts were considered significant if construction or operation could cause a substantial adverse change in the significance of a historical resource. Substantial changes could be caused by direct and indirect impacts.

Activities that cause direct impacts on archaeological resources are typically associated with construction, including ground disturbance, or the material or physical alteration of the environment for excavation, staging, heavy equipment usage and movement, drilling, demolition, and relocation. Direct impacts on built environment resources result from physical changes to a property (such as demolition, physical alterations, or a partial ROW acquisition that could change the historic setback of built environment historical resources within a parcel), that would affect the character-defining features and integrity of the resource that conveys its significance. Other direct impacts to built-environment resources include those impacts that affect the setting and feeling of the historic resource, including visual, sound, and vibration impacts or changes resulting from construction or operation of the Proposed Project or the Atwater Station Alternative.

Potential indirect impacts include all potential impacts that may result from the construction of the Proposed Project but would occur later in time or would be further removed in distance. Potential indirect impacts on archaeological resources would primarily result from increased human activity or population growth in the vicinity. Such activity could lead to increased construction and recreation in the area, which could potentially damage archaeological resources. Potential indirect impacts on built-environment historical resources would similarly result from changes in human activities. Both increased use could cause impacts, or decreased use could cause an impact through neglect. No potential for indirect impacts were identified at the time of preparing the Draft EIR.

The following impact analysis has been completed for the purposes of CEQA and considers the impacts of the Proposed Project and the Atwater Station Alternative on the historical resources identified in the study area. The impact analysis considers whether the Proposed Project and the Atwater Station Alternative would cause a substantial change in the significance of the identified

historical resources. The impact analysis assesses the temporary and permanent direct and indirect impacts from construction and operations and analyzes if the impacts are significant or less than significant. In general, impacts would be in the form of permanent impacts from the construction of the Proposed Project and the Atwater Station Alternative, as opposed to its operations.

3.5.4.2 Thresholds of Significance

The State CEQA Guidelines Appendix G (14 Cal. Code Regs. 15000 et seq.) has identified significance criteria to be considered for determining whether a project could have significant impacts on cultural resources and tribal cultural resources. An impact would be considered significant if construction or operation of the project would have any of the following consequences.

For cultural resources:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.
- Disturb any human remains, including those interred outside of formal cemeteries.

For tribal cultural resources:

- Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 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, and that is:
    - Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or
    - 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 Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

3.5.4.3 Project Impacts and Mitigation Measures

Impact CUL-1	Construction and operations of the Proposed Project would not directly or indirectly cause a substantial adverse change in the significance of a built environment historical resource.
Level of Impact	**Less than significant impact**

Impact Characterization and Significance Conclusion

Proposed Project

All proposed facilities (Ceres to Merced Extension Alignment, Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility) have the potential to affect built environment historic resources directly or indirectly in the study area. Table 3.5-4 lists the built

environment historical resources located within the CEQA study area for the Project and summarizes the potential impacts on these resources.

The Turlock Station would directly affect the Temporary Detention Camp for Japanese Americans-Turlock Assembly Center (Map ID# 2018-47) as a result of construction of new parking areas and a pedestrian bridge within the immediate setting of the resource, with a portion of the pedestrian bridge within the northernmost corner of the historical resource's boundary. Built as a temporary facility, the Temporary Detention Camp was next used as a rehabilitation center for the army before the demolition of the buildings associated with the detention facility. At the time of nomination to the CRHR in 1980, the site looked much as it does today. In 1980, there was little extant historic fabric from the period of significance, since nearly all of the detention camp had been demolished. The demolition of the site is not surprising, given the now-illegal nature of the activities conducted there, which are commemorated with a memorial at the north gate of the site. The resource retains integrity of location, which is the key aspect of integrity for the historical resource to convey its significance. The ephemeral and temporary nature of the site means that design, materials, workmanship, feeling, association, and setting are not key aspects of integrity for this resource to convey its significance. The character-defining features include its proximity to railroad transportation, its open spaces embodying desirable locations for establishing temporary detention centers, and its relative isolation from other large population centers within California. The Period of Significance for the property is April 1942 through August 1942.The construction of the Turlock Station, within the setting of the historical resource and slightly within the northern boundary, would not diminish the integrity of the historical resource. The setting has been altered with post-World-War-II development surrounding the fairgrounds and with the development of the fairgrounds itself, after the temporary facilities were demolished. Furthermore, the construction of the Turlock Station would not impede the public's ability to understand the significance of the Temporary Detention Camp. The construction of the Turlock station would cause a less-than-significant impact on the Temporary Detention Camp for Japanese Americans-Turlock Assembly Center.

The Ceres to Merced Extension Alignment would directly affect three built environmental historical resources: Central Pacific Railroad (San Joaquin Valley Main Line or Eastern Line)/ Southern Pacific Railroad San Joaquin Valley Main Line (Map ID# 2018-67), Turlock Irrigation District, Lateral No. 5 as a district contributor (Map ID# 2018-43), and Merced Irrigation District System, Martin Lateral segment as a district contributor (Map ID# 2018-50).

The Ceres to Merced Extension Alignment would directly affect the Central Pacific Railroad (San Joaquin Valley Main Line or Eastern Line)/ Southern Pacific Railroad San Joaquin Valley Main Line (Map ID# 2018-67).[5] Within the resource boundary, the Ceres to Merced Extension Alignment would construct a second mainline tracks, spur turnouts, modification of undercrossings, modification of at-grade crossing, and construction of new culverts and bridges, all within the existing railroad right-of-way. The construction of these improvements would not affect any of the resource's character-defining features. The resource's alignment through the San Joaquin Valley would remain intact, as would the resource's functioning as an active railroad. The addition of a second set of tracks would not affect the existing railroad tracks, which would remain in place. The railroad has existing second tracks interspersed throughout the resource, so an additional set of parallel tracks is consistent with the existing setting. The resource's setting within rural and agricultural areas of the eastern San Joaquin Valley would not be affected by the Ceres to Merced Extension Alignment. The Ceres to Merced Extension Alignment would not affect the resource's key

[5] This is the historic name for the existing Union Pacific Railroad (UPRR) Fresno subdivision railroad.

aspects of integrity, which are its location, association, and setting. The Ceres to Merced Extension Alignment would cause a less-than-significant impact on the Central Pacific Railroad (San Joaquin Valley Main Line or Eastern Line)/ Southern Pacific Railroad San Joaquin Valley Main Line.

The Ceres to Merced Extension Alignment would directly affect the Turlock Irrigation District, Lateral No. 5 (Map ID# 2018-43) by upgrading the existing siding track into mainline track within the setting of, and spanning over, the historical resource. The integrity of Lateral No. 5's character-defining resources, which include the lateral's consistent alignment relative to its earliest construction, its setting within a rural, agricultural environment, and the lateral's function as a working water conveyance system within the wider Turlock Irrigation District System, would not be diminished by the Ceres to Merced Extension Alignment. Lateral No. 5 would retain its key aspects of integrity, which include its location, feeling, and setting. The alteration of one feature within the historical resource's setting, modifying the siding track as a mainline track, would not diminish the resource's integrity. The Ceres to Merced Extension Alignment would not impact the Turlock Irrigation District, Lateral No. 5.

The Ceres to Merced Extension Alignment would directly affect the Merced Irrigation District System, Martin Lateral segment as a district contributor (Map ID# 2018-50) by adding a new mainline track and a box culvert extension within the setting of, and spanning over, the historical resource. The integrity of Martin Lateral's character-defining resources, which include the lateral's consistent alignment relative to its earliest construction, its setting within a rural, agricultural environment, and the lateral's function as a working water conveyance system within the wider Merced Irrigation District System, would not be diminished by the Ceres to Merced Extension Alignment. The Martin Lateral would retain its key aspects of integrity, which include its location, feeling, and setting. The alteration of one feature within the historical resource's setting, modifying the siding track as a mainline track, would not diminish the resource's integrity. The Ceres to Merced Extension Alignment would not impact the Merced Irrigation District System, Martin Lateral segment as a district contributor (Map ID# 2018-50).

The Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility would directly affect the Central Pacific Railroad (San Joaquin Valley Main Line or Eastern Line)/ Southern Pacific Railroad San Joaquin Valley Main Line (Map ID# 2018-67). Within the boundary and setting of the resource, the Proposed Project would construct parking areas, platforms, pedestrian crossings (at-, above-, and below-grade), modified track spurs, maintenance and layover facilities, and signage. The construction of these improvements would not affect any of the resource's character-defining features. The resource's alignment through the San Joaquin Valley would remain intact, as would the resource's functioning as an active railroad. The addition of boarding platforms would not affect the existing railroad tracks, which would remain in place. The railroad has existing stations interspersed throughout the resource, so additional stations are consistent with the existing setting. The resource's setting within rural and agricultural areas of the eastern San Joaquin Valley would not be affected by the construction of the Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility. The Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility would not affect the resource's key aspects of integrity, which are its location, association, and setting. The Turlock Station, Livingston Station, Merced Station, and Merced Layover & Maintenance Facility would cause a less-than-significant impact on the Central Pacific Railroad (San Joaquin Valley Main Line or Eastern Line)/ Southern Pacific Railroad San Joaquin Valley Main Line.

In conclusion, the Proposed Project would cause a less-than-significant impact to built historical resources.

Atwater Station Alternative

The Atwater Station Alternative would directly affect the Central Pacific Railroad (San Joaquin Valley Main Line or Eastern Line)/Southern Pacific Railroad San Joaquin Valley Main Line (Map ID# 2018-67). Within the boundary and setting of the resource, the Atwater Station Alternative would construct parking areas, platforms, a pedestrian tunnel, pedestrian improvements, and signage. The construction of these improvements would not affect any of the resource's character-defining features. The resource's alignment through the San Joaquin Valley would remain intact, as would the resource's functioning as an active railroad. The addition of boarding platforms would not affect the existing railroad tracks, which would remain in place. The railroad has existing stations interspersed throughout the resource, so additional stations are consistent with the existing setting. The resource's setting within rural and agricultural areas of the eastern San Joaquin Valley would not be affected by the construction of the Atwater Station Alternative. The Atwater Station Alternative would not affect the resource's key aspects of integrity, which are its location, association, and setting. The Ceres to Merced Extension Alignment would cause a less-than-significant impact on the Central Pacific Railroad (San Joaquin Valley Main Line or Eastern Line)/ Southern Pacific Railroad San Joaquin Valley Main Line. In conclusion, the Atwater Station Alternative would cause a less-than-significant impact to built historical resources. There would be no difference between the proposed Livingston Station and the Atwater Station Alternative (both would result in a less-then-significant impact).

