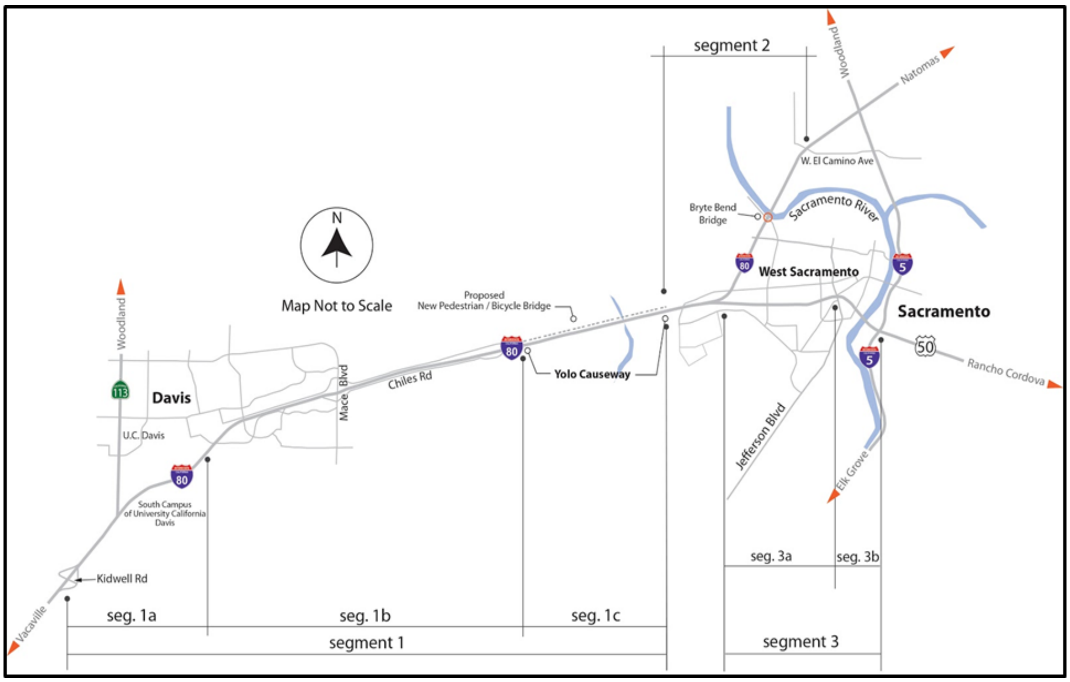
# Air Quality Report

YOLO 80 Corridor Improvements Project

YOL/SAC-80, PM 0.0/11.72 & 0.0/1.36

US-50 PM 0.0/0.617 in Sacramento County and
US-50 PM 0.0/3.12 in Yolo County
EA: 03-3H900
E-FIS: 0318000085

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U.S. Department of Transportation

State of California

Prepared By: ________________________________ Date: 4/26/2024


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Caltrans

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# Section 1. Introduction and Project Description

## 1.1. Introduction

The California Department of Transportation (Caltrans), District3, in collaboration with stakeholders, proposes to construct improvements consisting of managed lanes, pedestrian/bicycle facilities, and Intelligent Transportation System (ITS) elements along Interstate 80 (I-80) and United States Route 50 (US-50) from Kidwell Road near the eastern Solano County boundary (near Dixon), through Yolo County, and to West El Camino Avenue on I-80 and Interstate 5 (I-5) on US-50 in Sacramento County. The purpose of this project is to improve multimodal mobility on the I-80 and US-50 corridors in Solano, Yolo, and Sacramento Counties. This project will decrease congestion growth through the corridor and the effects congestion has on transit and freight. It will improve travel transit times, reliability, access, and viability through the corridor. This project will also increase people throughput by increasing transit, bicycle/pedestrian, and carpool use. The project will also address non-recurrent congestion caused by incidents, including collisions, by improving incident detection, verification, response and clearing.

Caltrans is both, the lead agency for the project's CEQA document, and as assigned by the FHWA, is the lead agency for the project's NEPA document. This air quality report addresses the potential short-term and long-term air quality impacts of the proposed improvements.

