FINAL
SUPPLEMENT ANALYSIS

WESTERN AREA POWER ADMINISTRATION
RIGHT-OF-WAY MAINTENANCE IN THE SAN JOAQUIN VALLEY ENVIRONMENTAL ASSESSMENT DOE/EA-1697-SA-01

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Tables

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Acronyms

% percent
AAQS Ambient Air Quality Standards
AB Assembly Bill
ACHP Advisory Council on Historic Preservation
ARB Air Resources Board
BLM Bureau of Land Management
CAAQS California Ambient Air Quality Standards
CC1 Contra Costa #1 Pumping Plant
CC3 Contra Costa #3 Pumping Plant
CC4 Contra Costa #4 Pumping Plant
CCR California Code of Regulations
CDFW California Department of Fish and Wildlife
CFR Code of Federal Register
CNDDB California Natural Diversity Database
CNPS California Native Plant Society
CO carbon monoxide
DOE Department of Energy
DWR Department of Water Resources
EA Environmental Assessment
EO Executive Order
EPA US Environmental Protection Agency
ESA Endangered Species Act
FONSI Finding of No Significant Impact
FR Federal Register
GHG greenhouse gas
GRIPS Guidelines, Requirements, Inspection, and Procedures Standards
HIL Highland Peak Microwave Facility
HWR Howard Ranch Microwave Facility
ID Identification

IPaC Information Planning and Conservation

IVM Integrated Vegetation Management

kV kilovolt

NAAQS National Ambient Air Quality Standards

NEPA National Environmental Policy Act

NHPA National Historic Preservation Act

NHTSA National Highway and Traffic Safety Administration

NMFS National Marine Fisheries Service

NO_2 nitrogen dioxide

NOx nitrogen oxides

NRHP National Register of Historic Places

O&M operation and maintenance

O_3 ozone

PA Programmatic Agreement

PCM Project Conservation Measure

PM particulate matter

PXY Pixley Microwave Facility

ROG reactive organic gases

ROW right-of-way

SA Supplement Analysis

SF_6 sulfur hexafluoride

SHPO California State Historic Preservation Officer

SIP State Implementation Plan

SJ San Joaquin

SO_2 sulfur dioxide

SOP Standard Operating Procedure

TAC toxic air contaminants

TANC Transmission Agency of Northern California

USFWS US Fish and Wildlife Service

USGS United States Geological Society

WAPA Western Area Power Administration

SUPPLEMENT ANALYSIS

CHAPTER 1. INTRODUCTION

The Western Area Power Administration (WAPA) Sierra Nevada Region is a power marketing administration of the U.S. Department of Energy (DOE). As a Federal agency, WAPA is responsible for examining the potential environmental consequences of its proposed actions prior to making a decision or commitment to implement an action. This Supplement Analysis (SA) is a review of the *Final Environmental Assessment (EA) for Right-of-Way Maintenance in the San Joaquin Valley, California*, DOE/EA-1697 (2011 EA), dated December 2011 (WAPA, 2011a). This SA has been prepared in accordance with the DOE's NEPA Recommendations for the Supplement Analysis Process (DOE, 2005).

The 2011 EA analyzed the potential environmental consequences of the proposed San Joaquin Valley Right-of-Way Maintenance Project, as required under the National Environmental Policy Act (NEPA), and other relevant Federal regulations.

1.1 Background

WAPA owns, operates, and/or maintains 17.2-kilovolt (kV), 69-kV, and 230-kV transmission lines, a 17.2-kV distribution line, associated substations, and a maintenance facility in San Joaquin, Contra Costa, Alameda, Calaveras, and Tuolumne counties, and owns and operates additional substations in Santa Clara and Merced counties, California (Figures 1 and 2). WAPA also has legal use of various, improved and unimproved access roads to their transmission lines. Collectively, these transmission line and associated access road rights-of-way (ROW), substations (including a 50-foot buffer surrounding each substation), and maintenance facility, are referred to as WAPA's San Joaquin Valley ROW, and comprise the project area. Portions of these ROWs, including access roads, pass through areas that require proactive vegetation maintenance. Vegetation maintenance is necessary to keep vegetation from interfering with the operation and maintenance (O&M) of the facilities. WAPA implements its Integrated Vegetation Management (IVM) Program, an adaptive management approach to follow environmentally protective vegetation control principles for unwanted vegetation, including natural control, physical/mechanical control, biological control, and chemical control (WAPA, 2007).

In December 2011, WAPA published the 2011 EA (WAPA, 2011a). The 2011 EA evaluated environmental impacts of the Proposed Action (San Joaquin Valley ROW Maintenance Program) and the No Action Alternative. WAPA's San Joaquin Valley ROW Maintenance Program updated the previous O&M Program to include all transmission lines, associated legal access roads, substations, and the maintenance facility into one comprehensive Master O&M Program, which included additional maintenance activities, particularly the use of herbicides in some areas.

The 2011 EA also provided information for Endangered Species Act (ESA) and National Historic Preservation Act (NHPA) consultation processes required for the additional maintenance activities. Subsequent to the publication of the *Draft EA for ROW Maintenance in the San Joaquin Valley, California* (WAPA, 2010b) WAPA reinitiated Section 7 consultation with the United States Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) to include the San Joaquin Valley ROW O&M Program in the programmatic informal consultation on the North Area ROW O&M Project (WAPA, 2010a). On June 6, 2011, WAPA received an amendment from the USFWS to the North Area ROW O&M Project concurrence letter to include the San Joaquin Valley ROW O&M Program and the Sacramento Valley O&M Program (USFWS, 2011). NMFS also concurred, but with additional restrictions placed on activities in or near certain water bodies (NMFS, 2011).

Pursuant to Section 106 of the NHPA, WAPA has a Programmatic Agreement (PA) with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) for existing routine O&M and emergency activities, including O&M and emergency activities along WAPA's ROWs, including access roads and substations (WAPA, 2010a).

1.2 Purpose and need for the San Joaquin Area ROW Maintenance Program

The purpose of the San Joaquin Valley ROW Maintenance Program is to maintain existing transmission line and legal access road ROWs, as well as substations, a maintenance facility, and other associated facilities (microwave facilities and pumping plants) in a manner: (1) consistent with prudent utility practices, including applicable reliability standards, and (2) that protects environmental resources while improving the efficiency and effectiveness of maintenance activities. WAPA has designed this maintenance program to balance environmental protection with system reliability and compliance with the National Electric Safety Code; Western Electricity Coordinating Council requirements; North American Electric Reliability Corporation reliability standards; Institute of Electrical and Electronics Engineers standards; and WAPA's Guidelines, Requirements, Inspections and Procedures Standards (GRIPS), Orders, and directives for maintaining system reliability and protection of human safety.

To meet this purpose, WAPA's objectives are to maintain its ROWs to:

- Protect from operational hazards;
- Provide access for maintenance;
- Protect facilities from fire;
- Control the spread of noxious weeds and protect environmental quality;

- Develop a technically and economically efficient program;
- Protect public and worker safety;
- Maintain sound relationships with land owners and land managers;
- Streamline regulatory permitting activities;
- Protect significant environmental resources, as defined by applicable Federal, state, and local laws; and
- Comply with environmental laws and regulations affecting Federal actions.

The need for the program includes:

- Eliminating the threat for vegetation to interfere with the lines and towers. Vegetation near transmission lines may pose a threat to public safety and the environment from arcing (which can cause fires) and trees falling onto the transmission lines;
- Performing O&M activities in a cost-effective manner that would benefit the public and natural ecosystems; and
- Maintaining the transmission line and legal access road ROWs to ensure that WAPA's maintenance crews have safe and all-weather access to ROW facilities.

1.3 Purpose and Need for the Supplement Analysis

In accordance with DOE policy §1021.330, all DOE organizations are required to evaluate sitewide NEPA documents every five years, including site-wide EAs, to determine whether the EA remains adequate, or whether to prepare a new EA, Supplemental EA, or Finding of No Significant Impact (FONSI) is required. This SA evaluates the 2011 *Final EA for ROW Maintenance in the San Joaquin Valley, California* (WAPA, 2011a). This evaluation requires identifying required updates to meet changes in maintenance operations, identifying new environmental regulations that impact the operations, and determining whether the existing EA continues to satisfactorily meet NEPA requirements or whether changes have occurred in the Proposed Action or environmental regulations that are substantial enough to trigger a supplemental EA. Based on the analysis, the SA will specifically determine:

- Whether there are new circumstances or information relevant to environmental concerns regarding the Proposed Action and/or their impacts.
- Whether any further NEPA documentation is required in addition to the SA.

The list of documents reviewed as part of this SA are shown in Table 1-1.

TABLE 1-1. Documents Reviewed as Part of Supplement Analysis

Document	Published Date
Final EA for ROW Maintenance in the San Joaquin Valley, California DOE/EA-1697 and Appendices	December 2011
Draft EA for ROW Maintenance in the San Joaquin Valley, California DOE/EA-1697	June 2010
San Joaquin Valley ROW Maintenance Project FONSI	December 2, 2011
Final EA for the North Area ROW Maintenance Program	June 2010
US Fish and Wildlife Service (USFWS) Programmatic Informal Consultation for the WAPA North Area ROW Operations and Maintenance Project, from Klamath County, Oregon through Alameda County, California	October 9, 2009
USFWS Amendment to the Informal Consultation for the Western Area Power Administration North Area ROW Operations and Maintenance Project, from Klamath County, Oregon through Alameda County, California	June 6, 2011
NMFS, Southwest Region, Letter confirming NMFS Section 7 of the ESA consultation for the North Area ROW O&M and San Joaquin Valley ROW programs.	September 16, 2011
Section 106 PA among WAPA, the ACHP, and the California SHPO concerning Emergency and Routine Operation and Maintenance Activities and other Routine Activities at Western Facilities in California	January 10, 2010
Cultural Resources Inventory Report for the San Joaquin Valley ROW Maintenance EA Project	July 2010
Cultural Resources Background Research/Filed Strategy Report for the San Joaquin Valley ROW Maintenance EA	March 2009
California Natural Diversity Database (CNDDB)	December 2016
California Native Plant Society (CNPS)	December 2016
California Department of Fish and Wildlife (CDFW) Special Animal List	October 2016
USFWS Information Planning and Conservation (IPaC)	December 2016

SUPPLEMENT ANALYSIS

CHAPTER 2. REVIEW OF PROJECT CHANGES

2.1 Project Area and Project Activities

The 2011 EA project area includes transmission line and legal access road ROWs, substations, and a maintenance facility within WAPA's Sierra Nevada Region of central California, which includes portions of San Joaquin, Contra Costa, Alameda, Calaveras, Tuolumne, Santa Clara, and Merced counties (see Figures 1 and 2). The project area includes approximately 125 miles of transmission line ROW, 28 miles of access roads, seven substations, one maintenance facility, three pumping plants, and three microwave facilities. The transmission lines are located adjacent to existing roads, farm roads, or levee roads (see Figures 3 through 6).

In the 2011 EA, the project area was divided into three geographical regions: Tracy, New Melones, and Morgan Hill/San Luis. The transmission line ROW, substations (including a 50-foot buffer surrounding each substation), and maintenance facility that comprise each area are described in this section. Legal access roads are located close to and outside of transmission line ROWs.

Tracy Area

The Tracy region of the project area now consists of the following substations, microwave facilities, and transmission line ROWs and access roads.

- Tracy Substation and Tracy Maintenance Facility within substation fencing, Los Vaqueros Substation, and Livermore Substation;
- Contra Costa #1, #3, and #4 Pumping Plants;
- Highland Peak and Pixley Microwave facilities;
- Hurley-Tracy #1/#2 230-kV transmission line between the Tracy Substation and the San Joaquin County/Sacramento County border;
- Tracy-Contra Costa 69-kV transmission line between the Tracy Substation and Contra Costa #4 Pumping Plant in Antioch;
- Tracy-Los Vaqueros 69-kV transmission line between the Tracy-Contra Costa transmission line (near Kellogg Creek Road in Contra Costa County) and the Los Vaqueros Substation;
- Byron-Bethany Tap 69-kV transmission line between the Tracy-Contra Costa transmission line and the Byron-Bethany Canal (near the Alameda-Contra Costa County line);
- Old River-Middle River 69-kV transmission line between the Los Vaqueros Substation and the Middle River Intake Pumping Plant;

- Tracy-Delta Mendota Canal Intertie 69-kV transmission line between the Tracy Substation and Delta Mendota Canal Intertie Pumping Plant;
- Tracy-Lawrence Livermore National Laboratory 230-kV transmission line between the Tracy Substation and Livermore Substation; and
- Livermore-424 115-kV transmission line between the Livermore Substation and Lawrence Livermore National Laboratory.

New Melones Area

The New Melones region of the project area consists of the following substations and transmission and distribution line ROWs and access roads.

- New Melones Substation;
- New Melones #1/#2 230-kV transmission line between the New Melones Generation Facility and the New Melones Substation;
- Tuttletown 17.2-kV line, east of New Melones Lake; and
- Gloryhole 17.2-kV line, north of New Melones Lake.

Morgan Hill/San Luis Area

The Morgan Hill/San Luis region of the project area now consists of three substations and one microwave facility.

- Coyote Substation in Morgan Hill;
- Pacheco Substation, west of the San Luis Reservoir;
- O'Neill Substation, east of the San Luis Reservoir; and
- Howard Ranch Microwave Facility, east of Interstate 5.

Project Activities in All Areas

Project activities for all areas include inspections, maintenance, and upgrades, described in detail in the EA and listed below.

- Inspection/system management
  - Aerial inspections
  - Ground inspections
  - Climbing inspections
- Maintenance Activities

    - Vegetation maintenance for transmission line ROW, access road ROW, substations, and maintenance facility
    - Access road maintenance – including culverts and ditches
    - Maintenance of transmission line substation, maintenance facility, and associated structure, hardware, and equipment
- Vegetation Maintenance
    - Wire Zone/Border Zone Approach
    - Buffered Approach
    - Manual vegetation control methods – cutting, girdling, trimming, slash/fuel reduction
    - Mechanical vegetation control methods
    - Herbicide control methods – selective, non-selective
- Equipment/System Upgrades – conductors, capacitor banks, transformers and breakers, small solar power arrays, and other electrical equipment

The 2011 EA included implementation of an Integrated Vegetation Management (IVM) Program within the Master O&M Program. The IVM Program contains a number of options for vegetation control, including cultural/natural control, physical/mechanical control, biological control, and chemical control. WAPA's current IVM Program is described in the *Integrated Vegetation Management Guide and Transmission Vegetation Management Program* (WAPA, 2007); this guide is updated periodically to reflect changes to industry standard maintenance practices and WAPA's own studies on maintenance effectiveness.

2.2 Changes in Project Area

WAPA maintains transmission lines to pumping plants near the existing ROW, and maintains several microwave facilities in the San Joaquin Valley. Four additional transmission lines are within the project area. WAPA conducts biological surveys and cultural resources surveys, as needed, prior to performing activities at these locations. Habitats and activities for these sites and additions to the transmission lines are similar to the other areas and will be added to the EA as an insignificant change.

Table 2-1 provides a summary of additions to the project area, with resource areas potentially impacted. These new sites are shown on Figures 1 through 6.

TABLE 2-1. Project Area Changes		
Description of Area Change	**Geographic Region and Location Description**	**Resource Areas Potentially Impacted**
Contra Costa #1 Pumping Plant 1 (CC1)	Tracy Area 0.037-acre site Located in Contra Costa Canal adjacent to Laurel Road near Highway 4 and existing transmission line	Biological, Cultural, Land Use, Hydrology
Contra Costa #3 Pumping Plant (CC3)	Tracy Area 0.087-acre site Located in Contra Costa Canal adjacent to Laurel Road near Highway 4 and existing transmission line	Biological, Cultural, Land Use, Hydrology
Contra Costa #4 Pumping Plant (CC4)	Tracy Area 0.047-acre site Located in Contra Costa Canal adjacent to Laurel Road near Highway 4 and existing transmission line	Biological, Cultural, Land Use, Hydrology
Highland Peak Microwave Facility (HIL)	Tracy Area 0.071-acre site Located in remote mountain terrain off Morgan Territory Road	Biological, Cultural, Land Use, Aesthetics
Pixley Microwave Facility (PXY)	Tracy Area 1.062-acre site Located at the edge of a golf course, west of Interstate 5 north of 8-mile Road.	Biological, Cultural, Land Use, Aesthetics
Byron-Bethany Tap 69-kV Transmission Line	Tracy Area Between Tracy-Contra Costa transmission line and Byron-Bethany Canal, near Alameda-Contra Costa County line	Biological, Cultural, Land Use, Aesthetics
Old River-Middle River 69-kV Transmission Line And Middle River Intake Pumping Plant	Tracy Area 3.63 mile line between Los Vaqueros Substation and Middle River Intake Pumping Plant (2.14 acres)	Biological, Cultural, Land Use, Hydrology, Aesthetics
Tracy-Delta Mendota Canal Intertie 69-kV Transmission Line And Delta Mendota Canal Intertie Pumping Plant	Tracy Area 4.47 mile line between Tracy Substation and Delta Mendota Canal Intertie Pumping Plant (1.18 acres)	Biological, Cultural, Land Use, Hydrology, Aesthetics
Livermore-424 115-kV Transmission Line	Tracy Area 1.15 mile line between the Livermore Substation and Livermore National Laboratory	Land Use
Howard Ranch Microwave Facility (HWR)	Morgan Hill/San Luis Area 0.065-acre site near orchards and a canal, east of Interstate 5 and west of Highway 33.	Biological, Cultural, Land Use, Aesthetics

2.3 Changes in Project Activities

Substation and maintenance facility activities are restricted to the confines of the existing fenced substation or microwave facility perimeter, and include remediation of small spills. O&M activities are grouped according to their associated activity category, which are listed and described in detail in the EA.

- Category A – Inspection and Minor Maintenance Activities – for substations, transmission lines, communication systems, maintenance facility, includes aerial and ground inspections
- Category B – Routine Maintenance Activities – for transmission lines (ROW, access roads, equipment) and communication system
- Category C – New Infrastructure – for transmission lines and communications systems

Under Category A, no major changes have occurred to the O&M activities or frequency of maintenance or inspection activities. However, there have been a few minor additions to activities. One of these is replacing oil circuit breakers with sulfur hexafluoride (SF_6) gas breakers, at the Contra Costa Pumping Plants substations. SF_6 is regulated as a greenhouse gas (GHG). Oil is still present within transformers. Monthly monitoring is conducted on all gas and oil-containing equipment (breakers, transformers, etc.) in the substation yards. Oil spills less than 1 gallon are listed as Category A and spills between 1 to 10 gallons are listed as Category B. However, cleaning up any spills less than 10 gallons are considered typical Category A O&M activities. Oil detention structures have been added to equipment maintained in Category A activities. These permanent structures are adjacent to substation and maintenance facilities and collect rain water and oil in case of spills.

Under Categories A and B, vegetation management remains the same as described in the EA. An additional herbicide was added to the list included in Appendix G, Herbicide Information, after the EA was finalized. According to Western's 2007 IVM, new herbicides are allowed to be added because all herbicides follow the screening process for selecting appropriate, effective, and safe herbicides. The new herbicide being used is Esplanade 200SC (Trade Name), also known as Indaziflam, US Environmental Protection Agency (EPA) Registration number 432-1516 and manufactured by Bayer, used for weed control.

Under Category A, helicopters are used for aerial inspections. Helicopters are also used under Categories B and C for reconductoring, pole replacement, and delivering personnel. Aircraft was mentioned in the EA; however, helicopters were not specifically listed. Helicopters land at nearby locations outside the ROW. The landing zones are individually surveyed before use to be sure they are appropriate and

conforming to standard operating procedures (SOP) and project conservation measures (PCM).