Table 3.5-4. Summary of Project Improvement Impacts on CEQA Historical Resources (Built Environment)

Map ID#	Resource Identifier	Address/Resource Name, Type, Description	City, County	Nearest Project Facility	Impacts
2018-67	P-24-000097	SPRR Mainline	Multiple Counties	All proposed facilities and the Atwater Station Alternative	Direct, LTS impact
2018-47	P-50-000527 CHL No. 934	Temporary Detention Camps for Japanese Americans-Turlock Assembly Center	Turlock; Stanislaus County	Ceres to Merced Extension Alignment , Turlock Station	Direct, LTS impact
2018-43	P-50-000073; CA-STA-4226H	Turlock Irrigation District – Lateral No. 5	Stanislaus and Merced Counties	Ceres to Merced Extension Alignment	Direct, LTS impact
50	P-24-001909	Merced County/Merced Irrigation District (ditches, canals, laterals, wells, pumping plants, dams, reservoirs, and hydroelectric facilities throughout Merced County) district and contributor: Martin Lateral	Merced County	Ceres to Merced Extension Alignment	Direct, LTS impact

Notes:
[a] Map ID#s correspond to location of resources provided in Appendix L-1.
LTS = less-than-significant

Impact CUL-2	Construction and operation of the Proposed Project could cause a substantial adverse change in the significance of an archaeological resource or tribal cultural resource.
Level of Impact	**Potentially significant impact**
Mitigation Measures	CUL-2.1: Conduct cultural resources awareness training CUL-2.2: Implement cultural resources monitoring plan CUL-2.3: Conduct archaeological monitoring CUL-2.4: Implement procedures in case of inadvertent archeological discoveries CUL-2.5: Conduct archaeological testing CUL-2.6: Implement avoidance and protection measures
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Proposed Project

The Proposed Project is generally located on lands that have been previously disturbed or within the existing UPRR ROW. Previous disturbance does not preclude the potential to affect cultural deposits, and, therefore, areas of heightened cultural sensitivity remain.

There are no known archaeological resources present within study areas for the Turlock Station, Livingston Station, Merced Station, or the Merced Layover & Maintenance Facility. One known but unevaluated archaeological resource (P-50-001923 [CA-STA-420H]) was identified within or directly adjacent to the Ceres to Merced Extension Alignment. The Ceres to Merced Extension Alignment has the potential to affect known archaeological resources directly or indirectly within the archaeological study area. Resource P-50-001923 (CA-STA-420H) is located within the Ceres to Merced Extension Alignment and was revisited during pedestrian survey and the site was noted to be heavily disturbed and that all diagnostic artifacts had been removed. While this resource may have minimal surface constituents, it is unknown whether this resource has a subsurface component. Although this resource may have been previously disturbed, this resource has not been evaluated and construction in the area could disturb archaeological resources. This is a potentially significant impact.

In addition, portions of the Ceres to Merced Extension Alignment, the Merced Layover & Maintenance Facility, and Merced Station are in the vicinity of the Merced River, Bear Creek, and the Jordan Canal, which are identified as areas with high general prehistoric archaeological resource sensitivity and high buried archaeological resource sensitivity. Therefore, construction of these facilities may disturb previously undocumented archaeological resources, which would constitute a potentially significant impact. Although the Proposed Project would primarily be located within disturbed areas where there have been multiple previous episodes of excavation and construction, previous disturbance does not preclude the potential to affect archaeological deposits. Portions of the Ceres to Merced Extension Alignment, the Merced Layover & Maintenance Facility, and Merced Station have been identified within areas of heightened cultural sensitivity and thus impacts on unknown archaeological resources may occur. While portions of the Ceres to Merced Extension Alignment, Turlock Station, and Livingston Station are not located within areas of high archaeological sensitivity, the potential remains to encounter unanticipated deposits during ground

disturbance of these proposed facilities. Encountering significant archaeological resources or tribal cultural resources during construction of the Proposed Project would result in a significant impact related to a known and unknown archaeological resources.

Atwater Station Alternative

There are no known archaeological resources present within study areas for the Atwater Station Alternative. The Atwater Station Alternative is not located within area of high general prehistoric archaeological resource sensitivity and high buried archaeological resource sensitivity. Nonetheless, the potential remains to encounter unanticipated deposits during construction of the Atwater Station Alternative, including significant archaeological resources or tribal cultural resources. This would be a potentially significant impact.

There is no difference between the proposed Livingston Station and the Atwater Station Alternative. There are no known archaeological resources present within study areas for both stations and neither station is located in an area with high archaeological sensitivity. Both would result in a less than significant impact after mitigation.

Mitigation Measures

Mitigation Measures CUL-2.1, CUL-2.4, and CUL-2.6 would apply to all facilities proposed for the Proposed Project and the Atwater Station Alternative. Mitigation Measures CUL-2.2 and CUL-2.3 would apply to a portion of the Ceres to Merced Extension Alignment, the Merced Station, and the Merced Layover & Maintenance Facility, as these facilities are located in areas identified as archaeologically sensitive. Mitigation Measures CUL-2.5 would apply to the portion of the Ceres to Merced Extension alignment where it encounters P-50-001923 (CA-STA-420H).

Mitigation Measure CUL-2.1: Conduct cultural resources awareness training

Prior to construction (any ground-disturbing activity), the construction contractor personnel who will work onsite will attend a preconstruction cultural resources awareness tailboard training session provided by the contractor. The training will address measures to avoid or protect artifacts and archaeological features, cultural resources identification, as well as the mandatory procedures to follow should potential cultural resources be exposed during construction.

Mitigation Measure CUL-2.2: Implement cultural resources monitoring plan

This mitigation measure would apply only to the portions of the Project that are identified as archaeologically sensitive by the geoarchaeological sensitivity mapping (see Appendix L-2 of the Draft EIR). Please note that the information contained in the geoarchaeological sensitivity mapping is confidential. As such, the mapping is not included in the Draft EIR.

Prior to construction (any ground-disturbing activity), an archaeological monitoring plan will be prepared and will identify areas for archaeological monitoring. This plan will include details regarding the protocols and procedures for archaeological monitoring, unanticipated discoveries, and the treatment of human remains. SJRRC will review and approve the plan prior to any ground-disturbing activities.

Mitigation Measure CUL-2.3: Conduct archaeological monitoring

This mitigation measure would apply only to the portions of the Project that are identified as archaeologically sensitive by the geoarchaeological sensitivity mapping (see Appendix L-2 of the Draft EIR). Please note that the information contained in the geoarchaeological sensitivity mapping is confidential. As such, the mapping is not included in the Draft EIR.

During construction (any ground-disturbing activity), SJRRC or its contractor(s) will be responsible for providing archaeological and tribal monitoring of ground-disturbing construction activities with potential to affect archaeological remains in areas that have been identified as archaeologically sensitive. Archaeological sensitivity is based on areas in close proximity to known archaeological sites; areas identified by the tribal consulting parties as sensitive; and/or geo-archaeological analysis.

Mitigation Measure CUL-2.4: Implement procedures in case of inadvertent archeological discoveries

During construction (any ground-disturbing activity), should there be an unanticipated discovery, work will stop within 100 feet of the discovery, and the construction contractor will call a qualified archaeologist to assess the significance of the find and to recommend appropriate measures. Should the discovery include human remains, all parties will comply with federal and state regulations and guidelines regarding the treatment of human remains, including relevant sections of NAGPRA (3(c)(d)), California Health & Saf. Code Section 8010 et seq., and Cal. Public Res. Code Section 5097.98, and consult with NAHC, tribal groups, and the State Historic Preservation Officer.

Mitigation Measure CUL-2.5: Develop and Implement an Archaeological Testing Plan.

Prior to construction (any ground-disturbing activity), SJRRC will retain a qualified archaeologist to prepare an Archaeological Testing Plan (ATP). The ATP will be implemented to assess the extent and significance of the previously recorded archaeological resources (P-50-001923 [CA-STA-420H]) identified within the archaeological study area. The ATP should include the following items:

- Background and anticipated resource types
- Research questions that can be addressed by the collection of data from the defined resource types
- Field Methods and Procedures
- Cataloging and Laboratory Analysis
- Findings and Interpretation

The ATP will be implemented to determine the extent of P-50-001923 (CA-STA-420H) within any area where ground disturbance is proposed. The results of the study will be summarized into a technical document that will determine whether further study is necessary. The technical document will also determine whether additional mitigation will be needed and implement additional studies if needed. All technical documents will be submitted to the Northwest Information Center (NWIC) of the California Historical Resources System (CHRIS), Rohnert Park, CA.

Mitigation Measure CUL-2.6: Implement avoidance and protection measures

Changing the rail alignment to avoid any newly discovered sites identified during project related ground disturbance is likely infeasible; however, access areas and laydown sites may be relocated should their location be found to be on archaeological sites. All avoidance and protection measures for archaeological resources will be delineated on construction drawings by the construction contractor.

Significance with Application of Mitigation

Due to the presence of the existing UPRR ROW and track, pavement, urban overlay, and property acquisition/permission-to-enter issues in the study area, evaluation of P-50-001923 (CA-STA-420H) through archaeological testing is not feasible.

Mitigation Measures CUL-2.1 and CUL-2.4 would require cultural awareness training for construction personnel and implementation of procedures in the event of the unanticipated discovery of archaeological resources or human remains. Mitigation Measures CUL-2.2 and CUL-2.3 would require the preparation of a construction monitoring plan that identifies the procedures to follow during archaeological monitoring in the portions of the Project that are identified as archaeologically sensitive by the geoarchaeological sensitivity mapping (see Appendix L-2 of the Draft EIR) or where known archaeological resources are located. Mitigation Measure CUL-2.5 would require archaeological testing to assess the extent and significance of P-50-001923 (CA-STA-420H). Mitigation Measure CUL-2.6 would require implementation of avoidance and protection measures throughout the entire Project in the event that P-50-001923 (CA-STA-420H) or any other new discovered site are determined to be eligible for NRHP or CRHR. Implementation of these mitigation measures would reduce potential impacts from the Proposed Project on archaeological resources and tribal cultural resources to a less-than-significant level.