## 1.2. Project Description

The proposed alternatives for this project includes with a flyover connector (option b) or without a flyover connector (option a). The option "b" would further improve operations by providing a direct connection of the managed lanes by flying over US-50 at the I-80/US-50 interchange:

- Alternative 1: No-Build.
- Build Alternative 2: Add a High Occupancy Vehicle (HOV) lane in each direction for use by vehicles with two or more riders (HOV 2+), and build an I-80 managed lane direct connector (Alt 2b) or without (Alt 2a).
- Build Alternative 3: Add a High Occupancy Toll (HOT) in each direction for use by vehicles with two or more riders (HOT 2+), and build an I-80 managed lane direct connector (Alt 3b) or without (Alt 3a). Single-occupied vehicles would pay a fee for the lane usage.
- Build Alternative 4: Add a HOT lane in each direction for use by vehicles with three or more riders (HOT 3+) Lane in Each Direction, and build an I-80 managed lane direct

connector (Alt 4b) or without (Alt 4a). Vehicles with less than three riders would pay a fee for lane usage.

- Build Alternative 5: Add an Express Lane in each direction (everyone using the lane pays to use the lane, regardless of number of riders.), and build an I-80 managed lane direct connector (Alt 5b) or without (Alt 5a).
- Build Alternative 6: Add a Transit-only lane in each direction, and build an I-80 managed lane direct connector (Alt 6b) or without (Alt 6a).
- Build Alternative 7: Repurpose the current number one general-purpose lane for use by vehicles with two or more riders (HOV 2+); no new lanes would be constructed. Build an I-80 managed lane direct connector (Alt 7b) or without (Alt 7a).

A few common design features and standardized measures are shared among the Build Alternatives. They include:

- Managed Lanes - The Build Alternatives each have managed lane options. Alternatives 2 and 8 includes a new High Occupancy Vehicle (HOV 2+) lane in each direction, while Alternatives 3 and 4 include new High Occupancy Toll (HOT) lanes, HOT 2+ and HOT 3+ respectively. Alternative 5 adds an Express Lane in each direction (i.e., everyone using the lane pays to use the lane, regardless of number of riders). Alternative 6 adds a Transit-only lane in each direction. Alternative 7 repurposes the current #1 general purpose lane to HOV 2+ and no new lanes would be constructed. Alternative 8 adds a HOV 2+ lane in each direction with I-80 connector ramp.
- Integrated Corridor Management – An Integrated Corridor Management system would be installed that incorporates data collected from traffic sensors, control devices, probe vehicles, transit monitoring systems, and user-generated data through mobile applications and social media networks to inform signal timing plans at intersections and/or ramp metering rates for freeway on-ramps.
- Intelligent Transportation System (ITS) - Each of the Build Alternatives would include placement (or relocation) of ramp meters, street lighting, traffic monitoring stations, closed-circuit television (CCTV), and changeable message signs (CMS).

- Signage - Each Build Alternative would include several different types and placement of new signs to provide graphic or text messages that inform motorists of toll zones and lane operating rules.

This Project is included in the SACOG Regional Transportation Plan (RTP), 2020 Metropolitan Transportation Plan (MTP)/Sustainable Communities Strategies (SCS), as project number CAL21276. It is also included in SACOG's 2021-2024 Metropolitan Transportation Improvement Program (TIP) as Project 12 of 552.