For substation maintenance, under Category A, typically occurring annually, substation washing has been added as an activity. An additional piece of equipment that is maintained at the substation that was not addressed in the 2011EA, is the shunt reactor. A shunt reactor is an absorber of reactive power, thus increasing the energy efficiency of the system. It is the most compact device commonly used for reactive power compensation in long high-voltage transmission lines and in cable systems.

Activities at the eight additional sites and 4 new transmission lines are the same as the category A, B, and C activities performed at other EA sites. Although WAPA does not own the Contra Costa pumping plants (maintained by Contra Costa Water District), WAPA performs vegetation management on the transmission lines and switchyards. WAPA owns and maintains the CC3 switchyard. Contra Costa Water District owns and operates the Middle River Intake Pumping Plant. US Bureau of Reclamation owns the Delta Mendota Intertie Pumping Plant. WAPA performs vegetation management on these facilities. The Transmission Agency of Northern California (TANC) owns the three microwave facilities, and WAPA performs vegetation management and fence maintenance.

Table 2-2 provides a summary of the changes in project activities per category and resource areas potentially impacted.

TABLE 2-2. Project Activity Changes

Activity Category	Project Activity Added or Revised	Resource Areas Potentially Impacted
A, B	Replace oil in breakers with SF_6 gas	Public Health and Safety, Air Quality
A	Increase size of oil spills up to 10-gallons as O&M	Water Resources
A	Add herbicide Indaziflam to list of herbicides	Biological, Public Health and Safety
A	Maintain oil detention structures	Water Resources
A, B, C	List helicopters as aircraft used for patrols, maintenance, and reconductoring	Biological, Land Use, Noise
A	Add substation washing	Water Resources
A, B	Add shunt reactor to equipment maintained at substations	Water Resources

2.4 Changes in Standard Operating Procedures and Project Conservation Measures

2.4.1 Standard Operating Procedures (SOP)

Western and its contractors follow SOPs for every O&M activity, regardless of the activity category. The SOPs are listed in the EA, grouped according to environmental issue area. All Western O&M personnel are subject to an annual training that includes SOPs, applicable environmental laws and regulations, and applicable agency requirements. Prior to conducting the O&M activity, Western's O&M personnel review the SOPs with contractors to make sure the intent and background of each procedure are clearly understood. In addition, Western's O&M personnel monitor contractors during maintenance activities, and conduct follow-up inspections of the job site at periodic intervals after the has been completed.

No additional or major revisions to SOPS pertaining to the activities described in the EA are required.

2.4.2 Project Conservation Measures (PCM)

Western has developed PCMs to protect natural and cultural resources. The full list of PCMs are included in the EA and divided into the following environmental resources: special-status plants; special-status fish and wildlife; water and aquatic habitats; cultural resources; and paleontological resources. Each PCM is also associated with the applicable activity categories A, B, C. PCMs have been integrated into Western's master GIS database and are used in project planning to generate activity reports. These activity reports identify the sensitive resources within the target area and specify PCMs according to the occurrence of the specific resources and the type of activity proposed. PCMs include, among other things, identification of limited operating periods, pre-construction flagging of sensitive resource areas, and equipment restrictions. Biological resource PCMs apply to species based on their listing status: Federal and state-listed species are protected along all ROWs on all land; and agency-listed species are protected on the agency's land (e.g., BLM sensitive species would be protected on BLM land).

No additional PCMs are required. The existing PCMs in the 2011 EA remain sufficient for the species and the associated environmental resource areas potentially affected.

CHAPTER 3. ANALYSIS

3.1 Introduction

Assessment of the affected environment and environmental consequences in the 2011 EA relied on a combination of existing data and data collected during biological and cultural resource field surveys performed from December 2008 to August 2009 and as needed since then. Surveys were conducted throughout the project area, miles of ROW and access roads, and new facilities. No additional surveys were conducted as part of this SA review.

3.2 Analysis

The analysis consists of a review of the project area and project activities for substantial changes in each environmental resource area, review of the regulatory environment since 2011 for each resource area, review of changes to WAPA's SOPs and the associated resource areas affected, and review of changes to the PCMs for biological and cultural resources. The analysis considers whether the changes are substantial and whether new information must be gathered and evaluated for impacts to environmental resource areas. Chapter 2 provides a description of changes and revisions that have occurred since the EA was published. Analysis for each environmental resource area is presented in this section.

3.2.1 Habitats and Vegetation

No additional habitat types were identified in this SA. New facility sites and transmission lines added to the Tracy and Morgan Hill/San Luis study areas are in close proximity to or along the transmission line ROW. These facilities have increased habitat type acreages which is reflected in Tables 3-1 and 3-2. Figure 2 shows the aerial background overview and Figures 3 through 6 show aerial close ups.

Tracy Area

Additional habitat acres in the Tracy area consist mostly of barren/commercial, agricultural (grain crop, row crop, and orchard), levee, and non-native grassland (0.2 acre dominated by iceplant). Three pumping plants, two microwave facilities, and four transmission lines have been added to the Tracy area.

CC1 and CC3 are along established roads with a high level of disturbance with barren and urban habitat including minimal non-native grassland. CC1 also includes a portion of the irrigation canal.

CC4 is located within disturbed habitat; however, the largest habitat type is attributed to levee structures with additional habitat designated as irrigation canal, non-native grassland, and barren.

HIL is located in a remote area of Contra Costa County. Habitat is dominated by non-native grassland with barren land cover and mixed chaparral. While mixed chaparral habitat is new to the Tracy region, this habitat type was present in the New Melones and Morgan Hill/San Luis areas during the 2011 EA evaluation and the description for the habitat remains the same for the Tracy region.

PXY is located within 150 feet of a canal in the Delta area. The habitat at this site consists primarily of non-native grassland with approximately 0.2 acre dominated by iceplant. The remaining habitat is mostly barren land cover with a small area of Great Valley scrub on the western edge.

Byron-Bethany Tap 69-kV Transmission Line is located within an agricultural setting with the largest habitat type consisting of row crop. Additional habitat is mostly non-native annual grassland followed by urban, commercial, and man-made waters.

Old River-Middle River 69-kV Transmission Line and Pumping Intake Plant is a 3.63-mile length of line within an agricultural setting. Habitat within this ROW consists of agricultural (grain crop and arrow crop) followed by urban/barren/commercial land cover. The remaining habitat is less than 0.5 acre individually and consists of man-made waters, freshwater marsh, river, levee, and non-native annual grassland. The Middle River Intake Pumping Plant is located along the Victoria Canal and consists of levee habitat.

Tracy-Delta Mendota Canal Intertie 69-kV Transmission Line and Pumping Plant is a 4.47 mile length of line located along the Delta Mendota Canal. Habitat is dominated by non-native grassland followed by levee structures. The remaining habitat consists of urban/barren, agricultural row crop and pasture, man-made waters, freshwater marsh, perennial creek, and seasonal wetlands. The Delta Mendota Intertie Pumping Plant is located along the Delta Mendota Canal and consists of levee habitat.

Livermore-424 115 Transmission Line is a 1.15-mile length of line located within the Lawrence Livermore National laboratory industrial site. The dominant habitat at this site consists of commercial landcover followed by barren, urban, non-native grassland, and man-made waters, respectively.

Table 3-1. Habitat Acreages in the Tracy Region (new acres added shown in parentheses).			
Upland Habitat Type	**Acres (added)**	**Wetland Habitat Type**	**Acres (added)**
Agricultural (grain crops, row crops, vineyards, orchards)	916.6 (12.8)	Meadows	9.7
Agricultural pasture	68.2 (0.2)	Wetlands, seasonal	47.3 (<0.1)
Agricultural (rice fields)	39.4	Wetlands, vernal pool (isolated and high density vernal pool grassland)	8.1
Grassland, non-native	313.7 (17.9)	Wetlands, freshwater marsh	3.8 (0.2)
Scrub, chenopod	17.4	Waters, man-made (irrigation canals, ditches, impoundments)	17.4 (0.7)
Levee	45.0 (14.1)	Waters, seeps/springs	0.5
Urban/barren/commercial	171.8 (20.0)	Waters, rivers and creeks	12.6 (0.5)
Chaparral, mixed	<0.1 (<0.1)	Riparian, Great Valley forest	0.2
		Riparian, Great Valley scrub	11.0 (0.1)
TOTAL ACREAGE			**1,624.7**

Morgan Hill/San Luis Area

HWR is the only additional facility located in this area and is within an agricultural setting in Merced County. Additional habitat acreage in the Morgan Hill/San Luis region consists mostly of urban/barren land followed by agricultural and man-made waters (irrigation drainage). The additional man-made waters associated with the HWR habitat buffer area contributed less than 0.1 acre (0.002 acre). This addition is not displayed in Table 3-2 due to the small relative area.

Table 3-2. Habitat acreages in the Morgan Hill/San Luis Region (new acres shown in parentheses).			
Upland Habitat Type	**Acres (added)**	**Wetland Habitat Type**	**Acres (added)**
Agricultural (grain crops and orchards)	2.7 (0.1)	Wetlands, freshwater marsh	< 0.1
Grassland, non-native	0.1	Waters, man-made (reservoir, ditch)	0.2
Urban/barren/commercial	3.1 (0.1)	Riparian, Great Valley scrub	0.2
Chaparral, mixed	0.4		
TOTAL ACREAGE			**6.8**

New Melones Area

Since no facilities were added to the New Melones area, there is no change to the total acreage or habitat types.

3.2.2 Special-Status Plants and Plant Communities

The CNDDB, USFWS IPaC, and CNPS Unites States Geological Society (USGS) 7.5 minute quadrangle lists were evaluated to identify changes to the special status plants under consideration (CNDDB, December 2016; USFWS, 2016; CNPS, 2016). Two additions to the special status plant species list (*Atriplex miniscula* and *Puccinellia simplex*) were identified since the 2011 EA. These additions are based on CNDDB records within 1 mile of project areas within the Tracy region. Five species that were excluded from consideration in 2011 based on lack of suitable habitat are now included for consideration based on the presence of suitable habitat (mixed chaparral) in the HIL Facility buffer area. Other changes on this list were limited to species name and special status classification changes. PCMs were only developed for species with Federal or state special status. PCMs were also developed for special status Federal species, specifically Bureau of Land Management (BLM)-sensitive species in the New Melones region (only areas on BLM property). Revisions to special-status plants considered in the EA are presented in Table 3-3, which are derived from Table 3.3-1 in the 2011 EA.

Table 3-3. Special Status Plants Considered

Species Name	Status [a]	Habitat Types[b]	Bloom period	Areas of Possible Occurrence [c]	PCM-ID	Updated information
Atriplex miniscula Lesser saltscale	CNPS List 1B.1	Scc, playa, Gnn, Gnp, alkaline, sandy	May - October	Tracy	N/A	New species
Arctostaphylos auriculata Mt. Diablo manzanita	CNPS List 1B.3	Cmo, Coa	January - March	Tracy	N/A	New species for consideration
Arctostaphylos manzanita ssp. *laevigata* Contra Costa manzanita	CNPS List 1B.2	Cmi, Cmo	January - April	Tracy	N/A	New species for consideration
Extriplex joaquiniana San Joaquin spearscale	CNPS List 1B.2	Scc, Mot, Wasp, Wse, Gnn/Gnp (sandy)/alkaline	April - October	Tracy	PCM-W001	Scientific name formerly *Atriplex joaquiniana*
Blepharizonia plumosa big tarplant	CNPS List 1B.1	Gnn, Gnp/clay soils	July - October	Tracy	N/A	Scientific name formerly *Blepharizonia plumose*
California macrophylla round-leaved filaree	CNPS List 1B.2	Wbla, Wblu, Wlo, Gnn, Gnp/clay soils	March - May	Tracy Morgan Hill/San Luis	N/A	CNPS Rank
Calochortus pulchellus Mt. Diablo fairy-lantern	CNPS List 1B.2	Cmi, Coa, Rgf, Gnn, Gnp	April - June	Tracy	N/A	New species for consideration

Table 3-3. Special Status Plants Considered						
Species Name	**Status [a]**	**Habitat Types[b]**	**Bloom period**	**Areas of Possible Occurrence [c]**	**PCM-ID**	**Updated information**
Carex vulpinoidea brown fox sedge	No listing	Rgf, Rgs, Wfm	May - June	Tracy	PCM-W002	CNPS Rank
Caulanthus lemmonii Lemmon's jewelflower	CNPS List 1B.2/BLMS	Gnn, Gnp, Wpj	March - May	Tracy	N/A	Possible Occurrence & Scientific name formerly *Caulanthus coulteri* var. *lemmonii*
Chloropyron molle ssp. *hispidum* Hispid bird's-beak	CNPS List 1B.1/BLMS	Mot, playas, Wse, Gnn, Gnp/alkaline	June - September	Tracy	PCM-W001	Scientific name formerly *Cordylanthus mollis* ssp. *hispidus*
Chloropyron palmatum palmate-bracted bird's beak	FE/SE/CNPS List 1B.1	Gnn, Gnp, Scc/alkaline	May - October	Tracy	PCM-B009	Scientific name formerly *Cordylanthus palmatus*
Crocanthemum suffrutescens Bisbee Peak rush-rose	CNPS List 3.2	Cmi, Coa, Cmo (often serpentinite gabbroic or ione soil)	April - June	New Melones	N/A	Scientific name formerly *Helianthemum suffrutescens*
Deinandra bacigalupi Livermore tarplant	CNPS List 1B.1	Mot, Wasp/alkaline	June - October	Tracy	PCM-W002	CNPS Rank
Hesperolinon breweri Brewer's western flax	CNPS List 1B.2	Cmi, Cmo, Gnn, Gnp, serpentine	May - July	Tracy	N/A	New species for consideration
Hibiscus lasiocarpos var. *occidentalis* woolly rose-mallow	CNPS List 1B.2	Waim, Waic, Warv, sloughs	June - September	Tracy	PCM-W002	Scientific name formerly *Hibiscus lasiocarpos*
Limosella australis Delta mudwort	CNPS List 2B.1	Wfm, Rgs	May - August	Tracy	PCM-W002	Scientific name formerly *Limosella subulata*
Neostapfia colusana Colusa grass	FT/SE/CNPS List 1B.1	Wvpi, Wvpgnn, Wacp, Waci, Waim, Wapd	May - August	New Melones	PCM-B028 PCM-W001 PCM-W002	Possible occurrence
Puccinellia simplex California alkali grass	CNPS List 1B.2	Scc, Mot, Gnn, Gnp, Wvpgnn, Wvpi, Wasp	March - May	Tracy	N/A	New species
Senecio clevelandii var. *heterophyllus* Red Hills ragwort	CNPS List 1B.2/BLMS	Wbla, Wblu, Wlo, Wfp (serpentinite seeps)	June - July	New Melones	PCM-B114 PCM-W002	Scientific name formerly *Packera clevelandii*
Stuckenia filiformis ssp. *alpina* Slender-leaved pondweed	CNPS List 2B.2	Wfm, Alk, Wapd, Wacp, Waci, Wadr	May - July	Tracy	PCM-W002	Scientific name formerly *Potamogeton filiformis*

Table 3-3. Special Status Plants Considered						
Species Name	Status [a]	Habitat Types[b]	Bloom period	Areas of Possible Occurrence [c]	PCM-ID	Updated information
Viburnum ellipticum Oval-leaved viburnum	CNPS List 2B.3	Cmi, Cmo, Fmc	May - June	Tracy	N/A	New species for consideration

[a] Status Codes:

BLMS: BLM Sensitive
FE: Federally Endangered
FT: Federally Threatened
FC: Federal Candidate
FD: Federally Delisted
SE: State Endangered
ST: State Threatened
SC: State Candidate
SFP: State Fully Protected
SSC: State Species of Concern
SR: State Rare

[b] Habitat type codes are from Western's data dictionary and are defined below. These codes consist of habitat types encountered throughout Western's Sierra Nevada Region, some of which are not present in the San Joaquin Valley project area. Habitats without codes are those that have not been encountered in Western's San Joaquin Valley, Sacramento Valley, or North Area ROWs.

Agri: Agriculture, rice fields	Fdf: Forest, Douglas fir	Rms: Riparian, montane scrub	Warv: Waters, river
Agor: Agriculture, orchards	Fmc: Forest, mixed conifer	Rmw: Riparian, montane white alder	Wasp: Waters, seep/spring
Agps: Agriculture, pasture	Fpp: Forest, ponderosa pine		
Aggr: Agriculture, grain crop	Fwf: Forest, white fir	Scc: Scrub, chenopod	Wfm: Wetland, freshwater marsh
Agvn: Agriculture, vineyard	Gnn: Grassland, non-native annual	Ssb: Scrub, sagebrush, bitterbrush	Wot: Wetland, other
Agrc: Agriculture, row crop	Gnp: Grassland, native perennial		Wse: Wetland, seasonal
Bar: barren	Lev: Levee	Waci: Waters, creek intermittent	Wsw: Wetland, swale
		Wacp: Waters, creek perennial	Wvpi: Wetland, vernal pool isolated
Cmi: Chaparral, mixed	Mot: Meadow	Wadr: Waters, drainage	Wvpgnn: Wetland, vernal pool grassland complex
Cmo: Chaparral, montane	Mwm: Meadow, wet montane	Waic: Waters, irrigation canal	
Coa: Chaparral, oak		Waim: Waters, impoundment	Wbla: Woodland, black oak
	Rgf: Riparian, Great Valley forest	Walk: Waters, lake	Wblu: Woodland, blue oak
Ebis: Elderberry, isolated	Rgs: Riparian, Great Valley scrub	Waot: Waters, other	Wfp: Woodland, foothill pine chaparral
Ebsv: Elderberry, savannah	Rma: Riparian, montane aspen	Wapd: Waters, pond	Wlo: Woodland, live oak

[c] Areas of Possible Occurrence reflects two factors: 1) the natural geographic range of a species and 2) the presence of suitable habitat within the project area. A species may occur in a particular region, but that region will not be listed for the species if the project area does not intersect suitable habitat.

The project area supports suitable habitat for a number of special-status species. The possible impacts to special-status plants and habitats have not changed since the publication of the 2011 EA. The changes to the project activities would not impact special-status plant species. The addition of the herbicide, Indaziflam, is allowed under WAPA's IVM program and used in accordance with the SOP PH-SOP-4 and the IVM program. PCMs and SOPs to avoid or minimize adverse impacts are sufficient. Therefore, there would no increased project-related affects to plants since the analysis conducted in the 2011 EA.

3.2.3 Wildlife

The consequences of the proposed actions on the surrounding habitat and wildlife are anticipated to be minimal and are consistent with the general considerations outlined in the 2011 EA report. The additional activity listed that may impact wildlife is the use of helicopters for all categories of maintenance. PCMs and WAPA SOPs are in place to avoid impacts to wildlife. PCMs for bird species are adequate to avoid or minimize adverse impacts from noise or nest disturbance. There would no increased project-related affects to wildlife since the analysis conducted in the 2011 EA.

Additional habitat for special status species is present in the Mountain House Conservation Bank which was designated in July 2012 to provide habitat for California tiger salamander, California red-legged frog, San Joaquin kit fox, Swainson's hawk, western burrowing owl, and vernal pool fairy shrimp (Fletcher Conservation Lands, 2012). The conservation area spans 147 acres in Alameda County and is approximately 0.5 mile from the Tracy line (Figure 4). Activities identified in the EA will not have any effect on the conservation bank or the species identified as having habitat in the conservation bank.

No new designated critical habitat was identified in the area.

3.2.4 Special-Status Wildlife

The CNDDB, USFWS IPaC, and CDFW Species Animal List (October 2016) were evaluated to identify changes to the special status wildlife species under consideration. There are no additional species to include on the special status wildlife species list for consideration. Changes observed on this list are limited to species scientific name changes and special status classifications. Revisions to this list are presented in Table 3-4, which is derived from Table 3.5-2 of the 2011 EA.