For the same reasons as the Proposed Project, implementation of Mitigation Measures CUL-2.1 and 2.4 would reduce the impact on archaeological resources from construction of the Atwater Station Alternative to a less-than-significant level.

Impact CUL-3	Construction of the Proposed Project could disturb human remains, including those interred outside of formal cemeteries.
Level of Impact	**Potentially significant impact**
Mitigation Measures	CUL-2.1: Conduct cultural resources awareness training CUL-2.4: Implement procedures in case of inadvertent archeological discoveries CUL-3.1: Comply with state laws relating to Native American remains
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Proposed Project

The Proposed Project is generally located on lands that have been previously disturbed or within the existing UPRR ROW. Previous disturbance does not preclude the potential to affect cultural deposits and, therefore, areas of heightened cultural sensitivity remain. The Proposed Project would primarily be located within disturbed areas where there have been multiple previous episodes of

excavation and construction. However, the potential remains for construction from the Proposed Project to encounter cultural deposits, including human remains.

The previously recorded archaeological resources in the study area are not anticipated to contain human remains. However, as discussed in 3.5.3.1 *Cultural Resource Data Sources*, portions of the Ceres to Merced Extension Alignment, the Merced Station, and the Merced Layover & Maintenance Facility are in the vicinity of the Merced River, Bear Creek, and the Jordan Canal, which are identified as areas with high general prehistoric archaeological resource sensitivity and high buried archaeological resource sensitivity. Therefore, construction of these facilities may disturb previously undocumented archaeological resources, including human remains. This is a potentially significant impact.

Although portions of the Ceres to Merced Extension Alignment, Turlock Station, and Livingston Station are not located within areas of high general prehistoric archaeological resource sensitivity and high buried archaeological resource sensitivity, the potential remains to encounter unanticipated deposits, including human remains, during ground disturbance of these proposed facilities. In summary, construction of all Proposed Project facilities could result in a potentially significant impact related to the disturbance of human remains.

Atwater Station Alternative

The Atwater Station Alternative is not located within area of high general prehistoric archaeological resource sensitivity and high buried archaeological resource sensitivity. However, the potential remains to encounter unanticipated deposits, including human remains, during ground disturbance of the Atwater Station Alternative. This would be a potentially significant impact.

There is no difference between the proposed Livingston Station and the Atwater Station Alternative. Both stations sites are not located in areas of high general prehistoric archaeological resource sensitivity or high buried archaeological resource sensitivity. Both would result in a less than significant impact after mitigation.

Mitigation Measures

Mitigation Measure CUL-2.1, CUL-2.4, and CUL-3.1 would apply to the Proposed Project and the Atwater Station Alternative for potential impacts on human remains.

Mitigation Measure CUL-2.1: Conduct cultural resources awareness training

Refer to measure description in Impact CUL-2.

Mitigation Measure CUL-2.4: Implement procedures in case of inadvertent archeological discoveries

Refer to measure description in Impact CUL-2.

Mitigation Measure CUL-3.1: Comply with state laws relating to Native American remains

If human remains of Native American origin are discovered during construction, it will be necessary to comply with state laws relating to the disposition of Native American burials, which fall under the jurisdiction of the NAHC (Cal. Public Res. Code 5097). If any human remains are discovered or recognized in any location other than a dedicated cemetery, there will be no

further excavation or disturbance of the site, or any nearby area reasonably suspected to overlie adjacent human remains, until the following steps are taken:

- The appropriate county coroner has been informed and has determined that no investigation of the cause of death is required.
- If the remains are of Native American origin:
    - The descendants of the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Cal. Public Res. Code Section 5097.98.
    - If the NAHC is unable to identify a descendant or the descendant fails to make a recommendation within 24 hours after being notified by the NAHC, then no further action is required.

Significance with Application of Mitigation

Implementation of Mitigation Measures CUL-2.1 and CUL-2.4 would ensure early identification and protection of unanticipated discoveries during construction. Implementation of Mitigation Measure CUL-3.1 would require compliance with state laws relating to Native American remains in the event human remains of Native American origin are discovered during construction. Protocols include informing the county coroner and contacting the NAHC for identification of descendants. Implementation of Mitigation Measure CUL-3.1 would reduce potential impacts on human remains from the Proposed Project to a less-than-significant level.

For the same reasons listed above, implementation of Mitigation Measures CUL-3.1 would reduce the impact on human remains from construction of the Atwater Station Alternative to a less-than-significant level.

Impact CUL-4	Construction of the Proposed Project could cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074.
Level of Impact	**Potentially significant impact**
Mitigation Measures	CUL-2.1: Conduct cultural resources awareness training CUL-2.4: Implement procedures in case of inadvertent archeological discoveries CUL-3.1: Comply with state laws relating to Native American remains CUL-4.1: Implement procedures in case of inadvertent tribal cultural resources discoveries
Level of Impact after Mitigation	**Less than significant impact**

Impact Characterization

Proposed Project

As described in Section 3.5.3.1, no tribal representatives requested tribal consultation under AB 52 for this project. Thus, no tribal cultural resources were identified in the vicinity of the Proposed Project.

Additionally, as stated above in Impact CUL-2 and CUL-3, no prehistoric archaeological resources, which have the potential to be considered tribal cultural resources, were identified within the archaeological study area. However, as discussed in Section 3.5.3.1 *Cultural Resource Data Sources*, portions of the Ceres to Merced Extension Alignment, the Merced Station, and the Merced Layover & Maintenance Facility are in the vicinity of the Merced River, Bear Creek, and the Jordan Canal, which are identified as areas with high general prehistoric archaeological resource sensitivity and high buried archaeological resource sensitivity. Therefore, construction of these facilities may disturb previously undocumented archaeological resources, which can be considered tribal cultural resources. This is a potentially significant impact.

Although portions of the Ceres to Merced Extension Alignment, Turlock Station, and Livingston Station are not located within areas of high general prehistoric archaeological resource sensitivity and high buried archaeological resource sensitivity, the potential remains to encounter previously undocumented archaeological resources, which can be considered tribal cultural resources. In summary, construction of all Proposed Project facilities could result in a potentially significant impact related to tribal cultural resources.

Atwater Station Alternative

The Atwater Station Alternative is not located within area of high general prehistoric archaeological resource sensitivity and high buried archaeological resource sensitivity. However, the potential remains to encounter previously undocumented archaeological resources, which can be considered tribal cultural resources. This would be a potentially significant impact.

There is no difference between the proposed Livingston Station and the Atwater Station Alternative. Both stations sites are not located in areas of high general prehistoric archaeological resource sensitivity or high buried archaeological resource sensitivity. Both would result in a less than significant impact after mitigation.

Mitigation Measures

Mitigation Measure CUL-2.1, CUL-2.4, CUL-3.1, and CUL-4.1 would apply to the Proposed Project and the Atwater Station Alternative for potential impacts on tribal cultural resources.

Mitigation Measure CUL-2.1: Conduct cultural resources awareness training

Refer to measure description in Impact CUL-2.

Mitigation Measure CUL-2.4: Implement procedures in case of inadvertent archeological discoveries

Refer to measure description in Impact CUL-2.

Mitigation Measure CUL-3.1: Comply with state laws relating to Native American remains

Refer to measure description in Impact CUL-3.

Mitigation Measure CUL-4.1: Implement procedures in case of inadvertent tribal cultural resources discoveries

In the event that an archaeological resource that could be considered a tribal cultural resource is unexpectedly identified during the course of the Project, and SJRRC or its contractor(s)

determines that the Project may cause a substantial adverse change to such a resource, SJRRC or its contractor(s) will employ one or more of the following standard mitigation measures:

- Consultation with the local tribal groups originally identified during outreach to the NAHC for this Project to determine if the resource is considered a tribal cultural resource.
    - Local tribal groups should be contacted immediately and have 72 hours to respond to requests to consult.
    - If no response is received treatment of the resource will occur under the direction of a qualified archaeologist.
- Avoidance and preservation of the resource in place, including, but not limited to, planning and construction to avoid the resource and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resource 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, but not limited to, the following:
    - Protecting the cultural character and integrity of the resource;
    - Protecting the traditional use of the resource;
    - Protecting the confidentiality of the resource.
- 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.
- Protecting the Resource.

Significance with Application of Mitigation

Implementation of Mitigation Measures CUL-2.1, CUL-2.4, CUL-3.1, and CUL-4.1 would ensure early identification and protection of unanticipated discoveries during project construction and the proper treatment of human remains. Implementation of Mitigation Measure CUL-4.1 would require that additional consultation with local tribal groups occur following inadvertent prehistoric archaeological discoveries. This consultation would allow for the assessment of prehistoric archaeological resources to consider their potential to be tribal cultural resources. Protocols include protection of the resource and contacting the four tribal representatives originally identified by the NAHC and that were notified of the Proposed Project. Mitigation Measure CUL-4.1 would be implemented in tandem with CUL-2.4. Implementation of Mitigation Measure CUL-4.1 would reduce potential impacts on human remains to a less-than-significant level.

For the same reasons listed above, implementation of Mitigation Measures CUL-2.1, CUL-2.4, CUL-3.1, and CUL-4.1 would reduce the impact on tribal cultural resources from construction of the Atwater Station Alternative to a less-than-significant level.

3.5.4.4 Overall Comparison of the Proposed Livingston Station and Atwater Station Alternative

Overall, there would be no substantial difference in impacts to cultural resources and tribal cultural resources between implementation of the Atwater Station Alternative or the proposed Livingston Station (both are expected to result in less than significant impacts after mitigation).

3.6 Energy

3.6.1 Introduction

This section describes the regulatory and environmental setting for energy resources and energy use in the vicinity of the Proposed Project and the Atwater Station Alternative. It also describes the impacts on energy resources that would result from implementation of the Proposed Project and the Atwater Station Alternative.