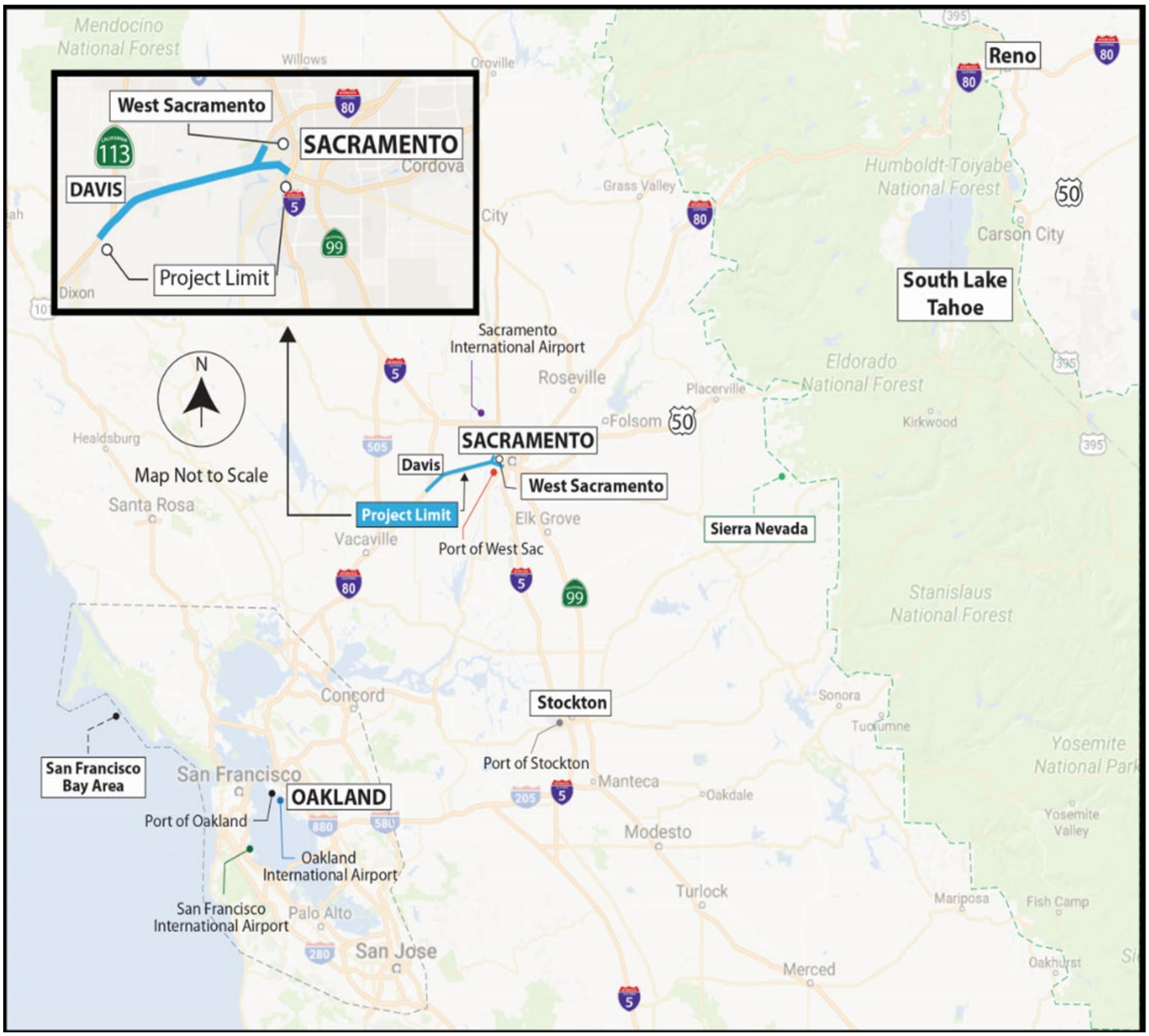



**Figure 1. Vicinity Map**

# Section 2. Air Quality Setting

Air quality of a region is determined by the climatological conditions, topography, and the types and amounts of pollutants. California is divided geographically into 15 air basins. An air basin generally has similar meteorological and geographic conditions. The proposed project is located in Solano, Yolo, and Sacramento Counties, which is governed by the Yolo-Solano County Air Pollution Control District (YSAQMD) and the Sacramento Metropolitan Air Quality Management District (SMAQMD), which are located in the Sacramento Valley Air Basin (SVAB). The SVAB includes Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, Yuba, and portions of Placer and Solano Counties.

The SVAB is bounded by the Sierra Nevada Mountain Range to the east and the Coastal Mountain Ranges to the west. Topography in the Sacramento Valley is generally flat, with elevations anywhere from slightly below sea level near the Sacramento/San Joaquin Delta to over 2,150 feet above sea level at the Sutter Buttes. Hot dry summers and mild rainy winters characterize the Mediterranean climate of the SVAB. During the year, the temperature may range from 20 to 115 degrees Fahrenheit with summer highs usually in the 90s and winter lows occasionally below freezing.