Table 3-4. Special Status Wildlife Considered

Species Name	Status [a]	Habitat Types [b]	Areas of Possible Occurrence [c]	PCM-ID	Updated information
California tiger salamander *Ambystoma californiense*	FT/ST	Wapd, Waim, Wvpi, Gnn, Gnp, Wblu, Wlo	Tracy	PCM-B059 PCM-W001 PCM-W002	State Status
Golden eagle *Aquila chrysaetos*	SFP/BLMS	Gnn, Gnp, Ssb, Agps, Scc, Wblu, Wlo, Wbla, Wvpgnn	Tracy New Melones Morgan Hill/San Luis	N/A	BLM Status
White-tailed kite *Elanus leucurus*	SFP/BLMS	Agps, Aggr, Agri, Agro, Gnn, Gnp, Wvpgnn, Rgs, Rgf, Wblu, Wfp, Wlo, Mot	Tracy New Melones Morgan Hill/San Luis	N/A	BLM Status

Table 3-4. Special Status Wildlife Considered					
Species Name	**Status [a]**	**Habitat Types [b]**	**Areas of Possible Occurrence [c]**	**PCM-ID**	**Updated information**
Bald eagle *Haliaeetus leucocephalus*	SE/SFP/BLMS	Walk, Rgf, Rgs, Rms, Rma, Wfm, Wapd, Warv	Tracy New Melones Morgan Hill/San Luis	PCM-B070	BLM Status
American peregrine falcon *Falco peregrinus anatum*	SFP	Cliffs, coastal or inland	Tracy New Melones	PCM-B069	Federal & State Status
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT/SE/	Rgf	Tracy	PCM-B083	Federal
California spotted owl *Strix occidentalis occidentalis*	SCC/BLMS	Rfg, Wblu, Wfp	New Melones (wintering)	N/A	BLM Status
Yellow warbler *Setophaga petechia*	SSC	Cmo, Fmc, Fpp, Rgf, Rgs, Mot, Rms, Rmw, Wbla, Wblu, Wfp, Wlo	Tracy New Melones Morgan Hill/San Luis	N/A	Scientific Name
Townsend's big-eared bat *Corynorhinus townsendii*	SC/SSC	Cmi, Cmo, Coa, Fmc, Fpp, Fwf, Gnn, Gnp, Wzpgnn, Mot, Mwm, Rgf, Rgs, Rma, Rms, Scc, Scb, Waci, Wacp, Wbla, Wblu, Wfp, Wlo/Roosts in caves, mines tunnels, buildings	Tracy New Melones Morgan Hill/San Luis	PCM-B096	State Status
Riparian (=San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	FE/SSC	Rgf, Rgs	Tracy	PCM-B119	State Status

[a] Status Codes:

BLMS: BLM Sensitive	SE: State Endangered
FE: Federally Endangered	ST: State Threatened
FT: Federally Threatened	SC: State Candidate
FC: Federal Candidate	SFP: State Fully Protected
FD: Federally Delisted	SSC: State Species of Concern
	SR: State Rare

[b] Habitat type codes are from Western's data dictionary and are defined below. These codes consist of habitat types encountered throughout Western's Sierra Nevada Region, some of which are not present in the San Joaquin Valley project area. Habitats without codes are those that have not been encountered in Western's San Joaquin Valley, Sacramento Valley, or North Area ROWs.

Agri: Agriculture, rice fields	Fdf: Forest, Douglas fir	Rms: Riparian, montane scrub	Warv: Waters, river
Agor: Agriculture, orchards	Fmc: Forest, mixed conifer	Rmw: Riparian, montane white alder	Wasp: Waters, seep/spring
Agps: Agriculture, pasture	Fpp: Forest, ponderosa pine		

Table 3-4. Special Status Wildlife Considered					
Species Name	Status [a]	Habitat Types [b]	Areas of Possible Occurrence [c]	PCM-ID	Updated information
Aggr: Agriculture, grain crop	Fwf: Forest, white fir	Scc: Scrub, chenopod	Wfm: Wetland, freshwater marsh		
Agvn: Agriculture, vineyard	Gnn: Grassland, non-native annual	Ssb: Scrub, sagebrush, bitterbrush	Wot: Wetland, other		
Agrc: Agriculture, row crop	Gnp: Grassland, native perennial		Wse: Wetland, seasonal		
Bar: barren	Lev: Levee	Waci: Waters, creek intermittent Wacp: Waters, creek perennial	Wsw: Wetland, swale Wvpi: Wetland, vernal pool isolated		
Cmi: Chaparral, mixed	Mot: Meadow	Wadr: Waters, drainage	Wvpgnn: Wetland, vernal pool grassland complex		
Cmo: Chaparral, montane	Mwm: Meadow, wet montane	Waic: Waters, irrigation canal			
Coa: Chaparral, oak		Waim: Waters, impoundment	Wbla: Woodland, black oak		
	Rgf: Riparian, Great Valley forest	Walk: Waters, lake	Wblu: Woodland, blue oak		
Ebis: Elderberry, isolated	Rgs: Riparian, Great Valley scrub	Waot: Waters, other	Wfp: Woodland, foothill pine chaparral		
Ebsv: Elderberry, savannah	Rma: Riparian, montane aspen	Wapd: Waters, pond	Wlo: Woodland, live oak		

[c] Areas of Possible Occurrence reflects two factors: 1.) the natural geographic range of a species and 2) the presence of suitable habitat within the project area. A species may occur in a particular region, but that region will not be listed for the species if the project area does not intersect suitable habitat.

The San Bruno elfin butterfly (*Callophrys mossii bayensis*) was identified in the IPaC list under the HIL area as Federally-endangered species; however, the range for this species is limited to the San Francisco peninsula. Since all project sites are outside of San Bruno elfin butterfly range, this species is eliminated from consideration and is now an addition to the EA Table 3.5-1 (Special-status Wildlife Eliminated from Consideration).

The project area supports suitable habitat for a number of special-status species. The possible impacts to special-status wildlife have not changed since the publication of the 2011 EA. No additional species-specific PCMs were required. PCMs and SOPs to avoid or minimize adverse impacts are sufficient.

3.2.5 Fish

As identified in the 2011 EA, the project activities affecting fish are indirect potential impacts to water quality such as an increase in turbidity, sedimentation, loss of large organic debris, temperature increase due to loss of shading, and application of herbicides. The activities that occur in close proximity to waterways would have the potential for runoff from the site. However, the 2011 EA has identified PCMs to reduce impact to water quality when working near waterways and contractors are required to implement Storm Water Pollution Prevention Plans (SWPPPs) when working near water bodies. The assessment of impact to fish and habitat has not changed since

the 2011 EA publication. The additional herbicide added to the list would be applied in accordance with WAPA's IVM and SOPs. Therefore, there would no increased project-related affects to fish since the analysis conducted in the 2011 EA.

3.2.6 Special-Status Fish

No additions to special status fish species were identified within the project areas. The only change to special status fish species was to longfin smelt (*Spirinchus thaleichthys*) which is currently a Federal candidate species. The PCM established for this species (PCM-B120) is sufficient to continue mitigating impact to longfin smelt.

3.2.7 Cultural Resources

The cultural resources section of the 2011 EA and the fully executed 2010 PA among WAPA, the ACHP, and SHPO concerning Emergency and Routine O&M Activities at Western Facilities in California were reviewed to determine if the EA remains adequate. The PA establishes protocols for updating cultural resources studies, assessing impacts of project actions by type, and mitigating impacts for O&M activities as listed in the EA and Appendix B of the PA. There are no geographic restrictions within the PA. With the PA in place, any changes to the existing conditions are addressed and incorporated into the management of cultural resources within the program. Therefore, the EA would only be inadequate if there were changes in project activities that would result in potential impacts to cultural resources.

There have been only minor changes to the project activities, as indicated in Table 2-2. These changes would not affect cultural resources or protocols in the PA and therefore, the EA remains adequate from this perspective.

Following the submittal of the EA, additional facilities and transmission lines were added to the project area that will now be covered under the EA (See Table 2-1). Three of the areas are located along the Contra Costa Canal and were studied for cultural resources. These areas, consisting of the CC1, CC3, and CC4, were all evaluated for National Register of Historic Places (NRHP) eligibility in 2015 (WAPA, 2017). Of the three sites studied, CC1 and CC4 did not meet any criteria under 36 Code of Federal Regulations (CFR) 60.4 for NRHP eligibility and were not associated with the period of significance with the Contra Costa Canal and therefore were evaluated as not eligible for the NRHP. The pumping plant CC3 was evaluated as eligible as a contributing element to the Contra Costa Canal for its association with the canal and that association is its function as a power source for the pumping plants. According to WAPA, SHPO concurred with the evaluation determination of all three facilities (WAPA, 2017).

For the three additional microwave project areas, HIL, PXY, and HWR, maintenance activities mostly include IVM, pesticide use, and some fence repair maintenance. Vegetation removal by hand or pesticide use would not disturb the ground surface.

Mastication techniques for vegetation removal cause little ground disturbance on dry soil. One of the BMPs specifies that mastication will not be used on wet soils. Unless new posts and poles are required at new locations, fence repair would not involve new ground disturbance.

For the additional transmission line segments and associated pumping plants, typical O&M activities for transmission lines and vegetation management would be conducted under the existing SOPs and PCMs. Therefore, the O&M activities and vegetation management at these sites would not impact cultural resources.

If other activities with minimal surface disturbance described in Section II of Appendix B of the PA are conducted, these activities would have a low probability of affecting cultural resources and Class 1 cultural resources studies would be performed prior to the work, as required by the PA. No additional consultation with SHPO is required. If activities cause extensive surface disturbance, as described in Section III of the PA, additional cultural resources studies would be performed and the information provided to SHPO. Therefore, the EA remains adequate from this perspective of protecting potential impacts to cultural resources. Therefore, there would no increased project-related affects to cultural resources since the analysis conducted in the 2011 EA.

If additional activities are added as part of routine O&M activities that are not identified in the EA or in Appendix B of the PA and could result in impacts on cultural resources, then the EA will require a supplement to address those activities. In addition, the PA would be amended to include those new activities and the amended PA would require approval by all Signatory Parties.

3.2.8 Paleontological Resources

The paleontological resources section of the EA was reviewed to determine if the EA remains adequate. Paleontological resources are known to occur in surveyed portions of the project area and have the potential to occur elsewhere within the project area. Similar to cultural resources, project activities that are ground disturbing, through excavation, would have the potential to cause adverse impacts to paleontological resources, if conservation measures were not in place. The additional activities listed in Table 2-2 would not affect paleontological resources. Therefore, the EA remains adequate from this perspective.

The additional project areas, listed in Table 2-1, would only have the potential to impact paleontological resources if the project activities at those locations involve ground disturbance, under Category B routine maintenance and Category C new infrastructure activities. These impacts could be prevented by avoidance of known paleontological sites in accordance with the PCMs and by implementation of the PCMs designed for areas where paleontological surveys have not been conducted. Therefore,

there would no increased project-related affects to paleontological resources since the analysis conducted in the 2011 EA.

3.2.9 Land Use

There have been no major changes in land uses in the project area since the 2011 EA was issued. Much of the project area is rural agricultural or open space, with portions overlapping the cities of Antioch, Discovery Bay, Knightsen, Oakley, Stockton, and Morgan Hill. While there has been population growth in the cities, the land use for the project area has remained the same. While applicable land use plans and policies along the ROWs and access roads could be revised over the course of proposed activities, WAPA would continue to ensure consistency with Federal, state, and local plans and policies and land uses, and continue to coordinate with land owners when accessing their easements for maintenance within their ROW. Existing land use SOPs (LU-SOPs-1 through 5) remain in place to reduce any adverse or nuisance impacts.

No new facilities have been constructed since 2011 that are incompatible with adjacent land uses. The three Contra Costa pumping plants are located within canals and are adjacent to the Tracy-Contra Costa transmission line. Land use is public/semi-public or residential-zoned for the pumping plants. The three microwave facilities (HIL, PXY, HWR) are located on agricultural-zoned land within barren land and mixed chaparral (HIL), near a golf course (PXY), and near orchards and a canal (HWR) and do not interfere with existing land uses in the adjacent areas.

The additional transmission line, Livermore-424 115-kV Transmission Line, is located within an urban industrial habitat adjacent to roads and parking lots and would not interfere with the existing industrial land use. Transmission line towers may interfere with farming practices around the towers and transmission lines may interfere with crop dusting. However, WAPA's siting criteria orients transmission lines to avoid splitting parcels and places lines adjacent to roads as much as possible to minimize impacts to farming. The existing land use SOPs are in place to reduce adverse and nuisance impacts during O&M activities.

The Tracy-Delta Mendota Canal Intertie 69-kV transmission line and intertie pumping plant (1.18 acres) are located adjacent to farm roads and the canal and levee road and would not interfere with the agricultural land uses to the east or the nearby wind farm to the west. The Byron-Bethany Tap 69-kV Transmission Line and Old River-Middle River 69-kV Transmission Line and intake pumping plant (2.14 acres) are located in between parcels or adjacent to agricultural fields and farm roads and would not significantly interfere with adjacent land uses.

Maintenance activities can be considered incompatible with existing land uses if they: create noise, visual impacts, or disturb or preclude existing land uses; conflict with existing utility ROWs; conflict with a special-use area; or result in a substantial loss of

important farmland. The additional project activity that could impact land use is the use of helicopters for maintenance and new infrastructure, due to noise. Noise would be temporary and short-term. Therefore, there would no increased project-related affects to land use since the analysis conducted in the 2011 EA.

3.2.10 Recreation

Several Federal, state, and local designated recreational areas exist within the project area. There are no parks near the HWR or PXY sites. Morgan Regional Preserve is within 2 miles of the HIL site. Nelson Park Ranch is within 0.2 mile of CC4 and Delta de Anza Regional Trail/Nunn Wilson Family Park is 0.1 mile from CC3. No new adverse impacts or loss of recreational area has occurred due to project activities or the addition of the new sites or transmission lines since the 2011 EA was issued. Maintenance activities that disrupt recreational activities are temporary and short term in nature. SOP REC-SOP-1 remains in place to reduce any adverse or nuisance impacts for members of the public accessing the recreation areas. Other SOPs for aesthetics, air quality, noise, and public health ensure that conflicts with established recreation areas are minimized to acceptable levels. Therefore, there would no increased project-related affects to recreation since the analysis conducted in the 2011 EA.

3.2.11 Aesthetics

There have been no significant changes to the existing transmission lines, ROW, or substation areas since the 2011 EA was issued. Four new transmission lines have been added, which would have a minor impact to aesthetics in the vicinity. The Livermore-424 115-kV Transmission Line is located within an industrial site where the aesthetics would not be significantly impacted by an additional transmission line. The additional transmission lines are located in agricultural areas and outside the viewshed of nearby residential areas. Three microwave facilities have been added that are located on agricultural land one in a remote mountain terrain (HIL), one adjacent to a golf course (PXY), and one near orchards (HWR). The facilities do not significantly impact the aesthetics of the surrounding areas. Project activities may continue to affect scenic quality as described in the EA. SOPs AES-SOP-1 through 3 ensure there would be no significant impacts to the visual quality or viewsheds. Therefore, there would no increased project-related affects to aesthetics since the analysis conducted in the 2011 EA.

3.2.12 Water Resources

Water resources include groundwater and surface water. There have been no substantial changes to the project area or maintenance activities that would impact water quality since the 2011 EA. Existing SOPs and PCMs would apply to the new facilities and transmission line activities to avoid significant impacts to water resources. WAPA does not operate or maintain the pumping plants. WAPA only

provides electricity to them and maintenance of the lines, and vegetation management as needed. The additional Old River-Middle River 69-kV Transmission Line crosses over a canal and the Tracy-Delta Mendota Canal Intertie 69-kV transmission line is adjacent to the Delta-Mendota Canal; these transmission lines were installed with enough height clearance and distance from the canals to not interfere or impact canal maintenance or equipment, and in accordance with any agency permits. All categories of O&M for these new transmission lines would be conducted in accordance with the procedures, SOPs, and PCMs described in the 2011 EA.

Under additions to project activities, shunt reactors that contain oil have been added at some of the substations. Cleaning oil spills up 10 gallons at substation have also been added to the Category A O&M activities. Oil detention structures are in place at substations to capture rain water and oil spills. Therefore, although impacts to adjacent water resources from oil spills would be a potential impact, these impacts would be minimized or avoided by following public health SOPs for hazardous materials safety and water resources SOPs. Substation washing was also added as an activity that would be conducted in accordance with SOPs WR-SOP-1 through 8. PCMs W001 and W002 ensure there are no adverse impacts to water resources or water quality, and to protect aquatic habitats. Any impacts to water resources due to maintenance activities are short term in nature. Impacts due to emergency situations may be longer term but temporary. WAPA would obtain any applicable permits for O&M activities. Therefore, there would no increased project-related affects to water resources since the analysis conducted in the 2011 EA.

3.2.13 Geology and Soils

There have been no significant changes to the geologic and soil conditions and maintenance activities that would impact the geological resources since the 2011 EA was issued.

Erosion is the main concern for transmission line maintenance. WAPA would continue to implement water resource SOPs, and aquatic PCMs concerning sedimentation associated with erosion. WAPA would continue implementation of SOPs GS-SOP-1 through 8 for geology-related impacts, including grading and vegetation management. WAPA conducts all O&M activities in conformance with their IVM Environmental Guidance Manual and Erosion Control and Revegetation Plan.

New transmission line structures would not alter impacts associated with potential seismic activity or require evaluation by a California-registered geotechnical engineer for geotechnical hazards and unstable conditions. Therefore, there would no increased project-related affects to geology or soils since the analysis conducted in the 2011 EA.

3.2.14 Public Health and Safety

Public health and safety concerns include hazardous materials, physical hazards, fire hazards, and electric and magnetic fields (EMF). There have been no significant changes to the project area, including the addition of the new facilities and transmission lines, or maintenance activities that would impact the public health and safety since the 2011 EA was issued. The addition of the new herbicide would not be a significant impact to public health and safety and would be managed in accordance with SOP PH-SOP-4. Replacing oil in circuit breakers to SF_6 would be conducted in accordance with SOP PH-SOP-5 for management of hazardous materials. WAPA electricians monitor and inspect oil and gas used in breakers and transformers. The WAPA compliance team replaces old breakers and recycles oil in accordance with SOPs.

WAPA would continue to implement public health SOPs PH-SOP-1 through 10 to ensure that potential adverse effects to public health would be minimized. WAPA will continue to implement SOPs related to other resource areas, such as geology and soils, water resources, biological resources, and transportation, which also protect the public. WAPA is required to also be in compliance with DOE orders and WAPA's own manual and procedures for health and safety to workers or the general public. Therefore, there would no increased project-related affects to public health and safety since the analysis conducted in the 2011 EA.

3.2.15 Air Quality

This section discusses the impact to air quality. Climate change was included in air quality in the original EA, but has been broken out into section 3.2.20 in this document.

The quality of surface air (air quality) is evaluated by measuring ambient concentrations of pollutants that are known to have deleterious effects on public health. The degree of air quality degradation is then compared to ambient air quality standards (AAQS), such as the California and National Ambient Air Quality Standards (CAAQS and NAAQS).

Criteria air pollutants refer to a group of pollutants for which regulatory agencies have adopted AAQS and region-wide pollution reduction plans. Criteria air pollutants are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead. Toxic air contaminants (TAC) refer to a category of air pollutants that pose a present or potential hazard to human health, but that tend to have more localized impacts than criteria air pollutants. Reactive organic gases (ROG) and nitrogen oxides (NOx) are also regulated as criteria pollutants because they are precursors to O_3 formation. Certain ROGs may also qualify as TACs. Two subsets of particulate matter are: inhalable particulate matter less than 10 microns in diameter (PM_{10}) and fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$).