Additional considerations with regard to energy resources and energy use are presented in Section 3.3, *Air Quality*, which discusses the implications of energy use on air quality; Section 3.8, *Greenhouse Gas Emissions*, which calculates potential greenhouse gas emissions from energy use; and Section 3.18, *Utilities and Service Systems*, which describes potential interruptions of electricity and natural gas service. Cumulative impacts on energy resources, in combination with planned, approved, and reasonably foreseeable projects, are discussed in Chapter 4, *Other CEQA-Required Analysis.*

3.6.2 Regulatory Setting

This section summarizes federal, state, regional, and local regulations related to energy resources and energy use that are applicable to the Proposed Project and the Atwater Station Alternative.

3.6.2.1 Federal

Energy Policy Act of 1992

The Energy Policy Act of 1992 consists of 27 titles detailing the various measures designed to lessen the nation's dependence on imported energy, provide incentives for clean and renewable energy, and promote energy conservation in buildings. Title III of Act addresses alternative fuels. It gave the U.S. Department of Energy administrative power to regulate the minimum number of light-duty alternative fuel vehicles required in certain federal fleets beginning in fiscal year 1993. The primary goal of this program is to cut petroleum use in the U.S. by 2.5 billion gallons per year by 2020.

Energy Policy Act of 2005

The Energy Policy Act of 2005, which was intended to establish a comprehensive, long-term energy policy, is implemented by the U.S. Department of Energy. The act addresses energy production in the United States (U.S.), including oil, gas, coal, and alternative forms of energy, as well as energy efficiency and tax incentives. Energy efficiency and tax incentive programs include credits for the construction of new energy efficient houses, production or purchase of energy efficient appliances, and loan guarantees for entities that develop or use innovative technologies that avoid the production of GHGs. To reduce national energy consumption, the Act also directed the National Highway Traffic Safety Administration (NHTSA) within the U.S. Department of Transportation to establish the Corporate Average Fuel Economy (CAFE) Program. Under the CAFE Program, NHTSA prescribes and enforces average fuel economy standards for passenger cars and light trucks sold in the U.S.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 was intended to increase U.S. energy security, develop renewable fuel production, and improve vehicle fuel economy. The Energy Independence and Security Act of 2007 amended the Energy Policy Act of 2005 to introduce more aggressive requirements. The Act's three key provisions strengthened the CAFE standards, the federal renewable fuel standard, and the federal energy efficiency standards for appliances and lighting.

Safer Affordable Fuel-Efficient Vehicles Rule

The National Highway Traffic Safety Administration (NHTSA) sets the Corporate Average Fuel Economy (CAFÉ) standards to improve the average fuel economy and reduce GHG emissions generated by cars and light-duty trucks. NHTSA and USEPA have proposed amendments to the current fuel efficiency standards for passenger cars and light-duty trucks and new standards covering model years 2021 through 2026. Under the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule, current standards would be maintained through 2026. California, 22 other states, the District of Columbia, and two cities filed suit against the proposed action on September 20, 2019.[1] The lawsuit requests a "permanent injunction prohibiting Defendants from implementing or relying on the Preemption Regulation," but does not stay its implementation during legal deliberations. Part 1 of the SAFE Vehicles Rule went into effect on November 26, 2019. Part 2 of the Rule was finalized on March 30, 2020. The SAFE Vehicles Rule will decrease the stringency of CAFÉ standards to 1.5 percent each year through model year 2026, as compared with the standards issued in 2012, which would have required about 5 percent annual increases. Because the rule would increase on-road vehicle emissions, it has been taken into account in the construction analysis as a worst-case analysis if the rule prevails in court. The rule has not been taken into account in the operational energy analysis because taking it into account would result in a higher energy reduction benefit given that on road vehicles would have higher fuel consumption with the new rules compared to the former rule; this is a worst-case analysis if the rule does not prevail in court. In January 2021, the Biden Administration announced plans to propose replacement or revision of the SAFE rule later in 2021.

3.6.2.2 State

California Green Building Standards

California Code of Regulations (Cal. Code Regs.), Title 24, Part 11, known as CALGreen, sets standards for sustainable building design for residential and non-residential buildings in California. This code sets forth sustainable construction practices applicable to planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. Effective January 1, 2014, 2013 CALGreen mandates permitted new residential and non-residential building construction, demolition, and certain additions and alteration projects to recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction and demolition debris generated during a project (CALGreen 4.408, 5.408, 301.1.1, and 301.3). 2016 CALGreen became effective January 1, 2017 and increases the recycle and/or salvage mandate to 65 percent for new residential and non-residential building construction, demolition, and certain additions and alteration projects (2016 CALGreen 4.408 and 5.408).

[1] *California et al. v. United States Department of Transportation et al.*, 1:19-cv-02826, U.S. District Court for the District of Columbia,

Senate Bill 1389, Chapter 568, Statutes of 2002

The California Energy Commission (CEC) is responsible for, among other things, forecasting future energy needs for the state and developing renewable energy resources and alternative renewable energy technologies for buildings, industry, and transportation. Senate Bill (SB) 1389 (Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report assessing major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors. The report is also intended to provide policy recommendations to conserve resources, protect the environment, and ensure reliable, secure, and diverse energy supplies. The 2019 *Integrated Energy Policy Report*, the most recent report required under SB 1389, was released to the public in February 2020 (California Energy Commission 2020a).

Assembly Bill 2076, Reducing Dependence on Petroleum

The CEC and the California Air Resources Board are directed by Assembly Bill 2076 (passed in 2000) to develop and adopt recommendations for reducing dependence on petroleum. A performance-based goal is to reduce petroleum demand to 15 percent below 2003 demand by 2020.

Senate Bills 1078, 107, and 2—Renewables Portfolio Standard

SBs 1078 (2002), 107 (2006) and 2 (2011), California's Renewables Portfolio Standard (RPS), obligates investor-owned utilities, energy service providers, and Community Choice Aggregators to procure additional retail sales per year from eligible renewable sources with the long-range target of procuring 33 percent of retail sales from renewable resources by 2020. In 2018, SB 100 was signed into law, which again increases the RPS to 60 percent by 2030 and requires all the state's electricity to come from carbon-free resources by 2045 (California Public Utilities Commission 2020). The California Public Utilities Commission (CPUC) and the CEC are jointly responsible for implementing the program.

Senate Bills 350 and 100—De Leon (Clean Energy and Pollution Reduction Act of 2015, 100 Percent Clean Energy Act of 2017)

SB 350 was approved by the California Legislature in September 2015 and signed by Governor Brown in October 2015. Its key provisions are to require the following by 2030: (1) an RPS of 50 percent and (2) a doubling of energy efficiency (electrical and natural gas) by 2030, including improvements to the efficiency of existing buildings. These mandates will be implemented by future actions of CPUC and CEC. SB 100 was approved by the California Legislature in August 2018 and signed by Governor Brown in September 2018. Its key provisions include updating the SB 350 RPS requirement from 50 to 60 percent by 2030 and creating the policy of planning to meet all the state's retail electricity supply with a mix of RPS-eligible and zero-carbon resources by December 31, 2045, for a total of 100 percent clean energy.

California Code of Regulations Title 20 and Title 24, Part 6

New buildings constructed in California must comply with the standards contained in Cal. Code Regs. Title 20, Energy Building Regulations, and Title 24, Energy Conservation Standards. Cal. Code Regs. Title 20 standards range from power plant procedures and siting to energy efficiency standards for appliances, ensuring reliable energy sources are provided and diversified through energy efficiency and renewable energy resources. Cal. Code Regs. Title 24 requires the design of building shells and building components to conserve energy. The Energy Conservation Standards for

new residential and nonresidential buildings were adopted by the California Energy Resources Conservation and Development Commission in June 1977 and were most recently revised in 2016 (per Cal. Code Regs. Title 24, Part 6). These standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (i.e., Cal. Code Regs. Title 24, Part 11) was adopted as part of the California Building Standards Code. The code was last updated in 2016. Cal. Code Regs. Part 11 establishes mandatory standards, including planning and designing for sustainable site development, energy efficiency (i.e., more than the California Energy Code requirements), water efficiency and conservation, material conservation and resource efficiency, and environmental quality. The 2019 standards improved upon the 2016 standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The 2019 standards went into effect on January 1, 2020.

California Energy Code

California's energy efficiency standards for residential and nonresidential buildings are described in Cal. Code Regs. Title 24, Part 6. These standards were established in 1978 in response to a legislative mandate to reduce California's energy consumption and have been updated periodically to include new energy efficiency technologies and methods. The California Energy Code requires compliance with energy efficiency standards for all new construction, including new buildings, additions, alterations, and, in nonresidential buildings, repairs.

California Energy Action Plan

The CEC is responsible for preparing the *State Energy Action Plan* (California Public Utilities Commission 2008), which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The *State Energy Action Plan* calls for the State to assist in the transformation of its transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the fewest environmental and energy costs. First-priority actions to address California's increasing energy demands are energy efficiency and demand response (i.e., reduction of customer electricity usage during peak periods to address system reliability and support the best use of energy infrastructure). Additional priorities include the use of renewable sources of power and distributed generation (i.e., the use of relatively small power plants near or at centers of high demand). To further this policy, the *State Energy Action Plan* identifies several strategies, including aiding public agencies and fleet operators.

Executive Order N-79-20

On September 23, 2020, Governor Gavin Newsom issued Executive Order N-79-20, directing the state to require that, by 2035, all new cars and passenger trucks sold in California be zero-emission vehicles. Following the order, the California Air Resources Board will develop regulations to meet the requirements of this Executive Order. The executive order also "directs state agencies to develop strategies for an integrated, statewide rail and transit network, and incorporate safe and accessible infrastructure into projects to support bicycle and pedestrian options, particularly in low-income and disadvantaged communities" (California Office of the Governor 2020).