Average annual rainfall is about 20 inches with about 75 percent occurring during the rainy season generally from November through March. The prevailing winds are moderate in strength and vary from moist clean breezes from the south to dry land flows from the north.

The mountains surrounding the SVAB create a barrier to airflow, which can trap air pollutants when certain meteorological conditions exist. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells lie over the Sacramento Valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of particulate matter pollutants are highest when these conditions are combined with smoke or when temperature inversions trap cool air, fog and pollutants near the ground.

The ozone season (May through October) in the Sacramento Valley is characterized by stagnant morning air or light winds, with the delta sea breeze arriving in the afternoon out of the southwest.

In addition, longer daylight hours provide a plentiful amount of sunlight to fuel photochemical reactions between ROG and NOx, which result in ozone formation. Likewise, $PM_{2.5}$ peak concentrations typically occur during the winter season (November – February) when temperature inversion and low wind speeds trap and concentrate $PM_{2.5}$ emissions, cooler temperature and high humidity increase the secondary formation of particulates.

As an air basin, air quality in the Sacramento region is impacted not only by pollutants generated within the region, but also by pollutants generated in the San Francisco Bay Area and the San Joaquin Valley, which are carried into the Sacramento region by Delta breezes. The effect of pollutants transported from the San Francisco Bay Area or from the San Joaquin Valley on air quality in the Sacramento region can vary from substantial to inconsequential on any given day, largely determined by accompanying meteorological conditions. Thus, the success of the Sacramento region in attaining better air quality is partially contingent on the achievement of better air quality in nearby areas that affect Sacramento's air quality.[1]

## 2.1. Regulatory Background

The project area is subject to air quality planning programs established by the Federal Clean Air Act of 1970 and the California Clean Air Act of 1988. Both of these acts provide for the protection of public health, timetables for achieving and maintaining ambient standards, and a requirement to develop a plan to assist in guiding air quality improvement efforts of state and local agencies. National and state ambient air quality standards have been identified for a number of criteria pollutants, which include ozone ($O_3$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), and particulate matter, both $PM_{10}$ and $PM_{2.5}$.

In addition to the above listed legislation, the Environmental Protection Agency (EPA) regulates a list of hazardous air pollutants (HAPs) or air toxics (64 Federal Register [FR] 38706). HAPs are air contaminants that are known or suspected to cause cancer, serious illness, or death. These contaminants originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), air sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Transportation conformity is required under Clean Air Act section 176(c) to ensure that federally supported highway and transit project activities are consistent with the purpose of State Implementation Plans (SIPs) to attain and maintain national ambient air quality standards (NAAQS). Conformity currently applies to areas that are designated nonattainment, and those re-designated to attainment after 1990 ("maintenance areas" with plans developed under Clean Air Act section 175A) for the following transportation-related criteria pollutants: $O_3$, $PM_{2.5}$, $PM_{10}$, CO, and $NO_2$. Conformity to the SIP means that transportation activities will not cause new air quality

[1] SACOG. Conformity Analysis for the 2021/2024 Metropolitan Improvement Program and amendment #1 to the Metropolitan Transportation Plan and Sustainable Communities Strategy 2040, adopted November 2019.

violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. The transportation conformity regulation is found in 40 CFR part 93 and provisions related to conformity SIPs are found in 40 CFR 51.390.

### 2.1.1. Federal Standards

NAAQS were established by the Federal Clean Air Act of 1970 (amended in 1977 and 1990) for six "criteria" pollutants. These criteria pollutants now include CO, $O_3$, $NO_2$, $PM_{10}$, sulfur dioxide ($SO_2$), and lead (Pb). In 1997, the EPA added $PM_{2.5}$ as a criteria pollutant. The air pollutants standards that have been established are considered for the most prevalent air pollutants that are known to be hazardous to human health. At the federal level, the U.S. EPA requires states to attain and maintain compliance with the federal standards as mandated by the Clean Air Act. The U.S. EPA requires non-compliant states to prepare and submit air quality plans showing how the standards will be met. The U.S. EPA also has programs to prevent significant deterioration of air quality and to identify and regulate toxic air pollutants.