To determine the air quality of an area (or air basin), the degree of air quality degradation by these pollutants, as measured at air quality monitoring locations, is compared to AAQS, such as the CAAQS and NAAQS. Areas are designated as "attainment," "nonattainment," "maintenance," or "unclassified" with respect to the AAQS. Regions in compliance with the standards are designated as "attainment" areas. In areas where the applicable AAQS are not being met, a "nonattainment" status is designated. Areas that have been classified as "nonattainment" but are now in compliance can be redesignated "maintenance" status if the state completes an air quality planning process for the area. Areas for which no monitoring data are available are designated as "unclassified," and are by default considered to be in attainment of the AAQS.

The project area traverses three air basins in central California. Table 3-5 lists the air basin in relation to project area counties. The Tracy region includes the San Francisco Bay Area and San Joaquin Valley air basins. The New Melones region lies entirely within the Mountain Counties Air Basin. The Morgan Hill/San Luis region includes the San Francisco Bay Area and San Joaquin Valley air basins. Following is a brief examination of the current attainment status of each region by county compared to the status documented in the 2011 Final EA.

Table 3-5. Air Basins and Counties within the Project Area

Project Area	Air Basins	Project Counties
Tracy	San Francisco Bay Area San Joaquin Valley	Alameda, Contra Costa San Joaquin
New Melones	Mountain Counties	Calaveras, Tuolumne
Morgan Hill/San Luis	San Francisco Bay Area San Joaquin Valley	Santa Clara Merced

Air Quality Changes

The 2011 Final EA listed all counties (Alameda, Contra Costa, San Joaquin, Calaveras, Tuolumne, Santa Clara, and Merced) as nonattainment for the 2008 O_3 (1-hour and 8-hour) standards. The 1-hour O_3 (1979) standard was revoked on June 15, 2005, and since the 2011 Final EA, the 8-hour O_3 (1997) standard was revoked on April 6, 2015. Revocation means there is no reclassification for areas that fail to meet the attainment date for the revoked standard, and no redesignations or maintenance plan approvals are needed for these areas. However, an area must ensure the air quality does not get worse after an air quality standard is revoked (EPA, 2016a). In October 2015 the EPA strengthened the NAAAQS for ground-level O_3 to 70 parts per billion (ppb) from the 2008 standard of 75 ppb (EPA, 2018a). All counties within the Project

area are listed as nonattainment for the 2008 8-hour O_3 standard and the new 2015 standard (EPA, 2017, 2018b).

Based on 2008 data, all counties, except Tuolumne, were also in nonattainment for PM_{10}. In 2008, these counties were designated as in attainment or unclassified for CO, NO_2, SO_2, and lead. Counties can be re-designated to attainment if the standards have been met due to permanent and enforceable reductions in emissions, the State has met all applicable State Implementation Plan (SIP) requirements pertaining to the area, and there is a fully approved plan for maintaining the standard, including a contingency plan. As of December 2017, all counties were in attainment for CO, NO_2, SO_2, lead, and PM_{10}. As of December 2017, Alameda, Contra Costa, Merced, Santa Clara, and San Joaquin counties were in nonattainment for $PM_{2.5}$ (2006 or 2012 standards). As of 2018, no Federal data was reported for Tuolumne County.

Table 3-6 provides a comparison of days above or exceeding air quality standards in 2008 and 2016 (the most recent available data). This illustrates an improvement in air quality across all regions. Table 3-7 presents the State and National attainment designations for each county.

Table 3-6. Comparison of Days Above Air Quality Standards in 2008 and 2016

Pollutant	Mountain Counties Air Basin 2008/2016	San Francisco Bay Area Air Basin 2008/2016	San Joaquin Valley Air Basin 2008/2016
State 1-Hour O_3	34/9	9/5	95/28
National 1-Hour O_3	2/0	2/0	14/1
State 8-Hour O_3	56/46	10/15	128/91
National 8-Hour O_3 (2015 Standard)	53/45	9/15	125/87
State 24-Hour PM_{10}	2/0	3/0	33/157.9
National 24-Hour PM_{10}	0/0	0/0	3/0
State 8-Hour CO	0 (2007)/NA	0/0 (2013)	0/0 (2013)
National 8-Hour CO	0 (2007)/NA	0/0 (2013)	0/0 (2013)

NA = not available
Source: www.arb.ca.gov/adam (ARB, 2018)

Table 3-7. Area Designations 2017

Pollutant	Averaging Time	Standard	BAAQMD	SJVAPCD	Mountain Counties	
			Alameda, Contra Costa, Santa Clara	Merced , San Joaquin	Calaveras	Tuolumne
State						
O_3	1-hour	0.09 ppm	N	N	N	N
	8-hour	0.070 ppm				
CO	1-hour	20 ppm	A	A/U	U	A
	8-hour	9.0 ppm				

NO_2	1-hour	0.18 ppm	A	A	A	A
	Annual	0.030 ppm				
SO_2	1-hour	0.25 ppm	A	A	A	A
	24-hour	0.04 ppm				
PM_{10}	24-hour	50 µg/m^3	N	N	N	U
	Annual	20 µg/m^3				
$PM_{2.5}$	Annual	12 µg/m^3	N	N	U	U
National						
O_3	8-hour	0.070 ppm	N	N	N	U
CO	1-hour	35 ppm	A	A/U	U	U
	8-hour	9 ppm				
NO_2	1-hour	0.100 ppm	A/U	A/U	U	U
	Annual	0.053 ppm	A			
SO_2	1-hour	0.075 ppm	A	A/U	U	U
	24-hour	0.14 ppm				
	Annual	0.030 ppm				
PM_{10}	24-hour	150 µg/m^3	U	A	U	U
$PM_{2.5}$	24-hour	35 µg/m^3	N	N	U	U
	Annual	12 µg/m^3	A/U			

A = attainment
N = nonattainment
ppm = parts per million
U = unclassified
µg/m^3 = micrograms per cubic meter
Source: EPA Green Book (https://www.epa.gov/green-book), BAAQMD 2017

Changes to the project area and activities have been evaluated, and improvements in air quality in the local air basins have been observed since the preparation of the Final EA. No significant impacts are anticipated with respect to air quality.

General Conformity

General conformity requirements were adopted as part of the CAA Amendments in 1990, and implemented by EPA in 1993. General conformity requires that all federal actions must conform to the EPA-approved SIP. The purpose of the general conformity program is to ensure that actions taken by the federal government do not undermine state or local efforts to achieve and maintain the NAAQS. EPA regulations in 40 CFR Part 93 Section 153(b)(1) exempts projects in nonattainment and maintenance areas from general conformity requirements if their projected emissions do not exceed specified *de minimis* levels. Therefore, this analysis of general conformity was conducted for all categories of O&M activities in the 2011 EA. Several project counties are designated nonattainment for O_3 and $PM_{2.5}$. The *de minimis* levels applicable to the SJ Valley ROW are presented in Table 3-8.

Table 3-8 Federal *de minimis* Thresholds by County

County	O_3 NAA Level[1]	O_3 *de minimis* Threshold[2] (tpy)	$PM_{2.5}$ NAA Level[1]	$PM_{2.5}$ *de minimis* Threshold (tpy)
Alameda	Marginal	100	Moderate[3]	100

Contra Costa	Marginal	100	Moderate[3]	100
Santa Clara	Marginal	100	Moderate[3]	100
San Joaquin	Extreme	10	Moderate	100
Merced	Extreme	10	Moderate	100
Calaveras	Marginal	100	-	-
Tuolumne	-	-	-	-

- = not applicable because county is in attainment with the standard for this pollutant
BAAQMD = Bay Area Air Quality management District
CAPCD = Calaveras Air Pollution Control District
NAA = nonattainment
SJVUAPCD = San Joaquin Valley Unified Air Pollution Control District
TAPCD = Tuolumne Air Pollution Control District
tpy = tons per year

1. Sourced from EPA Green Book 2018
2. The O_3 *de minimis* threshold is applicable to the O_3 precursors, nitrogen oxide (NO_x) and reactive organic gases (ROG). ROGs include volatile organic compounds (VOCs) that are non-methane organic gases.
3. NAA status from 2006 24-hour standard, rather than the 2012 standard. The 2012 standard lowered the 2006 primary standard of 15 micrograms per cubic meter to 12 micrograms per cubic meter. However, the 2006 24-hour primary standard was retained (Esworthy, 2015).

Local Air District Standards

The State is divided into Air Pollution Control Districts (APCD) and Air Quality Management Districts (AQMD), which are also called air districts. These agencies are county or regional governing authorities that have primary responsibility for controlling air pollution from stationary sources. The applicable authorities for the project include the Bay Area Air Quality Management District, San Joaquin Unified Air Pollution Control District, Calaveras Air Pollution Control District, and Tuolumne County Air Pollution Control District. The standards set by these authorities are presented in Table 3-9.

Table 3-9 Local Air District Thresholds (tpy)

County	ROG	NO_x	CO	SO_x	$PM_{2.5}$	PM_{10}
BAAQMD	10	10	-	-	54	82
SJVUAPCD	10	10	100	27	15	15
CAPCD	-	-	-	-	-	-
TAPCD	100	100	100	-	100	-

- = standard does not exist
BAAQMD = Bay Area Air Quality management District
CAPCD = Calaveras Air Pollution Control District
SJVUAPCD = San Joaquin Valley Unified Air Pollution Control District
TAPCD = Tuolumne Air Pollution Control District
tpy = tons per year

Project Emissions

Most impacts to air quality are from O_3 and $PM_{2.5}$ emissions, resulting from vehicle exhaust emissions and activities that generate fugitive dust and ash. Potential WAPA impacts for activities at new areas would continue to be avoided or minimized to less-than-significant levels through implementation of the appropriate air quality WAPA SOPs AQ-SOP-1 through AQ-SOP-7.

AQ-SOP-1: Western will adhere to all applicable requirements of those agencies having jurisdiction over air quality matters, and any necessary permits for O&M will be obtained.
AQ-SOP-2: Machinery and vehicles will be kept in good operating condition and older equipment will be replaced with equipment meeting applicable emission standards; appropriate emissions-control equipment will be maintained for vehicles and equipment, per EPA and/or Western air emission requirements.
AQ-SOP-3: Idle equipment will be shut down when not in active use; visible emissions from stationary generators will be controlled.
AQ-SOP-4: Dust-control measures will be implemented in road construction and maintenance, as needed. Trucks transporting loose material will be covered or maintain at least two feet of freeboard and will not create any visible dust emissions.
AQ-SOP-5: There will be no open burning of construction trash.
AQ-SOP-6: Grading activities will cease during periods of high winds (as determined by local air quality management districts).
AQ-SOP-7: Major operations will be avoided on days when the local Air Quality Index is expected to exceed 150.

Category C activities have the highest potential to cause adverse effects to air quality due to addition of new access roads. Similar to grading an existing access road, new road construction could cause fugitive dust creation (possibly of an even greater magnitude than simple grading) if proper SOPs are not implemented. In addition, the installation of a new access road would require the use of heavy machinery. However, no new access roads are anticipated at this time. The HIL microwave site has a dedicated access road. The other sites and transmission lines are adjacent to existing roads or canals.

A compilation of vehicles and off-road equipment utilized for all Category A, B, and C operations and maintenance activities is presented in Table 3-10.

Table 3-10 Compilation of Operations and Maintenance Equipment

Off-Road
Excavator
2 Brush Chippers
Truck Loader
Stump Cutter

	Feller Buncher
	Tractor
	4 All-terrain Vehicles (ATVs)
On-Road	
	1 Light Duty Truck
	3 Light Heavy Duty Vehicles
	12 Medium Duty Vehicles
	1 Medium Heavy Duty Diesel Truck
	1 Water Truck
	2 Heavy Duty Diesel Trucks
Aerial	
	1 Helicopter

Annual emissions were calculated for all operations and maintenance equipment based on use rates for 2017 (in hours or miles, as applicable) and modeled for 2018 (see Attachment 1).

Off-road emissions were calculated per EPA General Conformity Training Modules. Exhaust emission factors were sourced from the Sacramento Valley Air Basin fleet average emission factors for off-road diesel vehicles. All-terrain vehicle (ATV) emission factors were sourced from the ARB Emission Estimation Methodology for Off-Highway Recreational Vehicles. On-road emissions were calculated using the EPA-approved EMFAC2014 model created by ARB. Helicopter emissions were calculated using emissions factors from the Swiss Confederation Guidance on the Determination of Helicopter Emissions. Full emission calculation details are documented in Attachment 1.

Annual emissions for all A, B, and C category maintenance and operations are presented in Table 3-11. Federal *de minimis* thresholds are presented for those pollutants in nonattainment for each county.

Table 3-11 Average Annual Emissions for Operations and Maintenance Equipment by County

County		Annual Emissions (tpy)					
		ROG	NO_x	CO	SO_2	$PM_{2.5}$	PM_{10}
Alameda	O&M Emissions	0.11	0.31	1.10	0.00	0.01	0.02
	de minimis Threshold	100	100	-	-	100	-
	BAAQMD Threshold	10	10	-	-	10	15
Contra Costa	O&M Emissions	0.11	0.32	1.09	0.00	0.00	0.02
	de minimis Threshold	100	100	-	-	100	-
	BAAQMD Threshold	10	10	-	-	10	15
Santa Clara	O&M Emissions	0.11	0.30	1.11	0.00	0.01	0.02

	de minimis Threshold	100	100	-	-	100	-
	BAAQMD Threshold	10	10	-	-	10	15
Merced	O&M Emissions	0.14	0.38	1.33	0.00	0.01	0.02
	de minimis Threshold	10	10	-	-	100	-
	SJVUAPCD Threshold	10	10	100	-	15	15
San Joaquin	O&M Emissions	0.13	0.36	1.20	0.00	0.01	0.02
	de minimis Threshold	10	10	-	-	100	-
	SJVUAPCD Threshold	10	10	100	-	15	15
Calaveras	O&M Emissions	0.25	0.52	1.91	0.00	0.01	0.02
	de minimis Threshold	100	100	-	-	-	-
	CAPCD Threshold	-	-	-	-	-	-
Tuolumne	O&M Emissions	0.24	0.53	1.97	0.00	0.01	0.02
	de minimis Threshold	-	-	-	-	-	-
	TAPCD Threshold	100	100	100	-	-	100

BAAQMD = Bay Area Air Quality Management District
CAPCD = Calaveras Air Pollution Control District
O&M = operation and maintenance
SJVUAPCD = San Joaquin Valley Unified Air Pollution Control District
TAPCD = Tuolumne Air Pollution Control District
tpy = tons per year
- = not applicable because county is in attainment with the standard for this pollutant or local standard does not exist

Summary

For O_3 precursors (ROG and NO_X) and $PM_{2.5}$, emissions would not exceed the *de minimis* thresholds in any of the ROW counties in nonattainment; therefore, the project is exempt from general conformity requirements. Emissions would also not exceed any emission standards set by local air quality authorities; therefore, the project is in compliance with CAAQS and NAAQS.

WAPA would continue to employ vegetation management practices that would promote low-growing plant communities within the ROW, thereby minimizing long-term maintenance requirements and resulting in a long-term lessening of air quality emissions from management activities. Vehicles used to conduct project activities would be subject to EPA's and National Highway and Traffic Safety Administration (NHTSA) standards for heavy-duty trucks, which were issued in August 2011, to reduce air emissions. Additionally, all equipment used for project activities would be in compliance with the ARB On-Road Diesel, Off-Road Diesel, and Portable Diesel Equipment Requirements. Furthermore, SOPs AQ-SOP-1 through AQ-SOP-7 remain in place to ensure that impacts to air quality are minimized.

Conclusion

Air emissions result mainly from equipment used for maintenance, as well as workers' vehicles and trucks transporting equipment, parts, and materials. The emissions modeling in this document (Attachment 1) shows that project emissions would not exceed de minimus thresholds for criteria pollutants. Project activities would continue to be temporary, intermittent, of short duration, and generally widely dispersed along a narrow, long strip of land. Therefore, in accordance with the analysis in the 2011 EA, based on the results of the emissions modeling in this document and the continued implementation of the SOPs and PCMs described in this section, it is anticipated that the project would not cause a significant impact to air quality under the significance criteria in the original EA. The project would also not exceed general conformity thresholds or local air district thresholds; therefore, the project would not exceed Federal or state AAQS, prevention of significant deterioration increments, or other significance criteria. The changes in the project activities and regulations would not cause a substantial or significant impact to the air quality and impacts from the project would remain minimal.

3.2.16 Noise

There are no significant changes to the project area or maintenance activities that would impact the noise environment since the 2011 EA was issued. The use of helicopters is the only activity that could impact nearby residential communities.

The existing noise environment in the project area includes major transportation facilities, agricultural operations, and localized noise sources such as airports and railroad. Transmission lines along the existing ROW generate audible transmission-noise generated from corona discharge (random crackling or hissing), more audible during wet weather. Major sensitive noise receptors in the project area include residential communities with schools and hospitals, and wildlife habitats. The additional project activity that could impact sensitive receptors is the noise from the use of helicopters for maintenance and new infrastructure. However, noise would be temporary and short-term and activities would be conducted during the day time.

While population growth has occurred since 2011, the project construction and maintenance activities (including aerial inspections) remain the same as analyzed in the 2011 EA. WAPA would continue to comply with applicable Federal, state, and local noise standards and regulations. WAPA maintenance activities are temporary and short term in duration. WAPA would continue to implement SOPs NOISE-SOP-1 and 2, which includes evaluating local noise thresholds during construction. Therefore, there would no increased project-related affects to noise since the analysis conducted in the 2011 EA.

3.2.17 Transportation

The project area includes major transportation routes, some airports, farm roads, and railroads. Transmission lines run adjacent to and cross over these routes. There have been no changes to project area transmission line ROWs (including the additional transmission lines) that would significantly impact any of the types of transportation or routes since the 2011 EA was issued. There have been no modifications to the heights of existing towers. However, transmission lines may interfere with aerial application farming practices (crop dusting by airplanes or helicopters), and might apply to the Old River-Middle River 69-kV Transmission Line or Byron-Bethany Tap 9-kV Transmission Line locations. WAPA's siting criteria orients lines to avoid splitting parcels and along roads, which helps to minimize this potential impact. The additional sites and transmission lines located near roads would not significantly impact existing traffic for O&M activities, since O&M activities are intermittent and of short duration. WAPA would continue to implement SOP TRANS-SOP-1 during construction and maintenance activities to minimize impacts to roadway traffic. Therefore, there would no increased project-related affects to transportation since the analysis conducted in the 2011 EA.

3.2.18 Environmental Justice

The 2011 EA conducted an environmental justice analysis in compliance with Executive Order (EO) 12898, 59 Federal Register (FR) 7629 Section 1-101. The 2011 EA used 2000 census data and this SA uses 2010 data for comparison. Populations increased in all the counties ranging from 8 to 24 percent, except Tuolumne County, which experienced a decrease of 20 percent. Merced and San Joaquin counties experienced the largest percent increases at 24 percent. However, there was not a significant change in the economic, racial, and demographic makeup in these counties between the 2000 and 2010 census data (and the American Community Survey for 2010-2014). The most notable change was with Asian and Hispanic ethnicity, which increased in all counties. The percent change for other ethnic groups varied slightly between counties.

The median household income increased from 2007 to 2014 in Alameda, Contra Costa, San Joaquin, Santa Clara, and Tuolumne counties. The poverty level for a four-person household was based on a $21,203 annual income in 2007 and increased to $24,008 annual income for year 2014 (US Census, 2015).