3.6.2.3 Regional and Local

The San Joaquin Regional Rail Commission (SJRRC), a state joint powers agency, proposes improvements inside and outside of the Union Pacific Railroad (UPRR) right-of-way (ROW). The Interstate Commerce Commission Termination Act (ICCTA) affords railroads engaged in interstate commerce considerable flexibility in making necessary improvements and modifications to rail infrastructure, subject to the requirements of the Surface Transportation Board.[2] ICCTA broadly preempts state and local regulation of railroads and this preemption extends to the construction and operation of rail lines. As such, activities within the UPRR ROW are clearly exempt from local building and zoning codes and other land use ordinances. However, facilities located outside of the UPRR ROW, including proposed stations, the proposed Merced Layover & Maintenance Facility, and the Atwater Station Alternative would be subject to regional and local plans and regulations. Though ICCTA does broadly preempt state and local regulation of railroads, SJRRC intends to obtain local agency permits for construction of facilities that fall outside of the UPRR ROW even though SJRRC has not determined that such permits are legally necessary and such permits may not be required.

Appendix G of this environmental impact report (EIR), *Regional Plans and Local General Plans*, provides a list of applicable goals, policies, and objectives from regional and local plans of the jurisdictions in which the Proposed Project and the Atwater Station Alternative would be located. Section 15125(d) of the CEQA Guidelines requires an EIR to discuss "any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans." These plans were considered during the preparation of this analysis and were reviewed to assess whether the Proposed Project and the Atwater Station Alternative would be consistent with the plans of relevant jurisdictions.[3] The Proposed Project and the Atwater Station Alternative would be generally consistent with the applicable goals, policies, and objectives related to energy use and conservation identified in Appendix G.

3.6.3 Environmental Setting

This section describes the environmental setting related to energy resources and energy use. For the purposes of this analysis, the study area for energy resources and energy use is defined as the service area of identified energy providers that currently provide service to ACE or would provide service to the Proposed Project or the Atwater Station Alternative. This section begins with an overview of energy consumption in the state, followed by a detailed description of existing petroleum, natural gas, and electricity use in the study area.

3.6.3.1 Overview of Energy Consumption in the State

Overall, California's energy consumption (per capita) and production are among the lowest and highest, respectively, in the nation. Because of its mild climate and energy efficiency programs, California ranked 48th in the nation for per capita energy consumption in 2018 (the most recent year for which data is available) (Energy Information Administration 2020b). In 2018, California ranked fourth in the nation in conventional hydroelectric generation, second in net electricity generation from other renewable energy resources, and first as a producer of electricity from

[2] Altamont Corridor Express (ACE) operates within a ROW and on tracks owned by the UPRR, which operates interstate freight rail service in the same ROW and on the same tracks.

[3] An inconsistency with regional or local plans is not necessarily considered a significant impact under CEQA unless it is related to a physical impact on the environment that is significant in its own right.

biomass, geothermal, and solar energy (Energy Information Administration 2020b). As of January 2019, California ranked third in the nation in petroleum refining capacity (Energy Information Administration 2020b).

The transportation end-use sector consumes the largest share of energy in California. In 2018, transportation accounted for 39.8 percent of all energy consumed in California, compared to 23.2 percent for industrial uses, 18.9 percent for commercial uses, and 18.1 percent for residential uses (Energy Information Administration 2020a). Table 3.6-1 compares various modes of passenger travel within the United States and the approximate energy use for each mode. Commuter rail energy use per passenger mile was less than cars, personal trucks, and transit buses in 2017. In other words, commuter rail is more energy efficient per passenger mile than other common transportation modes for intercity commuting.

Table 3.6-1. 2017 U.S. Passenger Travel Mode and Energy Use

Travel Mode	Vehicle Miles (millions)	Passenger Miles (millions)	Energy Consumption (Btu per vehicle mile)	Energy Consumption (Btu per passenger mile)
Cars	1,424,302	2,195,206	4,451	2,888
Personal Trucks	1,214,523	2,210,432	6,067	3,334
Motorcycles	20,149	23,978	2,844	2,390
Air	5,848	685,977	280,416	2,391
Buses (Transit)	2,513	20,209	36,468	4,535
Rail (Transit)	832.6	20,169	19,297	788
Rail (Commuter)	378	12,384	54,251	1,657
Rail (Intercity-Amtrak)	316	6,563	31,644	1,524

Source: Davis & Boundy 2020.
Btu = British thermal unit.

3.6.3.2 Petroleum, Electricity and Natural Gas

Among the various types of energy sources, petroleum (diesel fuel) is the primary fuel consumed, in terms of operational energy demand, and is used to propel Altamont Corridor Express (ACE) locomotives on their scheduled runs. Of the other primary energy sources, electricity is used principally for station and parking facility lighting, and natural gas is not used (Garcia pers. comm.). Each of these fuel sources and the providers are described in the following sections.

Petroleum

California's crude oil production has declined overall in the past 30 years; however, it remains one of the top producers of crude oil in the nation, accounting for approximately 4 percent of total U.S. production in 2018. California ranks third in the nation in petroleum refining capacity and accounts for one-tenth of the total U.S. capacity (Energy Information Administration 2020b).

Valley Pacific Petroleum provides diesel fuel for the operation of ACE trains. Valley Pacific Petroleum obtains its fuel from the Chevron Richmond Refinery, a 2,900-acre petroleum refinery in Richmond, California, which processes about 250,000 barrels of crude oil per day (Chevron 2020). In 2017, ACE diesel fuel consumption was approximately 455,000 gallons to power four weekday roundtrips between Stockton and San Jose (Pennino pers. comm. A, B).

Electricity

California's electricity use is assessed annually by the California Independent System Operator (CAISO) and the California Public Utilities Commission (CPUC). CAISO is a not-for-profit corporation in charge of operating the long-distance, high-voltage power lines that deliver electricity, and CPUC publishes the *Long-Term Procurement Plan*, which aims to implement a safe, reliable, and cost-effective electricity supply in California. CAISO works with state agencies, generation and transmission owners, load-serving entities, and other balancing authorities to identify any issues regarding upcoming operating conditions. Significant amounts of new renewable generation have reached commercial operation, and this trend is expected to continue as new renewable generation comes online to meet the state's 60 percent renewables requirement by 2030 (California Independent System Operator 2020).

Electricity use for the Proposed Project would occur at the new stations and at the Merced Layover & Maintenance Facility. Table 3.6-2 lists the service providers that maintain energy utilities where the Proposed Project and the Atwater Station Alternative would be located. Table 4.6-3 provides information on peak energy demand and electricity consumption by service provider.

Table 3.6-2. Electricity Providers by Proposed or Alternative Facility

Municipality	Proposed or Alternative Facility	Electricity Provider
City of Ceres	Ceres to Merced Extension Alignment	Turlock Irrigation District
Stanislaus County (unincorporated areas)	Ceres to Merced Extension Alignment	
City of Turlock	Ceres to Merced Extension Alignment	
	Turlock Station	
City of Livingston	Ceres to Merced Extension Alignment	PG&E & Merced Irrigation District
	Livingston Station	
City of Atwater	Ceres to Merced Extension Alignment	
	Atwater Station Alternative	
City of Merced	Ceres to Merced Extension Alignment	
	Merced Layover & Maintenance Facility	
	Merced Station	
Merced County (unincorporated areas)	Ceres to Merced Extension Alignment	Turlock Irrigation District & Merced Irrigation District

PG&E = Pacific Gas and Electric Company.

Table 3.6-3. Electricity Consumption and Peak Demand by Electricity Providers

Electricity Provider	Electricity Consumption (GWh) in 2019	Peak Demand (MW) in 2018
PG&E	78,072	10,976
Turlock Irrigation District	2,084	629
Merced Irrigation District	499	109

Source: California Energy Commission 2019, 2020b.
GWh = gigawatt hour.
MW = megawatt.
PG&E = Pacific Gas and Electric Company.

Pacific Gas and Electric

Pacific Gas and Electric Company (PG&E) provides electricity for approximately 5.2 million customer accounts in a 70,000-square-mile service area in Northern and Central California. PG&E's service area stretches from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east. Within PG&E's service area, PG&E operates 107,000 circuit miles of electric distribution lines and 18,000 circuit miles of interconnected transmission lines (Pacific Gas and Electric Company 2020a).

In PG&E's service area, total electricity consumption was approximately 78,072 gigawatt hours (GWh) in 2019 (California Energy Commission 2020b). The California Energy Commission reported that peak demand within the PG&E service area was approximately 11,000 megawatts (MW) in 2018. Peak demand is the amount of electricity consumed at any given moment, usually integrated over a 1-hour period. Peak demand is important in evaluating system reliability, identifying congestion points on the electrical grid, and designing required system upgrades.

PG&E's generation portfolio includes hydroelectric facilities, a nuclear power plant, and a natural gas power plant (Pacific Gas and Electric Company 2020a; 2020b). The net operating capacity of these facilities at the end of 2019 was 7,686 MW. In 2019, PG&E generated 33,849 GWh through its own facilities, and purchased 27,210 GWh to meet the demands of its customers (Pacific Gas and Electric Company 2020a).

Turlock Irrigation District

The Turlock Irrigation District owns and operates an electric generation, transmission, and distribution system that serves approximately 102,000 customer accounts within a 662-square-mile area. The Turlock Irrigation District service area includes Ceres and Turlock and stretches from the Santa Clara County border in the west to the Tuolumne County border in the east. The Turlock Irrigation District operates 389 miles of transmission lines in Stanislaus and Merced Counties (Turlock Irrigation District 2018).

The total electricity consumption in 2019 within Turlock Irrigation District's service area was 2,084 GWh (California Energy Commission 2020b). Peak demand in 2018 was 629 MW (California Energy Commission 2019). The Turlock Irrigation District's reported electric generation capacity from Turlock Irrigation District's hydroelectric, natural gas, and wind facilities included 154 MW of electricity from district-owned hydroelectric facilities, 521 MW from district-owned natural gas facilities, and 137 MW from one district-owned wind facility (Turlock Irrigation District 2018).

Merced Irrigation District

Merced Irrigation District operates transmission and distribution electrical facilities serving customers spanning 560 square miles in eastern Merced County. Merced Irrigation District currently provides power to electric services approximately 11,000 customers in Eastern Merced County including Livingston, Atwater and Merced (Merced Irrigation District 2020).

The total electricity consumption in 2019 within Merced Irrigation District's service area was 499 GWh (California Energy Commission 2020b). The most recent peak demand figures from 2018 total 109MW (California Energy Commission 2019). Merced Irrigation District purchases nearly all its power from the Turlock Irrigation District, which generates its own power and purchases power from others, including PG&E.