### 2.1.2. State Standards

California established ambient air quality standards as early as 1969 through the Mulford-Carrol Act. Air pollutants regulated under the 1989 California Clean Air Act (amended in 1992) are similar to those regulated under the Federal Clean Air Act. In many cases, California standards are more stringent than the NAAQS. The California Clean Air Act requires attainment of California ambient air quality standards (CAAQS). The California Air Resources Board (CARB) regulates mobile emissions sources and oversees the activities of county and regional air quality districts. CARB regulates local air quality indirectly by establishing vehicle emission standards through its planning, coordinating, and research activities.

### 2.1.3. Local Air Quality Management District Rules and Regulations

The SMAQMD operates at the local level with primary responsibility for attaining and maintaining the Federal and State ambient air quality standards in Sacramento County. The SMAQMD works jointly with U.S. EPA, CARB, SACOG, other air districts in the Sacramento region, county and city transportation and planning departments, and various non-governmental organizations to improve air quality through a variety of programs. These programs include the adoption of regulations, policies and guidance, extensive education and public outreach programs, as well as emission reducing incentive programs.

The YSAQMD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws for Yolo-Solano County. The two districts are located in Northern California in the Sacramento Valley Air Basin. All projects are subject to SMAQMD and YSAQMD rules and regulations in effect at the time of construction.

## 2.2. Attainment Status

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are evaluated for each air pollutant. Table 1 lists the state and federal attainment status for all regulated pollutants. Under the federal standards, the regional $O_3$ designation is Nonattainment (Severe 15). Yolo County is in attainment of all other NAAQS. Sacramento County is designated as Maintenance (Moderate) for $PM_{10}$ and Nonattainment (Moderate) for $PM_{2.5}$. For the more stringent CAAQS, both Sacramento County and Yolo County are designated Nonattainment for $O_3$ and $PM_{10}$ and are in attainment of all other State standards.

**Table 1 - Attainment Status for Sacramento/Yolo Counties**

| Pollutant | State Status | Federal Status |
|---|---|---|
| Ozone ($O_3$) | Sacramento and Yolo Counties: Nonattainment | Sacramento and Yolo Counties:<br>2008 (8-hour): Nonattainment – Severe 15<br>2015 (8-hour): Nonattainment – Serious |
| Particulate Matter ($PM_{10}$) | Sacramento and Yolo Counties: Nonattainment | Sacramento County: Maintenance – Moderate<br>Yolo County: Attainment – Unclassifiable |
| Fine Particulate Matter ($PM_{2.5}$) | Sacramento County: Attainment<br>Yolo County: Unclassified | Sacramento County: Nonattainment – Moderate<br>Yolo County: Nonattainment – Moderate |
| Carbon Monoxide (CO) | Sacramento and Yolo Counties: Attainment | Sacramento and Yolo Counties: Unclassifiable/Attainment |
| Nitrogen Dioxide ($NO_2$) | Sacramento and Yolo Counties: Attainment | Sacramento and Yolo Counties: Unclassifiable/Attainment |
| Sulfur Dioxide ($SO_2$) | Sacramento and Yolo Counties: Attainment | Sacramento and Yolo Counties: Unclassifiable/Attainment |
| Sulfates | Sacramento and Yolo Counties: Attainment | Sacramento and Yolo Counties: Unclassifiable/Attainment |
| Lead | Sacramento and Yolo Counties: Attainment | Sacramento and Yolo Counties: Unclassifiable/Attainment |
| Visibility Reducing Particles | Sacramento and Yolo Counties: Unclassified | Sacramento County: N/A<br>Yolo County: N/A |
| Sulfates | Sacramento and Yolo Counties: Unclassified | Sacramento County: N/A<br>Yolo County: N/A |
| Hydrogen Sulfide | Sacramento and Yolo Counties: Unclassified | Sacramento County: N/A<br>Yolo County: N/A |

| Pollutant | State Status | Federal Status |
|---|---|---|
| Vinyl Chloride | Sacramento and Yolo Counties: No Information Available | Sacramento County: N/A<br>Yolo County: N/A |
| Sources:<br>CARB Map of State and Federal Area Designations: https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations<br>EPA Greenbook: https://www3.epa.gov/airquality/greenbook/anayo_ca.html | | |

## 2.3. Criteria Pollutants

The Clean Air Act requires the U.S. EPA to set National Ambient Air Quality Standards (NAAQS) for six criteria air contaminants: ozone, particulate matter, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. It also permits states to adopt additional or more protective air quality standards if needed. California has set standards for certain pollutants. Table 1 documents the current air quality standards. Air quality studies generally focus on six pollutants that are most commonly measured and regulated: Lead, CO, $O_3$, $NO_2$, $SO_2$, and suspended particulate, i.e., $PM_{10}$ and $PM_{2.5}$. These are referred to as “criteria” air pollutants (Table 2).