Since the ROW maintenance activities do not involve establishing new ROWs or constructing new transmission lines or tower alignments that may impact new populations, the effects of the maintenance activities would not be significant and would continue to be minimized by SOPs (for air quality, public health and safety). The microwave sites are located in agricultural land outside of communities. The three pumping plants are located within the existing canals in developed areas. Therefore, there would no increased project-related affects to environmental justice since the analysis conducted in the 2011 EA.

3.2.19 Intentional Destructive Acts

No significant changes were identified to the scenarios evaluated in the 2011 EA for the likelihood of intentional destructive acts. WAPA continues to take reasonable and prudent measures to protect infrastructure from such acts, including regular monitoring and patrols. Substations and microwave sites are fenced and locked, and ROWs are often also fenced with locked gates. Therefore, there would be no anticipated project related increases to intentional destructive acts on the ROWs since the analysis conducted for the 2011 EA.

3.2.20 Climate Change

Climate change was addressed under the air quality section in the 2011 EA. Climate change has been separated into its own section in this SA to more thoroughly address potential impacts.

Affected Environment

It is widely recognized that emissions of greenhouse gases (GHG) associated with human activities are contributing to changes in the global climate, and that such changes are having and would have adverse effects on the environment, the economy, and public health.

Man-made GHG emissions are largely comprised of carbon dioxide (CO_2) from the combustion of fossil fuels. Other GHGs, such as methane (CH_4) and nitrous oxide (N_2O), also contribute to climate change but occur in much smaller quantities. When quantifying GHG emissions, the different global warming potentials of GHG pollutants are usually taken into account by normalizing their rates to a CO_2 equivalent (CO_2e) emission rate. The major categories of fossil fuel combustion sources can be broken into sectors: residential, commercial, industrial, transportation, and electricity generation. The transportation sector includes all motor gasoline and diesel fuel combustion.

California's GHG emissions are large in a world-scale context. The State emitted 410.4 million metric tons CO_2e in 2015. Electricity generation within California contributed 19 percent of the total Statewide CO_2 emissions in 2015 (ARB, 2017). Fuel consumption estimates are included in Attachment 1.

Regulatory Environment

Assembly Bill 32 (AB 32) requires that California's GHG emissions be reduced to 1990 levels by 2020 (ARB, 2016b). GHG is defined as any gas that absorbs infrared radiation in the atmosphere. GHGs include CO_2, CH_4, and N_2O. AB 32 requires the California Air Resources Board (ARB) to develop a Scoping Plan that describes the approach California will take to reduce GHGs to achieve the goal. The Scoping Plan was approved by the ARB in 2008 and must be updated every five years. ARB is moving forward with a second update to the Scoping Plan to reflect the 2030 target

established by Executive Order B-30-15. Executive Order B-30-15 aims to reduce emissions 40 percent below 1990 levels by 2030.

EPA and California have taken the following steps to limit emissions that cause climate change (EPA, 2016c):

- EPA and the NHTSA worked together to set GHG and fuel economy standards for passenger vehicles in model years 2012-2016 and 2017-2025.
- EPA's and NHTSA's issued standards for heavy-duty trucks and buses, in August 2011.
- In January 2011, states and EPA initiated Clean Air Act permitting of GHG pollution from the largest new and modified stationary sources. In the first year of permitting, dozens of large sources such as power plants, cement plants, refineries, and steel mills received pre-construction permits for GHG emissions.
- In March 2012, Executive Order B-16-2012 was signed affirming a long-range climate goal for California to reduce GHG from transportation to 80 percent below 1990 levels by 2050.
- In 2013, California launched a Cap and Trade Program for GHG emissions.
- In 2014, ARB in collaboration with the Climate Action Team, prepared the first update to the Climate Change Scoping Plan.
- On August 3, 2015, the EPA unveiled the Clean Power Plan, a historic and important step in reducing carbon pollution from power plants; however, the current EPA administration in 2017 repealed the plan, effective October.

The EPA and NHTSA jointly finalized standards for medium- and heavy-duty vehicles to improve fuel efficiency and cut carbon pollution to reduce the impacts of climate change. The vehicle and engine performance standards cover model years 2018-2027 for certain trailers and model years 2021-2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks.

Local Authority

Of the local air authorities applicable to the Project, BAAQMD is the only authority to have stablished thresholds for GHG emissions. For operation, BAAQMD has set the threshold of significance at 1,100 MT/year CO_2e (BAAQMD 2017).

Significance Criteria

A significant impact on climate change would result if any of the following were to occur:

- Generate total GHG emissions that may exceed 25,000 MT CO_2e
- Generate GHG emissions in the Bay Area Air Basin that may exceed 1,100 MY/year CO_2e
- Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHG

Greenhouse Gas Emission Changes

GHG emissions from the project would continue to be minor during operations, consisting of exhaust from vehicles carrying service technicians around the project area, helicopters and small planes conducting periodic aerial inspections, operation of maintenance equipment, and commuting of employees. One of the changes to project activities includes changing oil breakers from oil to SF_6, primarily at CC1 and CC3 substations. . SF_6 is an inorganic, colorless, odorless, non-flammable, extremely potent GHG that is an excellent electrical insulator. New SF_6 gas breakers would be installed in accordance with manufacturer recommendations and WAPA's Construction Standards.

According to California Code of Regulations (CCR) Title 17, Subchapter 10, Climate Change, Sections 95350 et al., owners must keep records of equipment and meet the annual reporting requirements for emissions. Title 17, § Subarticle 3.1, the Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear is currently under revision. Federally, SF_6 emissions are reported under 40 CFR Part 98 Subpart DD, Electric Transmission and Distribution Equipment Use. In accordance with SOPs AQ-SOP-1 and AQ-SOP-2, WAPA will adhere to all applicable regulations.

The project would generate approximately 1,500 MT/year CO_2, presented in Table 3-12 (see also Attachment 1). The project, including the additional activities and the new facilities and transmission lines, would not generate quantities of GHG to cause a substantial impact related to global climate change or disrupt the California ARB progress on achieving the goals of the California Global Warming Solutions Act of 2006 (AB 32). Annual project emissions would not exceed 25,000 MT CO_2e in total or 1,100 MT CO_2e in the Bay Area air basin. The project remains consistent with the California Air Resources Board Climate Change Scoping Plan (ARB, 2008), which is based on continuing the reliable delivery of electricity to customers in California.

Table 3-12 Estimated GHG Emissions		
Air Basin	**GHG Emissions (MT/year CO_2e)**	**Threshold (MT/year CO_2e)**
Bay Area	616	1,100
Mountain Counties	443	-
San Joaquin Valley	440	-
Total	**1,499**	**25,000**

- = no applicable threshold

In addition, Climate change has increased the frequency of wildfire. The project maintenance activities, such as vegetation removal, will reduce the risk of wildfire in the project area, thus reducing the impacts of climate change induced wildfire on the infrastructure characterized in this document.

Conclusion

The emissions modeling in the document (Attachment 1) illustrates that project GHG emissions would not exceed 25,000 $MMTCO_2e$ in total or 1,100 MT CO_2e in the Bay Area air basin, therefore the project vegetation management would not have a significant impact on climate change, and the project would help to protect WAPA transmission and distribution assets from wildfire associated with climate change.

CHAPTER 4. CONCLUSION

This SA was prepared to determine if a supplemental EA or new EA should be prepared. This SA provides an analysis of the original Proposed Action and whether there are any substantial changes in environmental impacts or if there are significant new circumstances or information relevant to environmental concerns and bearing on the Proposed Action or its impacts.

The analysis in this SA indicates that the identified and projected environmental impacts of the Proposed Action would not be significantly different from those analyzed in the Final EA. SOPs and PCMs were incorporated into the Proposed Action to avoid and minimize any potential environmental effects. Changes to the project area and activities are not significant. Although eight new sites and four transmission lines were added since 2011, these are in the same vicinity and habitats as the other sites and require the same O&M activities, facility upgrades, and inspections and repairs as described in the Final EA. Additional tasks and features were added to the list of equipment to operate and maintain; however, these features and associated inspection and O&M would be similar to previous activities analyzed in the Final EA. Updates were made to the air quality analysis and general conformity analysis and regulations and biological resources species lists. No new or revised PCMS were required to be added for the biological species revisions. There would no increased project-related affects for any resource area since the analysis conducted in the 2011 EA.

CHAPTER 5. DETERMINATION

Findings

This Supplement Analysis finds that (1) the proposed actions are substantially consistent with the Final EA for Right-of-Way Maintenance in the San Joaquin Valley, California and the Finding of No Significant Impact (FONSI) and Floodplain Statement of Findings, and (2) there are no new circumstances or information relevant to environmental concerns and bearing on the proposed actions or their impacts. This Supplement Analysis also finds the proposed action will not affect threatened or endangered species. Therefore, no further NEPA documentation is required.

Latisha M. Saare Digitally signed by Latisha M. Saare Date: 2021.04.29 10:47:49 -07'00' Date_____

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SONJA ANDERSON Digitally signed by SONJA ANDERSON Date: 2021.05.05 13:00:07 -07'00' Date_____

Name: Sonja Anderson Title: Senior VP & SN Regional Manager

CHAPTER 6. REFERENCES

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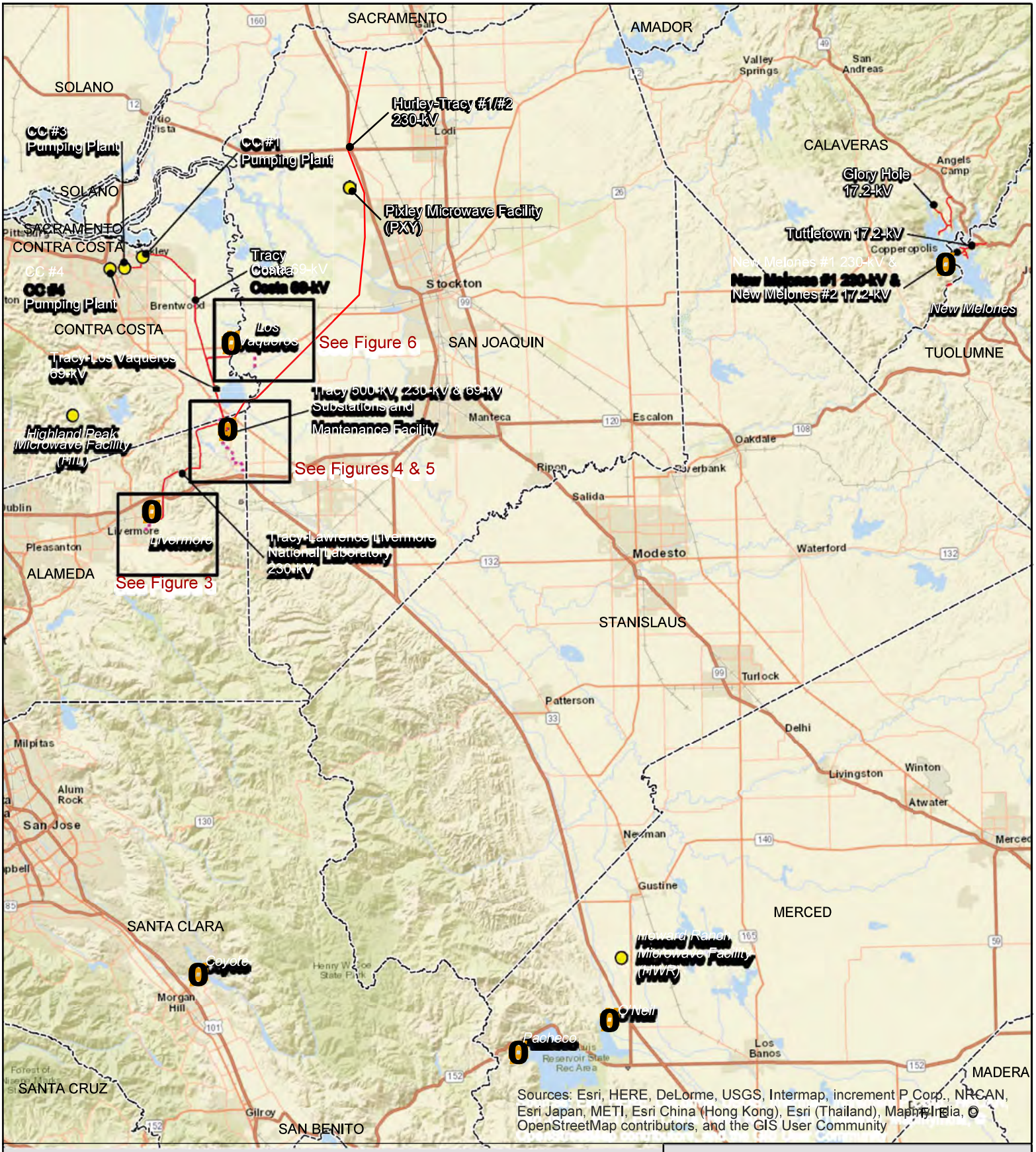

Original Substations

Original Transmission Line

Transmission Lines Added to EA

Facilities Added to EA

County

Miles

0 5 10

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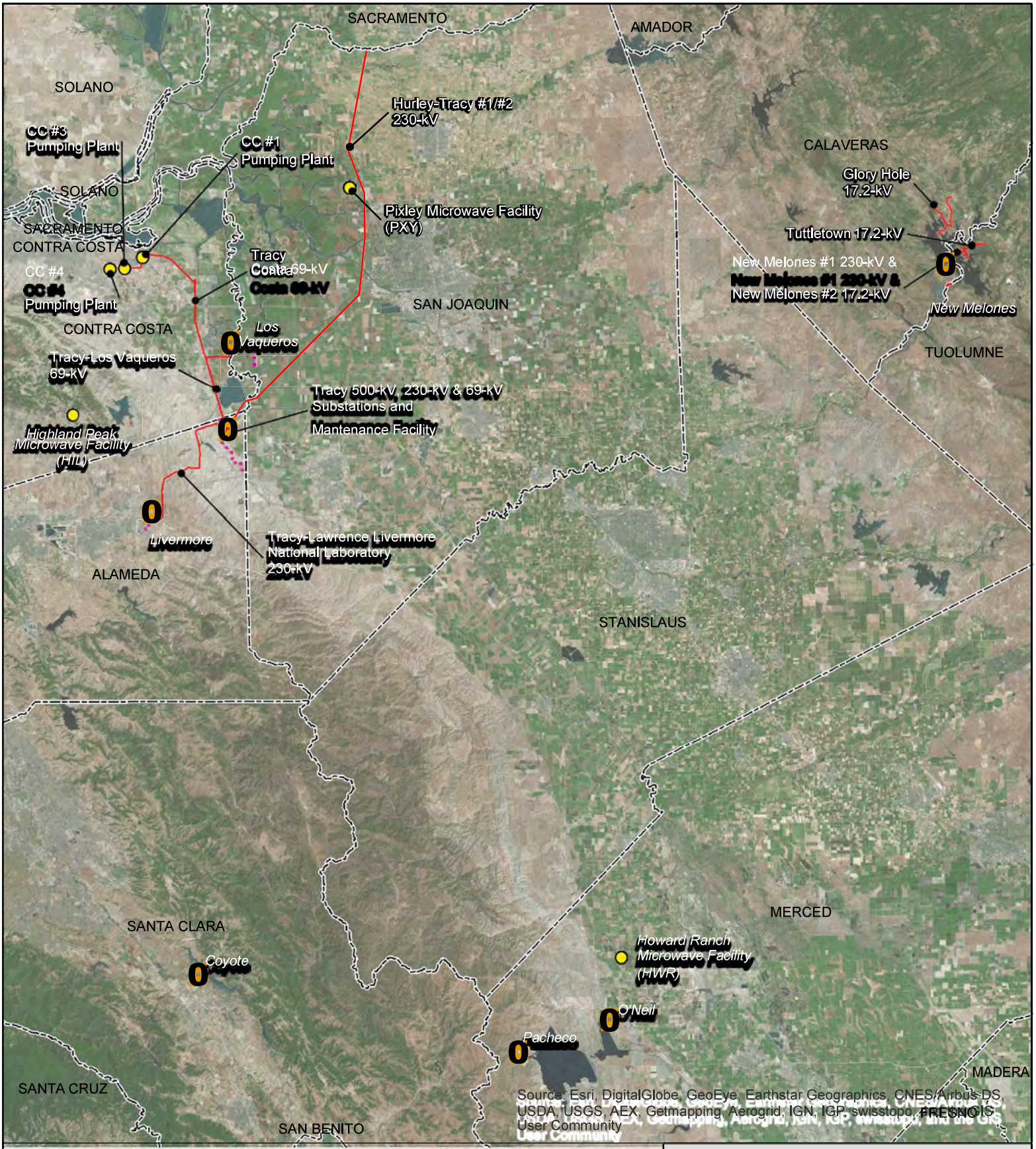
EA for ROW San Joaquin Valley

Project Features (ALL) and Figure Sheet Index Figure 1

Sources: ESRI Data Server 2012.

Burleson Consulting, Inc.



EA for ROW San Joaquin Valley

Aerial Overview
Figure 2

Sources: ESRI Data Server 2012.

Burleson Consulting, Inc.

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Original Substations
Original Transmission Line
Transmission Lines Added to EA

0 0.1 0.2 Miles

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EA for ROW San Joaquin Valley

Livermore-424
115-kV Transmission Line
Figure 3

Sources: ESRI Data Server 2012.

Burleson Consulting, Inc.

Original Substations

Original Transmission Line
Transmission Lines Added to EA

Miles
0 0.25 0.5

Document Path: S:\GIS\Projects\WAPA_AccessRoads\San_Joaquin_ROW\Fig 4_San_Joaquin_Added EA Features.mxd

EA for ROW San Joaquin Valley

Tracy-Delta Mendota Canal Intertie 69-kV Transmission Line Figure 4

Sources: ESRI Data Server 2012.

Burleson Consulting, Inc.