Natural Gas

PG&E is the only natural gas service provider for Stanislaus and Merced Counties and is responsible for maintaining the infrastructure for natural gas distribution and transmission. PG&E's natural gas system spans 70,000 square miles, serves approximately 6 million gas customers, and delivers 970 billion cubic feet (BCF) of gas per year, or 2.6 BCF per day. PG&E's gas transmission and distribution pipelines stretch from Eureka in the north to Bakersfield in the south and from the Pacific Ocean in the west to the Sierra Nevada in the east. PG&E has more than 6,500 miles of gas transportation pipeline and 42,000 miles of gas distribution pipeline. PG&E's network of high-pressure natural gas transmission pipelines generally follows existing transportation corridors, such as roads and railroad tracks (Pacific Gas and Electric Company 2020b).

3.6.4 Impact Analysis

This section describes the environmental impacts of the Proposed Project and the Atwater Station Alternative on energy resources. It describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant.

3.6.4.1 Methods for Analysis

Energy use associated with construction and operation of the Proposed Project and Atwater Station Alternative were assessed and quantified using standard and accepted energy intensity factors.

Construction

Construction of the Proposed Project and Atwater Station Alternative would require gasoline and diesel, as the primary sources of energy, for construction equipment, employee transport, and haul truck vehicles. Energy consumption associated with construction would be temporary and would cease when construction activities are complete. Construction-period energy demand is presented for the Proposed Project and Atwater Station Alternative. This construction-period energy demand was estimated using energy factors from the Energy Information Administration (2020c).

Operations

The analysis of energy demand associated with operations of the Proposed Project and the Atwater Station Alternative considers the following components.

- The increased consumption of fuels for operations of the extended passenger rail service and locomotive idling.
- The increased consumption of fuels from expanded shuttle service at the Great America and Pleasanton Stations due to changes in ridership.
- Increased electricity demand at the proposed stations, the Merced Layover & Maintenance Facility, and the Atwater Station Alternative. Increased natural gas demand at the Merced Layover & Maintenance Facility.
- The savings in automobile fuel consumption from reduced automobile vehicle miles traveled (VMT) due to the shift of travelers from automobiles to passenger rail transit.

For comparison purposes and to derive the net operational energy consumption, the energy demand for each component is converted into British thermal units (Btu) based on their respective energy

intensity factor. The methodology for deriving the operational energy demand for each of these components is summarized below. In addition, the methodology for determining the net energy impacts from the Proposed Project is also included for each of these components below. The energy demand for each of these components is compared to the No Project Conditions. Energy use under the No Project Conditions is defined as the energy use if the Proposed Project were not to be implemented. The No Project Conditions does not account for the energy use outside of the Ceres to Merced area (except for the shuttles) because the Proposed Project would not affect ACE service outside of the Ceres to Merced Area (except for the shuttles).

ACE Operations and Locomotive Idling

New ACE passenger rail service between Ceres and Merced would result in increased diesel fuel combustion from additional locomotive operations and increased idling[4] while loading passengers at stations and warming up after receiving routine maintenance. It is anticipated that the fleet would be maintained at the Merced Layover & Maintenance Facility (for light maintenance and daily servicing) or at the existing ACE Rail Maintenance Facility in Stockton (for heavy maintenance and repairs).

This analysis compares the energy use from operations of trains due to the Proposed Project in 2030 (full operations)[5] and 2040 (horizon year) with the No Project Conditions in 2030 and 2040. Under the No Project Conditions, there would be no train service between Ceres and Merced and, therefore, no energy use under the No Project Conditions associated with operations of ACE locomotives.

Expanded Shuttle Service

Changes in ACE ridership with operations of the Proposed Project would have corresponding effects on vehicle shuttle demand and VMT. ACE provides vehicle shuttle connections at the existing Great America and Pleasanton Stations. This analysis presents these increases on fuel consumption based on existing fuel usage. In addition, implementation of the Proposed Project would eliminate the Ceres–Merced Bus Bridge[6], which is a bus service that would run between Ceres and Merced and connect to the trains at Ceres, which was approved as Phase I of the *ACE Extension Lathrop to Ceres/Merced EIR* (Prior EIR). This analysis presents these decrease in fuel consumption from the elimination of this bus service.

This analysis compares the energy use from the operations of shuttles due to the Proposed Project in 2030 and 2040 with the No Project Conditions in 2030 and 2040. Under the No Project Conditions, the Proposed Project would not be implemented and the increase in ridership would not take place. Therefore, there would be no increase in shuttle service at the existing Great America

[4] For locomotive idling, the worst-case year would be full operations (2030) because there would be about twice as much idling at the Merced Station and about four times as much idling at the Merced Layover & Maintenance Facility, compared to the idling at these two locations for initial operations of one train in 2025. This analysis evaluates the full operational scenario in 2030.

[5] As discussed in Chapter 2, *Project Description*, operations could start by 2025 with one round trip per day between Ceres and Merced increasing to four round trips per day in 2030. The year 2030 was selected for the Energy analysis over 2025 since the Project would first reach its full level of operation in 2030 including its full level of train operations. In addition, given the progressive improvement in passenger vehicle efficiency, the benefits of diverting passenger vehicle use through increase train use would be lower in 2030 than in 2025 on a per vehicle-mile travelled (VMT) diverted basis and thus the analysis for 2030 would be conservative compared to 2025.

[6] This would be an electric bus bridge.

and Pleasanton Stations and no associated energy demand. Under the No Project Conditions, operations of the Ceres to Merced Bus Bridge would take place and there would be an associated energy demand from operations of this service.

Station and Merced Layover & Maintenance Facility Operations

The Proposed Project includes the construction of three new stations (Turlock, Livingston, and Merced Stations). In addition, the Merced Layover & Maintenance Facility would be constructed to support operation and maintenance activities associated with the Proposed Project. Operation of these new facilities would result in new electricity consumption, in particular for lighting at surface parking lots at stations and wayside power at the Merced Layover & Maintenance Facility.

This analysis compares the energy use from operations of the proposed stations and the Merced Layover & Maintenance Facility in 2030 and 2040 with the No Project Conditions in 2030 and 2040. Under the No Project Conditions, there would be no operations of the stations or facilities and, therefore, there would be no energy use under the No Project Conditions associated with operations of stations and facilities.

Displaced Passenger Vehicle Miles

The Proposed Project would introduce new passenger rail service between Ceres and Merced. Operations of the Proposed Project would divert traffic from the region's roadways and reduce automobile usage. In order to estimate avoided VMT, an energy intensity factor was used to convert each automobile vehicle mile into energy demand in Btu. The estimated energy intensity factor for light duty cars was 3,070 Btu per vehicle-mile in 2018 (Bureau of Transportation Statistics 2020). Although energy intensity is likely to decrease, this value was conservatively assumed to be the same for 2030 and 2040.

This analysis compares the energy savings (due to reduced VMT) from operations of the Proposed Project in 2030 and 2040 with the No Project Conditions in 2030 and 2040. The No Project Conditions would involve the use of a bus bridge between Ceres and Merced instead of train service. This bus bridge would result in VMT reductions (compared to the existing conditions without the bus bridge) because passengers would use the bus bridge and then ACE train service instead of driving. The passenger ridership quantities and VMT reductions associated with the bus bridge are considered to be part of the system-wide No Projection Conditions. The Proposed Project's displaced quantity of VMT is relative to No Project Conditions and, thus, represents the Proposed Project's incremental reduction in VMT relative to system-wide ACE operation, including operation of the bus bridge.

3.6.4.2 Thresholds of Significance

According to Appendix F of the CEQA Guidelines, conserving energy may be achieved by decreasing overall per capita energy consumption; decreasing reliance on fossil fuels such as coal, natural gas, and oil; and increasing reliance on renewable energy sources. Appendix G of the CEQA Guidelines identifies significance criteria to be considered for determining whether a project could have significant impacts on energy conservation. Under these criteria, an energy impact would be considered significant if construction or operation of the Proposed Project would have either of the following consequences.

- Potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

3.6.4.3 Impacts and Mitigation Measures

Impact EN-1	Construction and operations of the Proposed Project would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources.
Level of Impact	**Less than significant impact (beneficial)**

Impact Characterization and Significance Conclusion

Proposed Project

Construction

Construction impacts are defined as those resulting from building the Proposed Project, its associated infrastructure, and related physical changes. During construction of the Proposed Project, energy in the form of gasoline and diesel would be consumed to produce and transport construction materials, operate and maintain construction equipment, and transport construction workers to and from work sites. Energy would be used to construct the Proposed Project. Natural gas is not typically used during construction and none of the construction equipment identified for the Proposed Project would require electricity. Energy consumption associated with construction would be temporary and would cease when construction activities are complete.

Table 3.6-4 summarizes the estimated expenditure of diesel and gasoline associated with construction of the Proposed Project. Total gasoline and diesel use for construction of the Proposed Project is estimated to be approximately 233,000 gallons (36 billion Btu). However, the energy expenditure associated with construction of the Proposed Project would be temporary and limited to the duration of the construction period.

In addition, many financial incentives are offered by government agencies and utility companies to support energy-efficient investments. Thus, it is anticipated that construction materials built and purchased from offsite suppliers would be efficiently produced based on the economic incentive for efficiency. Additionally, jurisdictions where the Proposed Project would be constructed require reuse and recycling of construction and demolition materials, which would reduce the inherent energy cost of materials. Furthermore, implementation of Mitigation Measures AQ-2.1 and AQ-2.2 would require use of advanced emissions controls for off-road equipment, all construction equipment to be properly maintained, advanced emissions controls for locomotives, and use of a modern fleet for material delivery and haul trucks during the construction of the Proposed Project. These mitigation measures would require the use of newer construction equipment, locomotives, and on-road vehicles that are generally more fuel efficient than older models. Thus, energy resources would not be consumed in a wasteful, inefficient, or unnecessary manner during construction and environmental impacts would be less than significant.