Original Substations
Original Transmission Line
Transmission Lines Added to EA

0 0.1 0.2 Miles

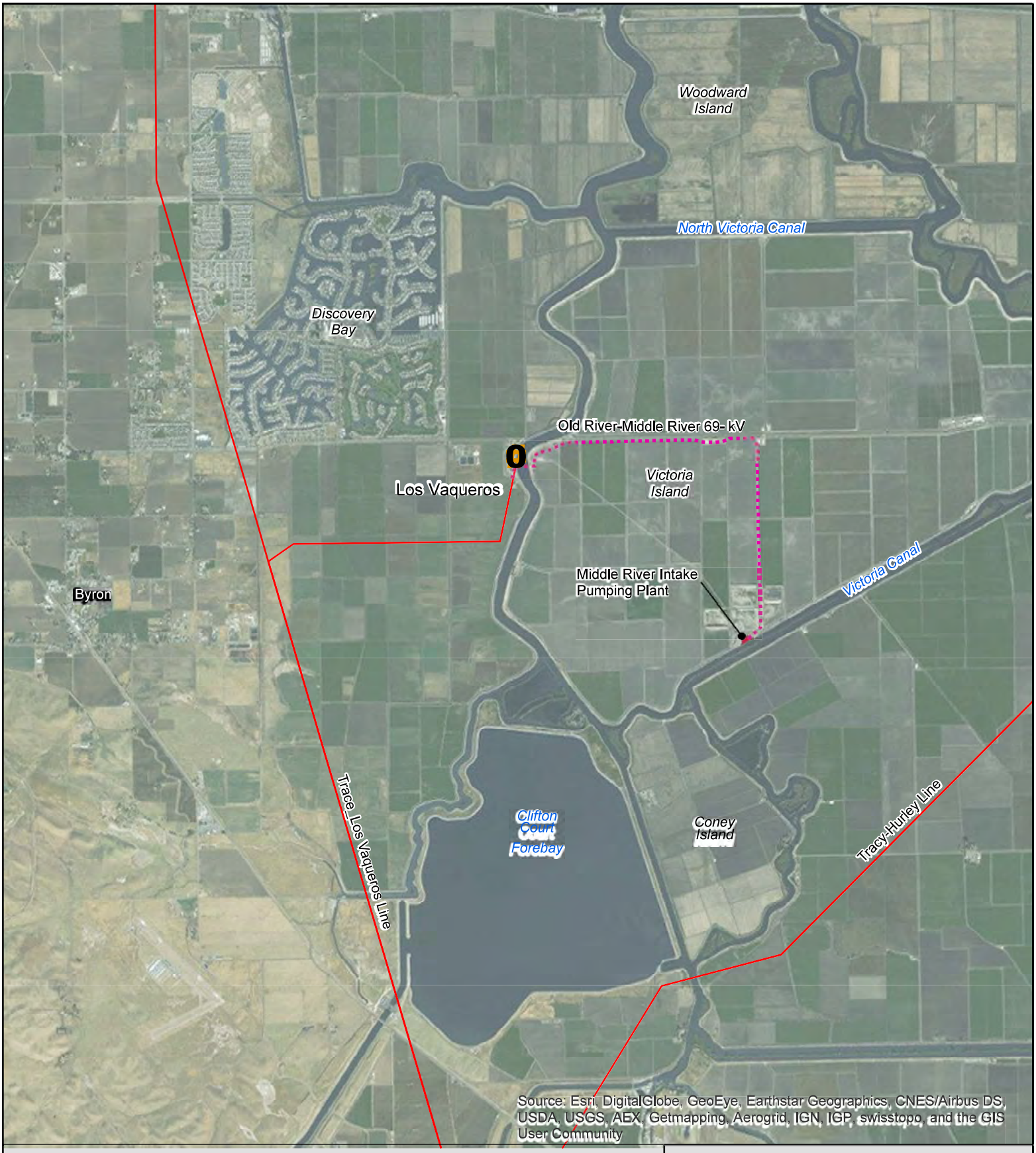
Document Path: S:\GIS\Projects\WAPA_AccessRoads\San_Joaquin_ROW\Fig 5_San_Joaquin_Added EA Features.mxd

EA for ROW San Joaquin Valley

Byron-Bethany Tap 69-kV Transmission Line Figure 5

Sources: ESRI Data Server 2012.

Burleson Consulting, Inc.



Original Substations

Original Transmission Line

Transmission Lines Added to EA

Miles

0 0.5 1

Document Path: S:\GIS\Projects\WAPA_AccessRoads\San_Joaquin_ROW\Fig 6_San_Joaquin_Added EA Features.mxd

EA for ROW San Joaquin Valley

Old River-Middle River 69-kV Transmission Line
Figure 6

Sources: ESRI Data Server 2012.

Burleson Consulting, Inc.

Attachment 1
Air Quality Emissions Calculations

Assumptions

Annual emissions (2018) were calculated for operations and maintenance activities (categories A, B, and C) for all seven counties in which the project is located. Equipment activity is not logged by county, so it was assumed that the entire fleet was used in each county; hence, these calculations are an overestimate and present a worst case scenario.

A compilation of vehicles and off-road equipment utilized for all Category A, B, and C operations and maintenance activities is presented in Table 1.

Table 1 Compilation of Operations and Maintenance Equipment
Off-Road
Excavator
2 Brush Chippers
Truck Loader
Stump Cutter
Feller Buncher
Tractor
4 All-terrain Vehicles (ATVs)
On-Road
1 Light Duty Truck
3 Light Heavy Duty Vehicles
12 Medium Duty Vehicles
1 Medium Heavy Duty Diesel Truck
1 Water Truck
2 Heavy Duty Diesel Trucks
Aerial
1 Helicopter

Annual emissions were calculated for all operations and maintenance equipment based on actual use rates for 2017 (in hours or miles, as applicable). The calculation summary in Excel follows this attachment. See below for specific calculation methods for off-road, on-road, and helicopter emissions.

Off-Road

Off-road emissions were calculated using ARB's ORDAS 2017 Individual Calculation Tool, version 7. ROG was calculated by converting the THC output by a conversion factor provided by ARB (1.21 for diesel; i.e., ROG = 1.21 x THC)(ARB 2007). SO_2 was calculated from the fuel consumption estimated in ORDAS 2017. Sulfur content in fuel was assumed to be the maximum allowed in California, 15 ppm by weight. All sulfur in fuel is assumed to be converted to SO_2.

All-terrain vehicle (ATV) emissions were calculated from the ARB Emission Estimation Methodology for Off-Highway Recreational Vehicles (ARB 2013). The following equation from ARB was used to calculate ATV emissions (variables were renamed to be consistent with EPA equation for off-road emissions when applicable).

$$AE_i = EF_i \times d$$

where

AE_i= annual emissions of chemical *i* (lb *i*/yr)
EF_i = chemical *i* emission factor (lb *i*/mile)
d = total annual miles of operation (miles/yr)

ATV emission factors were sourced from the ARB Emission Estimation Methodology for Off-Highway Recreational Vehicles. Only exhaust-related emissions were calculated (i.e. no hot soak, idling, etc.).

On-Road

On-road emissions were calculated using the EPA-approved EMFAC2014 model created by ARB. EMFAC2014 was used instead of the newer EMFAC2017 because it is the latest version to be approved by the EPA. EMFAC is similar to the MOVES model provided by the EPA, but is a California-specific model for vehicle emissions.

The general formula used in the EMFAC model is as follows:

Emissions = EF x source activity

For on-road vehicles, EF is typically expressed as mass of pollutant emitted per mile driven, per vehicle per day, or per trip made. The model was run for 2018 emissions. Mobile emissions were calculated by county and summarized by air basin.

Aerial (Helicopter)

Helicopter emissions were calculated using emissions factors from the Swiss Confederation Guidance on the Determination of Helicopter Emissions. Calculations assumed one helicopter would be used for two 8-hour days each year. The helicopter model was assumed to be a Hughes MD500. The following equation was used to calculate annual emissions:

$AE_i = EF_i \times FF(hp) \times t$

where

AE_i= annual emissions of chemical *i* (lb *i*/yr)
EF_i = chemical *i* emission factor (lb *i*/ kg f)
FF = fuel flow as a function of horsepower (kg f/hr)
t = total annual number of hours of operation (hr/yr)

Summary

Emissions from all three source types (off-road, on-road, and aerial) were combined to determine county-level annual emissions, presented in Table 2. Full calculations to support these emission calculations follow.

Table 2 Average Annual Emissions for Operations and Maintenance Equipment by County

County		Annual Emissions (tpy)					
		ROG	NO_x	CO	SO_2	$PM_{2.5}$	PM_{10}
Alameda	O&M Emissions	0.11	0.31	1.10	0.00	0.01	0.02
	de minimis Threshold	100	100	-	-	100	-
Contra Costa	O&M Emissions	0.11	0.32	1.09	0.00	0.00	0.02
	de minimis Threshold	100	100	-	-	100	-
Santa Clara	O&M Emissions	0.11	0.30	1.11	0.00	0.01	0.02
	de minimis Threshold	100	100	-	-	100	-
Merced	O&M Emissions	0.14	0.38	1.33	0.00	0.01	0.02
	de minimis Threshold	10	10	-	-	100	-
San Joaquin	O&M Emissions	0.13	0.36	1.20	0.00	0.01	0.02
	de minimis Threshold	10	10	-	-	100	-
Calaveras	O&M Emissions	0.25	0.52	1.91	0.00	0.01	0.02
	de minimis Threshold	100	100	-	-	-	-
Tuolumne	O&M Emissions	0.24	0.53	1.97	0.00	0.01	0.02
	de minimis Threshold	-	-	-	-	-	-

CO = carbon monoxide
NO_x = nitrogen oxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 10 microns in diameter
ROG = reactive organic gases (includes volatile organic compounds [VOC])
SO_2 = sulfur dioxide
tpy = tons per year

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Air Basin	County	Nonattainment Severity		Annual Emissions (tons per year)									
		O_3 (ROG & NO_x)	$PM_{2.5}$	ROG	de minimis Threshold	NO_x	de minimis Threshold	$PM_{2.5}$	de minimis Threshold	CO	SO_2	PM_{10}	CO_2
Mountain Counties	Calaveras	Marginal	-	0.25	100	0.52	100	0.01	-	1.91	0.00	0.02	236
	Tuolumne	-	-	0.24	-	0.53	-	0.01	-	1.97	0.00	0.02	242
	Total	-	-	0.47	-	0.96	-	0.02	-	3.60	0.00	0.04	443
Bay Area	Alameda	Marginal	Moderate	0.11	100	0.31	100	0.01	100	1.10	0.00	0.02	230
	Contra Costa	Marginal	Moderate	0.11	100	0.32	100	0.00	100	1.09	0.00	0.02	231
	Santa Clara	Marginal	Moderate	0.11	100	0.30	100	0.01	100	1.11	0.00	0.02	226
	Total	-	-	0.30	-	0.75	-	0.02	-	2.74	0.01	0.06	616
San Joaquin Valley	Merced	Extreme	Moderate	0.14	10	0.38	10	0.01	100	1.33	0.00	0.02	240
	San Joaquin	Extreme	Moderate	0.13	10	0.36	10	0.01	100	1.20	0.00	0.02	235
	Total	-	-	0.25	-	0.64	-	0.02	-	2.25	0.00	0.04	440

Attachment 1

Notes:

- = not applicable

Approach

Annual emissions for 2018 for each of the seven counties and were calculated using the tools described below. As equipment use was not specified by county, all equipment was assumed to be used for each county, presenting a worst case analysis. For those counties and pollutants designated nonattainment, emissions were compared to the applicable Federal de minimis level to demonstrate exemption from general conformity analysis.

Tools Used

Off-road: ARB's ORDAS 2017 Individual Calculation Tool, v7
Off-road (ATVs): emissions factors and equations from ARB recreational vehicle emissions methodology
Helicopter: emissions factors from Swiss Confederation, same model as used for SLTP EIS/EIR
On-road: EMFAC2014, made by ARB, approved by EPA for conformity analyses

Assumptions

Full equipment fleet used for each individual county; thus, these emissions are an overestimate
Equipment list was from WAPA, plus the helicopter assumed from the EA
VMT was derived from 2017 quarterly data
Ozone is measured by prescursors: ROG (also called VOC by the EPA) and NO_x
Air basins were summed by combining on-road emissions from each county, and off-road and helicopter emissions just once, as they would not occur twice in one basin.

Equipment	Annual Emissions (tpy)						
	NO_X	ROG	PM_{10}	$PM_{2.5}$	CO	SO_2	CO_2
2015 Caterpillar, 308E Tier 4i	0.0023	0.0001	0.0000	0.0000	--	0.0000	0.5584
2012 Morbark, M20R Tier 3	0.0067	0.0005	0.0003	0.0003	--	0.0000	3.1608
2017 Caterpillar, 279D Tier 4 final	0.0129	0.0006	0.0001	0.0001	--	0.0000	3.0414
2015 Morbark M15 Tier 3	0.0121	0.0007	0.0005	0.0005	--	0.0001	6.2228
2012 Verneer SC852 Tier 3	0.0004	0.0000	0.0000	0.0000	--	0.0000	0.0645
2016 Timberpro 735C Fellerbuncher Tier 3	0.0192	0.0014	0.0009	0.0009	--	0.0001	12.3828
2011 LS R4041H Tractor	0.0210	0.0010	0.0009	0.0009	--	0.0000	2.8814
2009 Yamaha, 250cc ATV 4x4	0.0007	--	--	0.0001	0.0273	--	0.1512
2010 Yamaha, 250cc ATV 4x4	0.0007	--	--	0.0001	0.0273	--	0.1512
2010 Honda, 250cc ATV 4x4	0.0007	--	--	0.0001	0.0273	--	0.1512
2008 POLARIS RANGER 700 4WD ATV	0.0044	--	--	0.0005	0.1796	--	0.9945
TOTAL	**0.08**	**0.00**	**0.00**	**0.00**	**0.26**	**0.00**	**29.76**

Notes:

-- = not available

Off-road emissions are identical for all counties. Construction equipment emissions from ORDAS 2017 Individual Calculation Tool, version 7. SO2 was calculated from fuel consumption. ROG was converted from THC. ATV emissions from ARB's recreational vehicle emission factors.

WAPA Equipment List

Responsible Party	Engine Model Year	Equipment Description	GVWR (lb)	Fuel	1Q17	2Q17	3Q17	4Q17
Mountain	308 E4	2015 Caterpillar, 308E Tier 4i	17,730	Diesel	11*	11*	11*	11*
Mountain	CHM20R8	2012 Morbark, M20R Tier 3	14,700	Diesel	12*	12*	12*	12*
Mountain	279D3	2017 Caterpillar, 279D Tier 4 final	9,700	Diesel	57*	57*	57*	57*
Mountain	CH15-8	2015 Morbark M15 Tier 3	8,900	Diesel	93*	93*	93*	93*
Mountain	SC-852	2012 Verneer SC852 Tier 3	4,460	Diesel	4*	4*	4*	4*
Mountain	735C-2	2016 Timberpro 735C Fellerbuncher Tier 3	84,800	Diesel	45*	45*	45*	45*
Drake		2011 LS R4041H Tractor	3,813	Diesel	131*	30	105	258
ATVs								
Davey	ATV1	2009 Yamaha, 250cc ATV 4x4	350	Gas	38	38	38	38
Davey	ATV2	2010 Yamaha, 250cc ATV 4x4	350	Gas	38	38	38	38
Davey	ATV3	2010 Honda, 250cc ATV 4x4	350	Gas	38	38	38	38
Drake		2008 POLARIS RANGER 700 4WD ATV	1,460	Gas	250*	250	250*	250*

* - data estimated based on monthly or quarterly data

Characterization

Type	Category	Year	HP	Annual Miles	Hours/ year	Load Factor	Fuel Used (gallons)[1]
Excavator	Excavator	2015	65	--	35	0.38	50
Brush Chipper	Other General Industrial Equipment	2012	400	--	40	0.34	281
Truck Loader	Crawler Tractor	2017	73	--	150	0.43	270
Brush Chipper	Other General Industrial Equipment	2015	140	--	225	0.34	553
Stump Cutter	Tractor/Loader/Backhoe	2012	27	--	10	0.37	6
Feller Buncher	Other Material Handling Equipment	2016	333	--	160	0.4	1100
Tractor	Tractor/Loader/Backhoe	2011	41	--	320	0.37	256
ATV	--	2009	--	152	--	--	--
ATV	--	2010	--	152	--	--	--
ATV	--	2010	--	152	--	--	--
ATV	--	2008	--	1000	--	--	--

Equipment Description	Annual Emissions (kg/yr)								Annual Emissions (tpy)						
	NO_x[1]	THC[1]	PM[1]	PM_{10}	$PM_{2.5}$	CO	SO_2	CO_2	NO_x	ROG	PM_{10}	$PM_{2.5}$	CO	SO_2	CO_2
2015 Caterpillar, 308E Tier 4i	2.100	0.080	0.029	0.03	0.03	--	0.00	507	0.0023	0.0001	0.0000	0.0000	--	0.0000	0.56
2012 Morbark, M20R Tier 3	6.062	0.364	0.274	0.27	0.27	--	0.03	2867	0.0067	0.0005	0.0003	0.0003	--	0.0000	3.16
2017 Caterpillar, 279D Tier 4 final	11.708	0.440	0.059	0.06	0.06	--	0.03	2759	0.0129	0.0006	0.0001	0.0001	--	0.0000	3.04
2015 Morbark M15 Tier 3	10.950	0.558	0.467	0.47	0.47	--	0.05	5645	0.0121	0.0007	0.0005	0.0005	--	0.0001	6.22
2012 Verneer SC852 Tier 3	0.408	0.009	0.015	0.01	0.01	--	0.00	59	0.0004	0.0000	0.0000	0.0000	--	0.0000	0.06
2016 Timberpro 735C Fellerbuncher Tier 3	17.415	1.031	0.788	0.79	0.79	--	0.11	11233	0.0192	0.0014	0.0009	0.0009	--	0.0001	12.38
2011 LS R4041H Tractor	19.052	0.761	0.775	0.78	0.78	--	0.02	2614	0.0210	0.0010	0.0009	0.0009	--	0.0000	2.88
	EF (g/mile)								0.0746	0.0043	0.0027	0.0027	0.0000	0.0003	28.31
2009 Yamaha, 250cc ATV 4x4	0.49	--	--	--	0.06	19.8	--	110	0.00	--	--	0.00	0.03	--	0.15
2010 Yamaha, 250cc ATV 4x4	0.49	--	--	--	0.06	19.8	--	110	0.00	--	--	0.00	0.03	--	0.15
2010 Honda, 250cc ATV 4x4	0.49	--	--	--	0.06	19.8	--	110	0.00	--	--	0.00	0.03	--	0.15
2008 POLARIS RANGER 700 4WD ATV	0.49	--	--	--	0.06	19.8	--	110	0.00	--	--	0.00	0.18	--	0.99
								TOTAL	0.0811	0.0043	0.0027	0.0034	0.2615	0.0003	29.76

Notes:

1. Sourced from ORDAS2017 Individual Calculation Tool, v7

Off-road Equipment Emissions

Annual emissions from ORDAS 2017 Individual Calculation Tool, v7
PM2.5 and PM10 assumed to be equal to PM
SO2 calculated from fuel consumption
15ppm diesel limit
ROG=THC*1.21
Diesel Fuel - Pounds / Gallon
7.0936325
Datasource: http://www.arb.ca.gov/ei/speciate/orgprof_10_

ATVs

Rate for PM is for PM in general, not specifically 2.5 microns
Only exhaust emissions were considered for ATVs (i.e. no Hot soak, idle, etc.)
Emission factors from ARB Emission Estimation Methodology for Off-Highway Recreational Vehicles, May 2013
Emission factors in g/mile
Miles summed from 2017 quarterly data

Emissions Equation

AE= EF*d

AE = annual emissions
EF= emission factor
d= annual average mileage
Source: ARB (altered to match off-road equation nomenclature)

County	Daily Emissions (tons/day)						
	ROG	NO_x	$PM_{2.5}$	CO	SO_2	PM_{10}	CO_2
Calaveras	0.0006	0.0012	0.0000	0.0045	0.0000	0.0001	0.5504
Tuolumne	0.0006	0.0012	0.0000	0.0046	0.0000	0.0001	0.5674
Total Mountain	0.0012	0.0024	0.0001	0.0091	0.0000	0.0001	1.1177
Alameda	0.0003	0.0006	0.0000	0.0022	0.0000	0.0001	0.5335
Contra Costa	0.0002	0.0006	0.0000	0.0022	0.0000	0.0001	0.5355
Santa Clara	0.0003	0.0006	0.0000	0.0023	0.0000	0.0001	0.5231
Total Bay Area	0.0008	0.0018	0.0000	0.0067	0.0000	0.0002	1.5920
Merced	0.0003	0.0008	0.0000	0.0029	0.0000	0.0001	0.5610
San Joaquin	0.0003	0.0007	0.0000	0.0025	0.0000	0.0001	0.5478
Total San Joaquin Valley	0.0006	0.0015	0.0000	0.0054	0.0000	0.0001	1.1088
	Annual Emissions (tpy)						
	ROG	NO_x	$PM_{2.5}$	CO	SO_2	PM_{10}	CO_2
Calaveras	0.23	0.43	0.01	1.63	0.00	0.02	200.88
Tuolumne	0.22	0.44	0.01	1.69	0.00	0.02	207.09
Total Mountain	0.45	0.87	0.02	3.32	0.00	0.04	407.97
Alameda	0.09	0.22	0.01	0.82	0.00	0.02	194.72
Contra Costa	0.09	0.23	0.00	0.81	0.00	0.02	195.44
Santa Clara	0.10	0.21	0.01	0.83	0.00	0.02	190.93
Total Bay Area	0.28	0.66	0.02	2.46	0.01	0.06	581.09
Merced	0.12	0.28	0.01	1.05	0.00	0.02	204.75
San Joaquin	0.11	0.26	0.01	0.92	0.00	0.02	199.96
Total San Joaquin Valley	0.23	0.55	0.02	1.97	0.00	0.04	404.70

EMFAC is a mobile source emissions inventory tool created by ARB and recommended for conformity analyses in California. EMFAC2014 is approved by the EPA, so this earlier model was utilized rather than EMFAC2017, which is not yet approved. The custom activity mode was used to input the VMT for the specific vehicles provided by WAPA. This information was used to generate emissions for a single year, assumed 2018. The model was run using the geographic level of county. All VMT from vehicles were used in every county despite the VMT actually being spread out over all counties; therefore, the output from this model is an overestimate.

WAPA Equipment List

Responsible Party	Engine Model Year	Vehicle Description	GVWR (lb)	Fuel	1Q17	2Q17	3Q17	4Q17	Characterization				VMT	
									Type	Vehicle Class	Fuel	Year	Annual	Daily
Drake		2011 FORD Ranger 4x4 Super Cab	5,150	Gas	1,798*	1,798	1,798*	1,798*	On-road	LDT2	Gas	2011	7,192	19.70
Mountain	G11-364	2014 Ford F-550, Tier 4 final	9,800	Diesel	4,050*	4,050*	4,050*	4,050*	On-road	LHD1	Dsl	2014	16,200	44.38
Mountain	G11-388	2014 Ford F-550, Tier 4 final	9,800	Diesel	129*	129*	129*	129*	On-road	LHD1	Dsl	2014	516	1.41
Drake		2009 FORD F-350 4X4	11,000	Diesel	3,186*	3,186*	3,186*	3,186	On-road	LHD2	Dsl	2009	12,744	34.92
Mountain	RW1-371	2014 Ford F-250, 6.2L 4X4	6,800	Gas	9,150*	9,150*	9,150*	9,150*	On-road	MDV	Gas	2014	36,600	100.27
Mountain	RW1-445	2017 Ford F-250, 6.2L 4X4	6,700	Gas	8,625*	8,625*	8,625*	8,625*	On-road	MDV	Gas	2017	34,500	94.52
Mountain	SUB	Ford F-150	6,750	Gas	5,706*	5,706*	5,706*	5,706*	On-road	MDV	Gas	-	22,824	62.53
Mountain	RW-401	2014 Ford F-250, 6.2L 4X4	6,800	Gas	75*	75*	75*	75*	On-road	MDV	Gas	2014	296	0.81
Mountain	RW-4094	Chevrolet Silverado	6,800	Gas	1,500*	1,500*	1,500*	1,500*	On-road	MDV	Gas	-	6,000	16.44
Davey	2202158	2014 Ford F-150, eco-boost V6	6,750	Gas	11,700	11,700	11,700	11,700	On-road	MDV	Gas	2014	46,800	128.22
Davey	2202562	2016 Ford F-150, eco-boost V6	6,750	Gas	9,100	9,100	9,100	9,100	On-road	MDV	Gas	2016	36,400	99.73
Davey	2202870	2017 Ford F-150, eco-boost V6	6,750	Gas	6,500	6,500	6,500	6,500	On-road	MDV	Gas	2017	26,000	71.23
Drake		2012 FORD F-250 4X4	6,900	Gas	2,596*	2,831	1,771	3,186	On-road	MDV	Gas	2012	10,384	28.45
Drake		2006 NISSAN 1/2 TON 4X4	6,500	Gas	2,596*	2,831	1,771	3,186	On-road	MDV	Gas	2006	10,384	28.45
Drake		2010 Toyota Tundra 4X4 Crew Cab	7,100	Gas	2,596*	2,831	1,771	3,186	On-road	MDV	Gas	2010	10,384	28.45
Drake		2003 FORD EXPLORER 4X4	7,000	Gas	1,190*	1,798	583	1,190*	On-road	MDV	Gas	2003	4,761	13.04
Drake		2002 Ford 1-Ton w/525 Gal. Water Tank	9,900	Gas	1,855*	1,798	583	3,186	On-road	T6TS	Gas	2002	7,422	20.33
Mountain	LA400-LBA4	2016 Kenworth T800W Tier 4, 2006 Cozad 50 ton lowbed	20,000	Diesel	879*	879*	879*	879*	On-road	T6 Utility	Dsl	2016	3,516	9.63
Mountain	HLA-1	2017 Kenworth, T880 Cummins Tier 4 final	84,500	Diesel	-	-	-	-	On-road	T7 Utility	Dsl	2017	-	-
Mountain	GPA - 1	2009 Peterbuilt 357 Tier 4i	68,000	Diesel	858*	858*	858*	858*	On-road	T7 Utility	Dsl	2009	3,432	9.40

* - data estimated based on monthly or quarterly data

	Total Daily VMT
LDT2-Gas	19.70
LHD1-Dsl	45.80
LHD2-Dsl	34.92
MDV-Gas	672.15
T6TS	20.33
T6 Utility	9.63
T7 Utility	9.40
All Vehicles	**811.93**

EMFAC2011 Veh & Tech	EMFAC2011 Vehicle	Description	Source	EMFAC2007 Vehicle	EMFAC2007 Vehicle Code	Truck / Non-Truck Category	Truck 1 / Truck 2 / Non-Truck Category
LDA - DSL	LDA	Passenger Cars	EMFAC2011-LDV	LDA	PC	Non-Trucks	Non-Trucks
LDA - GAS			EMFAC2011-LDV			Non-Trucks	Non-Trucks
LDT1 - DSL	LDT1	Light-Duty Trucks (GVWR <6000 lbs. and ETW <= 3750 lbs)	EMFAC2011-LDV	LDT1	T1	Non-Trucks	Non-Trucks
LDT1 - GAS			EMFAC2011-LDV			Non-Trucks	Non-Trucks
LDT2 - DSL	LDT2	Light-Duty Trucks (GVWR <6000 lbs. and ETW 3751-5750 lbs)	EMFAC2011-LDV	LDT2	T2	Non-Trucks	Non-Trucks
LDT2 - GAS			EMFAC2011-LDV			Non-Trucks	Non-Trucks
LHD1 - DSL	LHD1	Light-Heavy-Duty Trucks (GVWR 8501-10000 lbs)	EMFAC2011-LDV	LHDT1	T4	Trucks	Truck 1
LHD1 - GAS			EMFAC2011-LDV			Trucks	Truck 1
LHD2 - DSL	LHD2	Light-Heavy-Duty Trucks (GVWR 10001-14000 lbs)	EMFAC2011-LDV	LHDT2	T5	Trucks	Truck 1
LHD2 - GAS			EMFAC2011-LDV			Trucks	Truck 1
MCY - GAS	MCY	Motorcycles	EMFAC2011-LDV	MCY	MC	Non-Trucks	Non-Trucks
MDV - DSL	MDV	Medium-Duty Trucks (GVWR 6000-8500 lbs)	EMFAC2011-LDV	MDV	T3	Non-Trucks	Non-Trucks
MDV - GAS			EMFAC2011-LDV			Non-Trucks	Non-Trucks
MH - DSL	MH	Motor Homes	EMFAC2011-LDV	MH	MH	Non-Trucks	Non-Trucks
MH - GAS			EMFAC2011-LDV			Non-Trucks	Non-Trucks
T6 Ag - DSL	T6 Ag	Medium-Heavy Duty Diesel Agriculture Truck	EMFAC2011-HD	MHDT	T6	Trucks	Truck 2
T6 CAIRP heavy - DSL	T6 CAIRP heavy	Medium-Heavy Duty Diesel CA International Registration Plan Truck with GVWR>26000 lbs	EMFAC2011-HD			Trucks	Truck 2
T6 CAIRP small - DSL	T6 CAIRP small	Medium-Heavy Duty Diesel CA International Registration Plan Truck with GVWR<=26000 lbs	EMFAC2011-HD			Trucks	Truck 2
T6 instate construction heavy - DSL	T6 instate construction heavy	Medium-Heavy Duty Diesel instate construction Truck with GVWR>26000 lbs	EMFAC2011-HD			Trucks	Truck 2
T6 instate construction small - DSL	T6 instate construction small	Medium-Heavy Duty Diesel instate construction Truck with GVWR<=26000 lbs	EMFAC2011-HD			Trucks	Truck 2
T6 instate heavy - DSL	T6 instate heavy	Medium-Heavy Duty Diesel instate Truck with GVWR>26000 lbs	EMFAC2011-HD			Trucks	Truck 2
T6 instate small - DSL	T6 instate small	Medium-Heavy Duty Diesel instate Truck with GVWR<=26000 lbs	EMFAC2011-HD			Trucks	Truck 2
T6 OOS heavy - DSL	T6 OOS heavy	Medium-Heavy Duty Diesel Out-of-state Truck with GVWR>26000 lbs	EMFAC2011-HD			Trucks	Truck 2
T6 OOS small - DSL	T6 OOS small	Medium-Heavy Duty Diesel Out-of-state Truck with GVWR<=26000 lbs	EMFAC2011-HD			Trucks	Truck 2
T6 Public - DSL	T6 Public	Medium-Heavy Duty Diesel Public Fleet Truck	EMFAC2011-HD			Trucks	Truck 2
T6 utility - DSL	T6 utility	Medium-Heavy Duty Diesel Utility Fleet Truck	EMFAC2011-HD			Trucks	Truck 2
T6TS - GAS	T6TS	Medium-Heavy Duty Gasoline Truck	EMFAC2011-LDV			Trucks	Truck 2
T7 Ag - DSL	T7 Ag	Heavy-Heavy Duty Diesel Agriculture Truck	EMFAC2011-HD	HHDT	T7	Trucks	Truck 2
T7 CAIRP - DSL	T7 CAIRP	Heavy-Heavy Duty Diesel CA International Registration Plan Truck	EMFAC2011-HD			Trucks	Truck 2
T7 CAIRP construction - DSL	T7 CAIRP construction	Heavy-Heavy Duty Diesel CA International Registration Plan Construction Truck	EMFAC2011-HD			Trucks	Truck 2
T7 NNOOS - DSL	T7 NNOOS	Heavy-Heavy Duty Diesel Non-Neighboring Out-of-state Truck	EMFAC2011-HD			Trucks	Truck 2
T7 NOOS - DSL	T7 NOOS	Heavy-Heavy Duty Diesel Neighboring Out-of-state Truck	EMFAC2011-HD			Trucks	Truck 2
T7 other port - DSL	T7 other port	Heavy-Heavy Duty Diesel Drayage Truck at Other Facilities	EMFAC2011-HD			Trucks	Truck 2
T7 POAK - DSL	T7 POAK	Heavy-Heavy Duty Diesel Drayage Truck in Bay Area	EMFAC2011-HD			Trucks	Truck 2
T7 POLA - DSL	T7 POLA	Heavy-Heavy Duty Diesel Drayage Truck near South Coast	EMFAC2011-HD			Trucks	Truck 2
T7 Public - DSL	T7 Public	Heavy-Heavy Duty Diesel Public Fleet Truck	EMFAC2011-HD			Trucks	Truck 2
T7 Single - DSL	T7 Single	Heavy-Heavy Duty Diesel Single Unit Truck	EMFAC2011-HD			Trucks	Truck 2
T7 single construction - DSL	T7 single construction	Heavy-Heavy Duty Diesel Single Unit Construction Truck	EMFAC2011-HD			Trucks	Truck 2
T7 SWCV - DSL	T7 SWCV	Heavy-Heavy Duty Diesel Solid Waste Collection Truck	EMFAC2011-HD			Trucks	Truck 2
T7 tractor - DSL	T7 tractor	Heavy-Heavy Duty Diesel Tractor Truck	EMFAC2011-HD			Trucks	Truck 2
T7 tractor construction - DSL	T7 tractor construction	Heavy-Heavy Duty Diesel Tractor Construction Truck	EMFAC2011-HD			Trucks	Truck 2
T7 utility - DSL	T7 utility	Heavy-Heavy Duty Diesel Utility Fleet Truck	EMFAC2011-HD			Trucks	Truck 2
T7IS - GAS	T7IS	Heavy-Heavy Duty Gasoline Truck	EMFAC2011-LDV			Trucks	Truck 2
PTO - DSL	PTO	Power Take Off	EMFAC2011-HD			Trucks	Truck 2
SBUS - DSL	SBUS	School Buses	EMFAC2011-HD	SBUS	SB	Non-Trucks	Non-Trucks
SBUS - GAS			EMFAC2011-LDV			Non-Trucks	Non-Trucks
UBUS - DSL	UBUS	Urban Buses	EMFAC2011-LDV	UBUS	UB	Non-Trucks	Non-Trucks
UBUS - GAS			EMFAC2011-LDV			Non-Trucks	Non-Trucks
Motor Coach - DSL	Motor Coach	Motor Coach	EMFAC2011-HD	OBUS	OB	Non-Trucks	Non-Trucks
OBUS - GAS	OBUS	Other Buses	EMFAC2011-LDV			Non-Trucks	Non-Trucks
All Other Buses - DSL	All Other Buses	All Other Buses	EMFAC2011-HD			Non-Trucks	Non-Trucks

Area	GAI	Sub-Area	Cal. Year	Season	Title	Veh_Tech	EMFAC2007 Category	Population	VMT	Trips	ROG_TOTAL	CO_TOTEX	NOx_TOTEX	CO2_TOTEX	PM10_TOTAL	PM2_5_TOTAL	SOx_TOTEX	Fuel_GAS	Fuel_DSL
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	All Vehicles	All Vehicles	26.6	811.9	177.3	0.0006	0.0045	0.0012	0.5504	0.0001	0.0000	0.0000	0.0498	0.0081
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	ALL OTHER BUSES - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LDA - DSL	LDA - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LDA - GAS	LDA - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LDT1 - DSL	LDT1 - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LDT1 - GAS	LDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LDT2 - DSL	LDT2 - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LDT2 - GAS	LDT2 - GAS	0.5225	19.7	3.21	0.0000	0.0001	0.0000	0.0092	0.0000	0.0000	0.0000	0.0010	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LHD1 - DSL	LHDT1 - DSL	1.38	45.8	17.4	0.0000	0.0001	0.0003	0.0301	0.0000	0.0000	0.0000		0.0027
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LHD1 - GAS	LHDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LHD2 - DSL	LHDT2 - DSL	0.9498	34.9	11.9	0.0000	0.0000	0.0002	0.0257	0.0000	0.0000	0.0000		0.0023
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	LHD2 - GAS	LHDT2 - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	MCY - GAS	MCY - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	MDV - DSL	MDV - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	MDV - GAS	MDV - GAS	22.3	672.2	134.3	0.0005	0.0038	0.0005	0.4207	0.0000	0.0000	0.0000	0.0455	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	MH - DSL	MH - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	MH - GAS	MH - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	MOTOR COACH - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	OBUS - GAS	OBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	PTO - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	SBUS - DSL	SBUS - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	SBUS - GAS	SBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 AG - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 CAIRP HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 CAIRP SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 INSTATE CONSTRUCTION HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 INSTATE CONSTRUCTION SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 INSTATE HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 INSTATE SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 OOS HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 OOS SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 PUBLIC - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6 UTILITY - DSL	MHDT - DSL	0.4922	9.63		0.0000	0.0000	0.0000	0.0136	0.0000	0.0000	0.0000		0.0012
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T6TS - GAS	MHDT - GAS	0.5205	20.3	10.4	0.0000	0.0005	0.0001	0.0306	0.0000	0.0000	0.0000	0.0034	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 AG - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 CAIRP - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 CAIRP CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 NNOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 NOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 OTHER PORT - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 POAK - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 POLA - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 PUBLIC - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 SINGLE - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 SINGLE CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 SWCV - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 TRACTOR - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 TRACTOR CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7 UTILITY - DSL	HHDT - DSL	0.4105	9.40		0.0000	0.0000	0.0000	0.0205	0.0000	0.0000	0.0000		0.0018
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	T7IS - GAS	HHDT - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	UBUS - DSL	UBUS - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	8	Calaveras (MC)	2018	Annual	Calaveras (MC)-2018-Annual	UBUS - GAS	UBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	All Vehicles	All Vehicles	23.7	811.9	158.8	0.0006	0.0048	0.0012	0.5674	0.0001	0.0000	0.0000	0.0517	0.0081
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	ALL OTHER BUSES - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LDA - DSL	LDA - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LDA - GAS	LDA - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LDT1 - DSL	LDT1 - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LDT1 - GAS	LDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LDT2 - DSL	LDT2 - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LDT2 - GAS	LDT2 - GAS	0.4931	19.7	3.01	0.0000	0.0001	0.0000	0.0097	0.0000	0.0000	0.0000	0.0010	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LHD1 - DSL	LHDT1 - DSL	1.28	45.8	16.1	0.0000	0.0001	0.0003	0.0301	0.0000	0.0000	0.0000		0.0027
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LHD1 - GAS	LHDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LHD2 - DSL	LHDT2 - DSL	0.8731	34.9	11.0	0.0000	0.0000	0.0002	0.0256	0.0000	0.0000	0.0000		0.0023
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	LHD2 - GAS	LHDT2 - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	MCY - GAS	MCY - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	MDV - DSL	MDV - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	MDV - GAS	MDV - GAS	19.6	672.2	117.7	0.0005	0.0039	0.0006	0.4372	0.0000	0.0000	0.0000	0.0473	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	MH - DSL	MH - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	MH - GAS	MH - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	MOTOR COACH - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	OBUS - GAS	OBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	PTO - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	SBUS - DSL	SBUS - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	SBUS - GAS	SBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 AG - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 CAIRP HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 CAIRP SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 INSTATE CONSTRUCTION HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 INSTATE CONSTRUCTION SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 INSTATE HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 INSTATE SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 OOS HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 OOS SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 PUBLIC - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6 UTILITY - DSL	MHDT - DSL	0.4922	9.63		0.0000	0.0000	0.0000	0.0136	0.0000	0.0000	0.0000		0.0012
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T6TS - GAS	MHDT - GAS	0.5485	20.3	11.0	0.0001	0.0006	0.0001	0.0307	0.0000	0.0000	0.0000	0.0034	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 AG - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 CAIRP - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 CAIRP CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 NNOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 NOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 OTHER PORT - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0