Table 3.6-4. Proposed Project—Construction Fuel Consumption

Proposed Project Facilities	Fuel Consumption, Diesel (gallons)	Fuel Consumption, Gasoline (gallons)	Btu (billions)[a, b]
Ceres to Merced Extension Alignment	97,542	12,661	15
Turlock Station	27,628	3,446	4
Livingston Station[c]	24,515	2,855	4
Merced Station	21,401	2,265	3
Merced Layover & Maintenance Facility	62,065	8,183	10
Total	233,151	29,410	*36*

[a] Diesel heat content used for conversion to Btu: 137,381 Btu/gallon (Energy Information Administration 2020c).
[b] Gasoline heat content used for conversion to Btu: 120,286 Btu/gallon (Energy Information Administration 2020c).
[c] The Atwater Station Alternative would require the same amount of fuel during construction, as the proposed Livingston Station.

Operations

Operations impacts are those resulting from ongoing, routine, and occasional activities associated with operation of the Proposed Project. During operations, the new stations would not result in any demand for natural gas (Garcia pers. comm.) and would comply with applicable Cal. Code Regs., Title 24 standards for energy efficiency. The Merced Layover & Maintenance Facility would, however, require the use of natural gas.

Proposed Project operations would involve up to four additional one-way morning service trips and four additional one-way evening service trips between Ceres and Merced, operations of new stations (the Turlock Station, Livingston Station, and Merced Station), and operations of the Merced Layover & Maintenance Facility, all of which would result in an increase in energy consumption. However, the new service and accessibility to ACE passenger rail services would encourage the diversion of travelers and commuters from automobiles to passenger rail. The reduction in automobile VMT and the related decrease in fuel consumption would offset the energy demands for the Proposed Project and result in a net energy savings relative to the No Project Conditions.

As described in Section 3.6.4.1, *Methods for Analysis*, the analysis of energy demand associated with the Proposed Project considers the following components.

- Increased consumption of petroleum from operation of passenger rail service. Renewable diesel fuel would be used for the locomotives, which would result in lower petroleum consumption than what is presented in this section.
- Increased consumption of fuel from expanded shuttle service at Great America and Pleasanton Stations due to increased ridership with the Proposed Project.
- New consumption of electricity associated with the Turlock Station, Livingston Station, Merced Station, and the Merced Layover & Maintenance Facility. New consumption of natural gas with the Merced Layover & Maintenance Facility.
- Reduced automobile VMT and savings in automobile fuel consumption due to modal shift to commuter rail transit.

New operations of passenger rail services would result in increased consumption of petroleum. Table 3.6-5 summarizes the daily operating hours and associated diesel use under existing conditions (2019)[7], the 2030 scenarios, and the 2040 scenarios. Operations of the Proposed Project would increase diesel use by approximately 17.2 billion Btu annually in 2030 and 2040 compared to the No Project Conditions.

Table 3.6-5. Proposed Project and Atwater Station Alternative Operations—Annual Locomotive Fuel Consumption

	Daily Hours by Locomotive[a]	Diesel Use (gallons)	Diesel Use (Btu billions)[b]
Existing Conditions (2019)[c]	17.6	455,000	63.1
2030 No Project Conditions	0	0	0.0
2030 Proposed Project	4.8	124,953	17.2
2030 Atwater Station Alternative	4.8	124,953	17.2
[2030 Proposed Project] – [2030 No Project Conditions]			17.2
[2030 Atwater Station Alternative] – [2030 No Project Conditions]			17.2
2040 No Project Conditions	0	0	0.0
2040 Proposed Project	4.8	124,953	17.2
2040 Atwater Station Alternative	4.8	124,953	17.2
[2040 Proposed Project] – [2040 No Project Conditions]			17.2
[2040 Atwater Station Alternative] – [2040 No Project Conditions]			17.2

[a] Locomotive fuel consumption rate based on the Prior EIR (25,852 gallons per hour of operation).
[b] Diesel heat content used for conversion to Btu: 137,381 Btu/gallon (Energy Information Administration 2020c).
[c] The numbers presented for the existing conditions represent the energy use along the existing system between San Jose and Stockton. No ACE Locomotives currently operate between Ceres and Merced.

Operations of the Proposed Project would result in expanded shuttle service at Great America and Pleasanton Stations due to increased ridership (see Chapter 2, *Project Description*). Expanded shuttle vehicle services would increase fuel consumption of diesel, compressed natural gas (CNG), and electricity. Table 3.6-6 summarizes the annual diesel, CNG, and electricity use of vehicle shuttles/bus bridges under existing conditions (2019), the 2030 scenarios, and the 2040 scenarios. Shuttle and bus operations due to operation of the Proposed Project would result in a decrease of diesel, CNG, and electricity use by approximately 0.2 billion Btu in 2030, compared to the No Project Conditions, and an increase of diesel, CNG, and electricity use of approximately 0.5 billion Btu in 2040, compared to the No Project Conditions.

Operations of the Proposed Project would also result in new consumption sources of electricity associated with new stations and the Merced Layover & Maintenance Facility, and new consumption of natural gas associated with the Merced Layover & Maintenance Facility. Table 3.6-7 summarizes the energy use anticipated for operations of the new stations included in Proposed Project. As shown, operation of the Proposed Project would result in increased energy demand of approximately 6,424 million Btu per year, compared to the No Project Conditions.

[7] 2019 was used as the baseline condition because full year data was not available for 2020 during EIR preparation and because 2020 is an anomalous year for transportation emissions due to the substantial disruptions due to the COVID-19 health emergency.

Table 3.6-6. Proposed Project and Atwater Station Alternative Operations—Annual Vehicle Shuttle/Bus Bridge Fuel Consumption

	Annual Fuel			Btu (billions)			
	Great America Station Vehicle Shuttle (CNG, diesel gallon equivalent)	Pleasanton Station Vehicle Shuttle (diesel, gallons)	Ceres-Merced Bus Bridge (kWh)	Great America Station Vehicle Shuttle[a]	Pleasanton Station Vehicle Shuttle[a]	Ceres–Merced Bus Bridge[b]	Total
Existing (2019)	-	-	-	-	-	-	-
2030 No Project Conditions	-	-	197,943	-	-	0.7	0.7
2030 Proposed Project	3,111	676	-	0.4	0.1	-	0.5
2030 Atwater Station Alternative	3,111	676	-	0.4	0.1	-	0.5
[2030 Proposed Project] – [2030 No Project Conditions]							-0.2
[2030 Atwater Station Alternative] – [2030 No Project Conditions]							-0.2
2040 No Project Conditions	-	-	197,943	-	-	0.7	0.7
2040 Proposed Project	8,710	-	-	1.2	-	-	1.2
2040 Atwater Station Alternative	8,710	-	-	1.2	-	-	1.2
[2040 Proposed Project] – [2040 No Project Conditions]							0.5
[2040 Atwater Station Alternative] – [2040 No Project Conditions]							0.5

CNG = compressed natural gas.
kWh = kilowatt hour.
[a] Diesel heat content used for conversion to Btu: 137,381 Btu/gallon (Energy Information Administration 2020c).
[b] Electricity heat content used for conversion to Btu: 3,412 Btu/kWh (Energy Information Administration 2020c).

Table 3.6-7. Proposed Project and Atwater Station Alternative Operations—Energy Use at New Stations and Facilities

Proposed and Alternative Facilities	Energy Usage with the No Project Conditions (kWh, Btu, Btu millions, or gallons)	Future Energy Usage (kWh, Btu, Btu millions, or gallons)
Proposed Project		
Electricity at Turlock Station (kWh/month)	--	2,584
Electricity at Livingston Station (kWh/month)	--	2,655
Electricity at Merced Station (kWh/month)	--	3,086
Electricity at Merced Layover & Maintenance Facility (kWh/month)	--	77,218
Natural Gas at Merced Layover & Maintenance Facility (Btu/month)	--	243,483,333
Emergency Generator Fuel Consumption at Merced Layover & Maintenance Facility (average gallons/month)		10
Total Monthly Electricity (kWh)	--	*85,543*
Total Annual Electricity (kWh)	--	*1,026,516*
Total Annual Electricity, Natural Gas, and Diesel Consumption —(Btu millions)[a]	--	*6,440*
Total Annual Proposed Project Electricity and Natural Gas Above No Project Conditions (Btu millions)	--	*6,440*
Alternative Analyzed at an Equal Level of Detail		
Electricity at Atwater Station Alternative	--	2,799
Total Monthly Electricity with the Atwater Station Alternative (kWh)	--	*85,687*
Total Annual Electricity with the Atwater Station Alternative (kWh)	--	*1,028,244*
Total Annual Electricity and Natural Gas with Atwater Station Alternative—(Btu millions)[a]	--	*6,446*
Total Annual Atwater Station Alternative Electricity and Natural Gas Above No Project Conditions (Btu millions)	--	*6,446*

kWh = kilowatt hour.
Btu = British thermal units.
[a] Electricity heat content used for conversion to Btu: 3,412 Btu/kWh (Energy Information Administration 2020c).

Operations of the Proposed Project would also result in reduced automobile VMT and savings in automobile fuel consumption due to modal shift to commuter rail transit. This modal shift would offset the energy demands associated with ACE operations and locomotive idling, expanded shuttle service, station operations, and operations of the Merced Layover & Maintenance Facility. Table 3.6-8 presents the annual energy savings from reduced automobile VMT due to modal shift for 2030 and 2040. Based on the projected ACE ridership resulting from operation of the Proposed Project, the mode switch from vehicle to ACE under the Proposed Project is estimated to reduce VMT annually by approximately 24.0 million in 2030 and approximately 30.7 million in 2040, compared to the No Project Conditions. This decrease in automobile VMT would result in an annual savings of approximately 73.6 billion Btu per year in 2030 and approximately 94.2 billion Btu per year in 2040, compared to the No Project Conditions.[8]

Table 3.6-8. Proposed Project and Atwater Station Alternative Operations—Annual ACE Ridership and Total Automobile VMT Displaced

	Annual ACE Ridership (thousands)	Annual Auto VMT Displaced (millions)	Btu Reduction (billions)[a]
Existing (2019)	0	0	0
2030 No Project Conditions	0	0	0
2030 Proposed Project	441	24.0	73.6
2030 Atwater Station Alternative	445	24.4	74.8
[2030 Proposed Project] – [2030 No Project Conditions]			*73.6*
[2030 Atwater Station Alternative] – [2030 No Project Conditions]			*74.8*
2040 No Project Conditions	0	0	0
2040 Proposed Project	567	30.7	94.2
2040 Atwater Station Alternative	570	31.1	95.5
[2040 Proposed Project] – [2040 No Project Conditions]			*94.2*
[2040 Atwater Station Alternative] – [2040 No Project Conditions]			*95.5*

Source: Bureau of Transportation Statistics 2020.
VMT = vehicle miles traveled.
Btu = British thermal units.
[a] An "energy intensity factor" was used to convert each automobile vehicle mile into energy demand in Btu. The estimated energy intensity factor for light duty cars was 3,070 Btu per vehicle-mile in 2018. This value was conservatively assumed to be the same for 2030 and 2040.