Area	GAI	Sub-Area	Cal_Year	Season	Title	Veh_Tech	EMFAC2007 Category	Population	VMT	Trips	ROG_TOTAL	CO_TOTEX	NOx_TOTEX	CO2_TOTEX	PM10_TOTAL	PM2_5_TOTAL	SOx_TOTEX	Fuel_GAS	Fuel_DSL
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 POAK - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 POLA - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 PUBLIC - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 SINGLE - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 SINGLE CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 SWCV - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 TRACTOR - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 TRACTOR CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7 UTILITY - DSL	HHDT - DSL	0.4105	9.40		0.0000	0.0000	0.0000	0.0205	0.0000	0.0000	0.0000		0.0018
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	T7IS - GAS	HHDT - GAS	0	0	0	0	0	0	0	0	0	0	0	
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	UBUS - DSL	UBUS - DSL	0	0	0	0	0	0	0	0	0	0		0
Mountain Counties	15	Tuolumne (MC)	2018	Annual	Tuolumne (MC)-2018-Annual	UBUS - GAS	UBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	All Vehicles	All Vehicles	22.9	811.9	155.0	0.0003	0.0022	0.0006	0.5335	0.0001	0.0000	0.0000	0.0477	0.0080
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	ALL OTHER BUSES - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LDA - DSL	LDA - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LDA - GAS	LDA - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LDT1 - DSL	LDT1 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LDT1 - GAS	LDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LDT2 - DSL	LDT2 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LDT2 - GAS	LDT2 - GAS	0.4923	19.7	3.09	0.0000	0.0000	0.0000	0.0090	0.0000	0.0000	0.0000	0.0010	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LHD1 - DSL	LHDT1 - DSL	1.21	45.8	15.2	0.0000	0.0000	0.0002	0.0297	0.0000	0.0000	0.0000		0.0027
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LHD1 - GAS	LHDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LHD2 - DSL	LHDT2 - DSL	0.8158	34.9	10.3	0.0000	0.0000	0.0001	0.0252	0.0000	0.0000	0.0000		0.0023
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	LHD2 - GAS	LHDT2 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	MCY - GAS	MCY - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	MDV - DSL	MDV - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	MDV - GAS	MDV - GAS	19.1	672.2	118.7	0.0002	0.0019	0.0002	0.4056	0.0000	0.0000	0.0000	0.0435	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	MH - DSL	MH - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	MH - GAS	MH - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	MOTOR COACH - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	OBUS - GAS	OBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	PTO - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	SBUS - DSL	SBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	SBUS - GAS	SBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 AG - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 CAIRP HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 CAIRP SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 INSTATE CONSTRUCTION HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 INSTATE CONSTRUCTION SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 INSTATE HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 INSTATE SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 OOS HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 OOS SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 PUBLIC - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6 UTILITY - DSL	MHDT - DSL	0.4922	9.63		0.0000	0.0000	0.0000	0.0135	0.0000	0.0000	0.0000		0.0012
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T6TS - GAS	MHDT - GAS	0.3858	20.3	7.72	0.0000	0.0002	0.0000	0.0300	0.0000	0.0000	0.0000	0.0032	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 AG - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 CAIRP - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 CAIRP CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 NNOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 NOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 OTHER PORT - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 POAK - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 POLA - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 PUBLIC - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 SINGLE - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 SINGLE CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 SWCV - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 TRACTOR - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 TRACTOR CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7 UTILITY - DSL	HHDT - DSL	0.4105	9.40		0.0000	0.0000	0.0000	0.0205	0.0000	0.0000	0.0000		0.0018
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	T7IS - GAS	HHDT - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	UBUS - DSL	UBUS - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	39	Alameda (SF)	2018	Annual	Alameda (SF)-2018-Annual	UBUS - GAS	UBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	All Vehicles	All Vehicles	22.9	811.9	155.4	0.0002	0.0022	0.0006	0.5355	0.0001	0.0000	0.0000	0.0479	0.0080
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	ALL OTHER BUSES - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LDA - DSL	LDA - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LDA - GAS	LDA - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LDT1 - DSL	LDT1 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LDT1 - GAS	LDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LDT2 - DSL	LDT2 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LDT2 - GAS	LDT2 - GAS	0.5013	19.7	3.15	0.0000	0.0000	0.0000	0.0090	0.0000	0.0000	0.0000	0.0010	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LHD1 - DSL	LHDT1 - DSL	1.30	45.8	16.4	0.0000	0.0001	0.0002	0.0298	0.0000	0.0000	0.0000		0.0027
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LHD1 - GAS	LHDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LHD2 - DSL	LHDT2 - DSL	0.8691	34.9	10.9	0.0000	0.0000	0.0001	0.0253	0.0000	0.0000	0.0000		0.0023
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	LHD2 - GAS	LHDT2 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	MCY - GAS	MCY - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	MDV - DSL	MDV - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	MDV - GAS	MDV - GAS	18.9	672.2	117.1	0.0002	0.0018	0.0002	0.4076	0.0000	0.0000	0.0000	0.0437	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	MH - DSL	MH - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	MH - GAS	MH - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	MOTOR COACH - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	OBUS - GAS	OBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	PTO - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	SBUS - DSL	SBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	SBUS - GAS	SBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 AG - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 CAIRP HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 CAIRP SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 INSTATE CONSTRUCTION HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 INSTATE CONSTRUCTION SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 INSTATE HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0

Area	GAI	Sub-Area	Cal_Year	Season	Title	Veh_Tech	EMFAC2007 Category	Population	VMT	Trips	ROG_TOTAL	CO_TOTEX	NOx_TOTEX	CO2_TOTEX	PM10_TOTAL	PM2_5_TOTAL	SOx_TOTEX	Fuel_GAS	Fuel_DSL
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 INSTATE SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 OOS HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 OOS SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 PUBLIC - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6 UTILITY - DSL	MHDT - DSL	0.4922	9.63		0.0000	0.0000	0.0000	0.0135	0.0000	0.0000	0.0000		0.0012
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T6TS - GAS	MHDT - GAS	0.3916	20.3	7.84	0.0000	0.0002	0.0000	0.0298	0.0000	0.0000	0.0000	0.0032	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 AG - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 CAIRP - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 CAIRP CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 NNOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 NOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 OTHER PORT - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 POAK - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 POLA - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 PUBLIC - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 SINGLE - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 SINGLE CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 SWCV - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 TRACTOR - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 TRACTOR CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7 UTILITY - DSL	HHDT - DSL	0.4105	9.40		0.0000	0.0000	0.0000	0.0205	0.0000	0.0000	0.0000		0.0018
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	T7IS - GAS	HHDT - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	UBUS - DSL	UBUS - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	40	Contra Costa (SF)	2018	Annual	Contra Costa(SF)-2018-Annual	UBUS - GAS	UBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	All Vehicles	All Vehicles	24.8	811.9	168.4	0.0003	0.0023	0.0006	0.5231	0.0001	0.0000	0.0000	0.0467	0.0080
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	ALL OTHER BUSES - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LDA - DSL	LDA - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LDA - GAS	LDA - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LDT1 - DSL	LDT1 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LDT1 - GAS	LDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LDT2 - DSL	LDT2 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LDT2 - GAS	LDT2 - GAS	0.5636	19.7	3.55	0.0000	0.0000	0.0000	0.0088	0.0000	0.0000	0.0000	0.0009	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LHD1 - DSL	LHDT1 - DSL	1.27	45.8	15.9	0.0000	0.0000	0.0002	0.0295	0.0000	0.0000	0.0000		0.0027
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LHD1 - GAS	LHDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LHD2 - DSL	LHDT2 - DSL	0.8685	34.9	10.9	0.0000	0.0000	0.0001	0.0251	0.0000	0.0000	0.0000		0.0023
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	LHD2 - GAS	LHDT2 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	MCY - GAS	MCY - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	MDV - DSL	MDV - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	MDV - GAS	MDV - GAS	20.8	672.2	129.6	0.0002	0.0019	0.0002	0.3957	0.0000	0.0000	0.0000	0.0425	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	MH - DSL	MH - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	MH - GAS	MH - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	MOTOR COACH - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	OBUS - GAS	OBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	PTO - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	SBUS - DSL	SBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	SBUS - GAS	SBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 AG - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 CAIRP HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 CAIRP SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 INSTATE CONSTRUCTION HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 INSTATE CONSTRUCTION SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 INSTATE HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 INSTATE SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 OOS HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 OOS SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 PUBLIC - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6 UTILITY - DSL	MHDT - DSL	0.4922	9.63		0.0000	0.0000	0.0000	0.0135	0.0000	0.0000	0.0000		0.0012
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T6TS - GAS	MHDT - GAS	0.4177	20.3	8.36	0.0000	0.0003	0.0000	0.0299	0.0000	0.0000	0.0000	0.0032	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 AG - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 CAIRP - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 CAIRP CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 NNOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 NOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 OTHER PORT - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 POAK - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 POLA - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 PUBLIC - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 SINGLE - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 SINGLE CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 SWCV - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 TRACTOR - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 TRACTOR CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7 UTILITY - DSL	HHDT - DSL	0.4105	9.40		0.0000	0.0000	0.0000	0.0205	0.0000	0.0000	0.0000		0.0018
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	T7IS - GAS	HHDT - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	UBUS - DSL	UBUS - DSL	0	0	0	0	0	0	0	0	0	0		0
San Francisco Bay Area	45	Santa Clara (SF)	2018	Annual	Santa Clara (SF)-2018-Annual	UBUS - GAS	UBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	All Vehicles	All Vehicles	23.1	811.9	154.8	0.0003	0.0029	0.0008	0.5610	0.0001	0.0000	0.0000	0.0507	0.0081
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	ALL OTHER BUSES - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LDA - DSL	LDA - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LDA - GAS	LDA - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LDT1 - DSL	LDT1 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LDT1 - GAS	LDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LDT2 - DSL	LDT2 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LDT2 - GAS	LDT2 - GAS	0.4700	19.7	2.92	0.0000	0.0000	0.0000	0.0093	0.0000	0.0000	0.0000	0.0010	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LHD1 - DSL	LHDT1 - DSL	1.33	45.8	16.7	0.0000	0.0001	0.0002	0.0300	0.0000	0.0000	0.0000		0.0027
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LHD1 - GAS	LHDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LHD2 - DSL	LHDT2 - DSL	0.8974	34.9	11.3	0.0000	0.0000	0.0001	0.0255	0.0000	0.0000	0.0000		0.0023
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	LHD2 - GAS	LHDT2 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	MCY - GAS	MCY - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	MDV - DSL	MDV - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	MDV - GAS	MDV - GAS	19.2	672.2	117.9	0.0003	0.0024	0.0003	0.4323	0.0000	0.0000	0.0000	0.0465	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	MH - DSL	MH - DSL	0	0	0	0	0	0	0	0	0	0		0

Area	GAI	Sub-Area	Cal_Year	Season	Title	Veh_Tech	EMFAC2007 Category	Population	VMT	Trips	ROG_TOTAL	CO_TOTEX	NOx_TOTEX	CO2_TOTEX	PM10_TOTAL	PM2_5_TOTAL	SOx_TOTEX	Fuel_GAS	Fuel_DSL
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	MH - GAS	MH - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	MOTOR COACH - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	OBUS - GAS	OBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	PTO - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	SBUS - DSL	SBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	SBUS - GAS	SBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 AG - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 CARP HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 CARP SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 INSTATE CONSTRUCTION HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 INSTATE CONSTRUCTION SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 INSTATE HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 INSTATE SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 OOS HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 OOS SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 PUBLIC - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6 UTILITY - DSL	MHDT - DSL	0.4922	9.63		0.0000	0.0000	0.0000	0.0136	0.0000	0.0000	0.0000		0.0012
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T6TS - GAS	MHDT - GAS	0.2979	20.3	5.96	0.0000	0.0003	0.0000	0.0298	0.0000	0.0000	0.0000	0.0032	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 AG - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 CARP - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 CARP CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 NNOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 NOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 OTHER PORT - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 POAK - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 POLA - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 PUBLIC - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 SINGLE - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 SINGLE CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 SWCV - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 TRACTOR - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 TRACTOR CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7 UTILITY - DSL	HHDT - DSL	0.4105	9.40		0.0000	0.0000	0.0000	0.0205	0.0000	0.0000	0.0000		0.0018
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	T7IS - GAS	HHDT - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	UBUS - DSL	UBUS - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	52	Merced (SJV)	2018	Annual	Merced (SJV)-2018-Annual	UBUS - GAS	UBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	All Vehicles	All Vehicles	24.5	811.8	165.7	0.0003	0.0025	0.0007	0.5478	0.0001	0.0000	0.0000	0.0493	0.0080
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	ALL OTHER BUSES - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LDA - DSL	LDA - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LDA - GAS	LDA - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LDT1 - DSL	LDT1 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LDT1 - GAS	LDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LDT2 - DSL	LDT2 - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LDT2 - GAS	LDT2 - GAS	0.5003	19.7	3.13	0.0000	0.0000	0.0000	0.0091	0.0000	0.0000	0.0000	0.0010	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LHD1 - DSL	LHDT1 - DSL	1.37	45.8	17.3	0.0000	0.0001	0.0002	0.0299	0.0000	0.0000	0.0000		0.0027
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LHD1 - GAS	LHDT1 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LHD2 - DSL	LHDT2 - DSL	0.9223	34.9	11.6	0.0000	0.0000	0.0001	0.0253	0.0000	0.0000	0.0000		0.0023
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	LHD2 - GAS	LHDT2 - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	MCY - GAS	MCY - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	MDV - DSL	MDV - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	MDV - GAS	MDV - GAS	20.4	672.2	125.5	0.0003	0.0021	0.0003	0.4194	0.0000	0.0000	0.0000	0.0450	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	MH - DSL	MH - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	MH - GAS	MH - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	MOTOR COACH - DSL	OBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	OBUS - GAS	OBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	PTO - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	SBUS - DSL	SBUS - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	SBUS - GAS	SBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 AG - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 CARP HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 CARP SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 INSTATE CONSTRUCTION HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 INSTATE CONSTRUCTION SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 INSTATE HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 INSTATE SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 OOS HEAVY - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 OOS SMALL - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 PUBLIC - DSL	MHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6 UTILITY - DSL	MHDT - DSL	0.4922	9.63		0.0000	0.0000	0.0000	0.0136	0.0000	0.0000	0.0000		0.0012
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T6TS - GAS	MHDT - GAS	0.4078	20.3	8.16	0.0000	0.0003	0.0000	0.0301	0.0000	0.0000	0.0000	0.0033	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 AG - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 CARP - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 CARP CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 NNOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 NOOS - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 OTHER PORT - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 POAK - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 POLA - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 PUBLIC - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 SINGLE - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 SINGLE CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 SWCV - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 TRACTOR - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 TRACTOR CONSTRUCTION - DSL	HHDT - DSL	0	0		0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7 UTILITY - DSL	HHDT - DSL	0.4105	9.40		0.0000	0.0000	0.0000	0.0205	0.0000	0.0000	0.0000		0.0018
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	T7IS - GAS	HHDT - GAS	0	0	0	0	0	0	0	0	0	0	0	
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	UBUS - DSL	UBUS - DSL	0	0	0	0	0	0	0	0	0	0		0
San Joaquin Valley	53	San Joaquin (SJV)	2018	Annual	San Joaquin (SJV)-2018-Annua	UBUS - GAS	UBUS - GAS	0	0	0	0	0	0	0	0	0	0	0	

Field Name	Pollutant	Units	Process
TOG_RUNEX	Total Organic Gases	Tons Per Day	Running Exhaust
TOG_IDLEX	Total Organic Gases	Tons Per Day	Idle Exhaust
TOG_STREX	Total Organic Gases	Tons Per Day	Start Exhaust
TOG_TOTEX	Total Organic Gases	Tons Per Day	Total Exhaust
TOG_DIURN	Total Organic Gases	Tons Per Day	Diurnal
TOG_HTSK	Total Organic Gases	Tons Per Day	Hot Soak
TOG_RUNLS	Total Organic Gases	Tons Per Day	Running Loss
TOG_RESTL	Total Organic Gases	Tons Per Day	Resting Loss
TOG_TOTAL	Total Organic Gases	Tons Per Day	Total
ROG_RUNEX	Reactive Organic Gases	Tons Per Day	Running Exhaust
ROG_IDLEX	Reactive Organic Gases	Tons Per Day	Idle Exhaust
ROG_STREX	Reactive Organic Gases	Tons Per Day	Start Exhaust
ROG_TOTEX	Reactive Organic Gases	Tons Per Day	Total Exhaust
ROG_DIURN	Reactive Organic Gases	Tons Per Day	Diurnal
ROG_HTSK	Reactive Organic Gases	Tons Per Day	Hot Soak
ROG_RUNLS	Reactive Organic Gases	Tons Per Day	Running Loss
ROG_RESTL	Reactive Organic Gases	Tons Per Day	Resting Loss
ROG_TOTAL	Reactive Organic Gases	Tons Per Day	Total
CO_RUNEX	Carbon Monoxide	Tons Per Day	Running Exhaust
CO_IDLEX	Carbon Monoxide	Tons Per Day	Idle Exhaust
CO_STREX	Carbon Monoxide	Tons Per Day	Start Exhaust
CO_TOTEX	Carbon Monoxide	Tons Per Day	Total
NOx_RUNEX	Nitrogen Dioxide	Tons Per Day	Running Exhaust
NOx_IDLEX	Nitrogen Dioxide	Tons Per Day	Idle Exhaust
NOx_STREX	Nitrogen Dioxide	Tons Per Day	Start Exhaust
NOx_TOTEX	Nitrogen Dioxide	Tons Per Day	Total
CO2_RUNEX	Carbon Dioxide	Tons Per Day	Running Exhaust
CO2_IDLEX	Carbon Dioxide	Tons Per Day	Idle Exhaust
CO2_STREX	Carbon Dioxide	Tons Per Day	Start Exhaust
CO2_TOTEX	Carbon Dioxide	Tons Per Day	Total
PM10_RUNEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Running Exhaust
PM10_IDLEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Idle Exhaust
PM10_STREX	Fine Particulate Matter (<10 microns)	Tons Per Day	Start Exhaust
PM10_TOTEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Total Exhaust
PM10_PMTW	Fine Particulate Matter (<10 microns)	Tons Per Day	Tire Wear
PM10_PMBW	Fine Particulate Matter (<10 microns)	Tons Per Day	Brake Wear
PM10_TOTAL	Fine Particulate Matter (<10 microns)	Tons Per Day	Total
PM2_5_RUNEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Running Exhaust
PM2_5_IDLEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Idle Exhaust
PM2_5_STREX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Start Exhaust
PM2_5_TOTEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total Exhaust
PM2_5_PMTW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Tire Wear
PM2_5_PMBW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Brake Wear
PM2_5_TOTAL	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total
SOx_RUNEX	Sulfur Oxides	Tons Per Day	Running Exhaust
SOx_IDLEX	Sulfur Oxides	Tons Per Day	Idle Exhaust
SOx_STREX	Sulfur Oxides	Tons Per Day	Start Exhaust
SOx_TOTEX	Sulfur Oxides	Tons Per Day	Total
Fuel_GAS	Fuel	1000s Gallons	Gasoline
Fuel_DSL	Fuel	1000s Gallons	Diesel

Western Area Power Administration
Right-of-Way Maintenance in the San Joaquin Valley

Hughes/MD500

(SHP < 600)

Number of Units	Days	Hours per day	Total Hours
1	2	8	16

HP	Mean Operating (%) Power	Mean Operating Effective HP	Fuel Flow		Fuel Use
			(kg f/sec)	(kg f/hr)	(gal/hr)
420	0.80	336	3.12E-02	112.3	36.4

HCs	NO_x	CO	Exhaust PM_{10}	Exhaust $PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Emission Factors								
(g/kg f)*					(kg/gal)**			
7.13	5.74	8.88	0.18	0.18	9.5700	0.0003	0.0003	9.6718
(lb/kg f)					(lb/gal)			
0.02	0.01	0.02	0.0004	0.0004	21.0979	0.0006	0.0007	21.3222
Emission Rates								
(lb/hr)								
1.77	1.42	2.20	0.04	0.04	767.97	0.02	0.02	776.14
(lb/day)								
14.12	11.37	17.59	0.36	0.36	6143.79	0.17	0.20	6209.12
Annual Emissions								
(ton)					(MT)			
0.0141	**0.0114**	**0.0176**	**0.0004**	**0.0004**	**5.5736**	**0.0002**	**0.0002**	**5.6329**

* Ref: Swiss Confederation, DETEC and FOCA "Guidance on the Determination of Helicopter Emissions", 2009

** GHG Factors: http://www.eia.gov/oiaf/1605/coefficients.html

Conversions:
Jet fuel : 6.8 lb/gal
1 lb/0.4536 kg
1 ton/2000 lbs