Overall, operations of the Proposed Project would result in net energy savings. As shown in Table 3.6-9, the annual net energy reductions from operation of the Proposed Project would be approximately 50.2 billion Btu per year in 2030 and approximately 70.1 billion Btu per year in 2040, compared to the No Project Conditions.

[8] With the No Project Conditions, ACE service between Ceres and Merced would consist of electric bus service only. As noted in Section 3.6.4.1, Methods for Analysis, the No Project Conditions would result in reductions of VMT from the use of the bus bridge. Energy reductions from those VMT reductions are not included in the No Project Conditions row in Table 3.6-8 because the Proposed Project's VMT-related emissions are relative to the entire ACE system, including the bus bridge. In other words, for VMT accounting purposes the No Project Conditions are assumed to be zero.

Table 3.6-9. Proposed Project and Atwater Station Alternative Operations—Summary of Annual Energy Demand (Compared to No Project Conditions)

Source of Energy Use	Btu/Year (2030) (billions)	Btu/Year (2040) (billions)
Proposed Project Energy Expenditures (net change from No Project Conditions)		
Locomotive fuel consumption	17.2	17.2
Shuttle fuel consumption	-0.2	0.5
Energy use at new stations and the Merced Layover & Maintenance Facility	6.4	6.4
Subtotal	23.4	24.1
Atwater Station Alternative Energy Expenditures (net change from No Project Conditions)		
Locomotive fuel consumption	17.2	17.2
Shuttle fuel consumption	-0.2	0.5
Energy use at new stations and the Merced Layover & Maintenance Facility	6.4	6.4
Subtotal	23.4	24.1
Proposed Project and Atwater Station Alternative Energy Savings		
VMT displaced (Proposed Project)	-73.6	-94.2
Net Energy Demand (Proposed Project)	**-50.2**	**-70.1**
VMT Displaced (Atwater Station Alternative)	-74.8	-95.5
Net Energy Demand (Atwater Station Alternative)	**-51.4**	**-71.4**

VMT = vehicle miles traveled.
Btu = British thermal units.

As shown in Table 3.6-1, rail travel per passenger-mile is less energy intensive than travel by car, personal truck, and transit buses per passenger-mile. With implementation of the Proposed Project, additional travelers could choose to ride ACE instead of an alternative form of transportation. Therefore, despite increased energy demand as a result of additional train operations and roundtrips, implementation of the Proposed Project would reduce automobile VMT and consequently reduce energy consumption per passenger mile. This change in energy consumption due to the Proposed Project would be an environmental benefit.

Overall, as shown in Table 3.6-9, operation of the Proposed Project would result in a net energy savings compared to the No Project Conditions. Energy use benefits achieved through operation of the Proposed Project would offset the short-term construction energy use in less than a year. Energy savings achieved thereafter would contribute to reductions in energy use. In addition, energy demand at new stations and facilities would be further minimized through compliance with Cal. Code Regs., Title 24 standards and would not result in activities that consume electricity in an inefficient manner. Energy demand with operations of the Proposed Project would result in less energy use than the No Project Conditions. As such, the Proposed Project would result in a beneficial impact on the environment and, therefore, the environmental impacts associated with the wasteful, inefficient, or unnecessary consumption of energy resources would be less than significant.

Atwater Station Alternative

Like the Proposed Project, the Atwater Station Alternative would result in a less-than-significant (beneficial) environmental impact from reduced energy demand. Operations of the Atwater Station Alternative would result in a slightly greater reduction of VMT than the proposed Livingston Station.

The estimated expenditure of diesel and gasoline associated with construction of the Atwater Station Alternative would be the same as for the proposed Livingston Station (see Table 3.6-4). For the same reasons as the Proposed Project, energy resources would not be consumed in a wasteful, inefficient, or unnecessary manner during construction of the Atwater Station Alternative and environmental impacts would be less than significant.

For the same reasons as the Proposed Project, the Atwater Station Alternative would result in a beneficial impact on the environment and the environmental impacts associated with the wasteful, inefficient, or unnecessary consumption of energy resources would be less than significant. As shown in Table 3.6-5 and 3.6-6, operations of the Atwater Station Alternative would result in the same demand of locomotive fuel consumption and shuttle fuel consumption as the Proposed Project. As shown in Table 3.6-7, electrical use at the Atwater Station Alternative would be slightly greater than the proposed Livingston Station due to the slightly larger station footprint. In addition, as shown in Table 3.6-8, the Atwater Station Alternative is expected to reduce the energy demand slightly more than the proposed Livingston Station because the Atwater Station Alternative would result in a greater VMT reduction than the proposed Livingston Station. Overall, as summarized in Table 3.6-9, operations of the Atwater Station Alternative is expected to have a greater reduction in energy demand compared to the Proposed Project. In 2030, operation of the Atwater Station Alternative is expected to result in a net energy savings of 51.4 billion Btu per year compared to a net energy savings of 50.2 billion Btu per year for the Proposed Project. In 2040, operation of the Atwater Station Alternative is expected to result in a net energy savings of 71.4 billion Btu per year compared to a net energy savings of 70.1 billion Btu per year for the Proposed Project. Energy use benefits achieved through operation of the Atwater Station Alternative would offset the short-term construction energy use in less than a year. Energy savings achieved thereafter would contribute to reductions in energy use.

Impact EN-2	Construction and operations of the Proposed Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.
Level of Impact	**Less than significant impact**

Impact Characterization and Significance Conclusion

Proposed Project

There are various state and local plans that contain policies about clean energy and energy efficiency. The *State Energy Action Plan* calls for the state to assist in the transformation of its transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the fewest environmental and energy costs (California Public Utilities Commission 2008). The Regional Transportation Plan/Sustainable Communities Strategy for Merced County contains a goal to reduce usage of nonrenewable energy resources for transportation purposes. The general plans for Merced County and the cities of Livingston, Merced, and Turlock contain policies related to clean energy and energy efficiency. These policies are contained in *Appendix G, Regional Plans and Local General Plans* and generally relate to promoting energy efficiency and clean energy in building design and transportation.

As discussed in Impact EN-1, during construction of the Proposed Project, energy would be consumed to produce and transport construction materials, to operate and maintain construction equipment, and to transport construction workers to and from work sites. Large equipment used for construction would be powered with diesel fuel. Overall, energy consumption would involve mostly

diesel fuel for construction equipment and transport, with negligible quantities of electricity required. PG&E, Turlock Irrigation District, and Merced Irrigation District would be able to accommodate the increase in temporary electricity use with existing resources. Electricity consumption during construction would not be substantial and, thus, would not affect the ability of PG&E, Turlock Irrigation District, or Merced Irrigation District to serve the region with existing supplies or obstruct the ability of these electricity providers to comply with applicable state or local plan requirements regarding clean energy.

Operation of the Proposed Project would result in an increase in energy consumption. The energy consumption would be primarily associated with the trains' consumption of diesel fuel and consumption of energy at new stations and the Merced Layover & Maintenance Facility. During operation of the Proposed Project, ACE trains would continue to run on diesel fuel. Renewable diesel fuel would be used for the locomotives, which would result in less traditional diesel fuel consumption than what is presented in this section. As such, the fuel estimate is conservative because it does not account for the use of renewable diesel fuel. Energy savings from avoided VMT would fully offset energy use from train operation under the Proposed Project, as the amount of energy consumed in diesel fuel use would be less than the amount of energy saved from avoided personal vehicle use under the No Project Conditions (see Table 3.6-9). Lighting, mechanical systems, and maintenance activities at new stations and the Merced Layover & Maintenance Facility would result in demand for electricity and natural gas from regional and local providers. The energy consumption during operation would not result in a substantial increase in energy demand and would not obstruct the ability of energy providers to comply with state and local plan requirements regarding clean energy. In addition, the new stations and layover facility would comply with applicable Cal. Code Regs., Title 24 standards, which require installation and maintenance of energy-efficient electrical systems. As discussed in Impact EN-1, energy use benefits achieved through operation of the Proposed Project would offset the short-term construction energy use in less than a year.

Overall, the Proposed Project would not obstruct the ability of energy providers to comply with state and local plan requirements regarding clean energy and impacts would be less than significant.

Atwater Station Alternative

The *City of Atwater General Plan* contains energy-related policies with similar intent to those included in the other general plans that are applicable to the Proposed Project. As described in Impact EN-1, the Atwater Station Alternative would reduce energy demand to a greater extent than the proposed Livingston Station because the Atwater Station Alternative would result in a slightly greater VMT reduction. These energy savings would fully offset energy use from train operation under the Atwater Station Alternative. For the same reasons as described for the Proposed Project, the Atwater Station Alternative would result in a less than significant impact, as it would not conflict with or obstruct applicable state and local plans related to clean energy or energy efficiency.

3.6.4.4 Overall Comparison of the Proposed Livingston Station and Atwater Station Alternative

Because the Atwater Station Alternative would have slightly higher ridership and associated VMT reductions than the proposed Livingston Station, the Atwater Station Alternative would have slightly greater reduction in energy demand compared to the proposed Livingston Station. As shown in

Table 3.6-9, annual energy reductions for the Atwater Station Alternative would be greater than the proposed Livingston Station by 1.2 and 1.3 billion Btu per year, relative to the No Project Conditions.

Overall, both the Atwater Station Alternative and the proposed Livingston Station would result in benefits from reduced energy demand. However, overall, the Atwater Station Alternative would result in greater benefits due to slightly greater reductions in energy demand.