Table 2. Table of State and Federal Ambient Air Quality Standards

## Ambient Air Quality Standards

| Pollutant | Averaging Time | California Standards [1] | | National Standards [2] | | |
|---|---|---|---|---|---|---|
| | | Concentration [3] | Method [4] | Primary [3,5] | Secondary [3,6] | Method [7] |
| Ozone ($O_3$)[8] | 1 Hour | 0.09 ppm (180 μg/$m^3$) | Ultraviolet Photometry | — | Same as Primary Standard | Ultraviolet Photometry |
| | 8 Hour | 0.070 ppm (137 μg/$m^3$) | | 0.070 ppm (137 μg/$m^3$) | | |
| Respirable Particulate Matter (PM10)[9] | 24 Hour | 50 μg/$m^3$ | Gravimetric or Beta Attenuation | 150 μg/$m^3$ | Same as Primary Standard | Inertial Separation and Gravimetric Analysis |
| | Annual Arithmetic Mean | 20 μg/$m^3$ | | — | | |
| Fine Particulate Matter (PM2.5)[9] | 24 Hour | — | — | 35 μg/$m^3$ | Same as Primary Standard | Inertial Separation and Gravimetric Analysis |
| | Annual Arithmetic Mean | 12 μg/$m^3$ | Gravimetric or Beta Attenuation | 12.0 μg/$m^3$ | 15 μg/$m^3$ | |
| Carbon Monoxide (CO) | 1 Hour | 20 ppm (23 mg/$m^3$) | Non-Dispersive Infrared Photometry (NDIR) | 35 ppm (40 mg/$m^3$) | — | Non-Dispersive Infrared Photometry (NDIR) |
| | 8 Hour | 9.0 ppm (10 mg/$m^3$) | | 9 ppm (10 mg/$m^3$) | — | |
| | 8 Hour (Lake Tahoe) | 6 ppm (7 mg/$m^3$) | | — | — | |
| Nitrogen Dioxide ($NO_2$)[10] | 1 Hour | 0.18 ppm (339 μg/$m^3$) | Gas Phase Chemiluminescence | 100 ppb (188 μg/$m^3$) | — | Gas Phase Chemiluminescence |
| | Annual Arithmetic Mean | 0.030 ppm (57 μg/$m^3$) | | 0.053 ppm (100 μg/$m^3$) | Same as Primary Standard | |
| Sulfur Dioxide ($SO_2$)[11] | 1 Hour | 0.25 ppm (655 μg/$m^3$) | Ultraviolet Fluorescence | 75 ppb (196 μg/$m^3$) | — | Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method) |
| | 3 Hour | — | | — | 0.5 ppm (1300 μg/$m^3$) | |
| | 24 Hour | 0.04 ppm (105 μg/$m^3$) | | 0.14 ppm (for certain areas)[11] | — | |
| | Annual Arithmetic Mean | — | | 0.030 ppm (for certain areas)[11] | — | |
| Lead[12,13] | 30 Day Average | 1.5 μg/$m^3$ | Atomic Absorption | — | — | High Volume Sampler and Atomic Absorption |
| | Calendar Quarter | — | | 1.5 μg/$m^3$ (for certain areas)[12] | Same as Primary Standard | |
| | Rolling 3-Month Average | — | | 0.15 μg/$m^3$ | | |
| Visibility Reducing Particles[14] | 8 Hour | See footnote 14 | Beta Attenuation and Transmittance through Filter Tape | No National Standards | | |
| Sulfates | 24 Hour | 25 μg/$m^3$ | Ion Chromatography | | | |
| Hydrogen Sulfide | 1 Hour | 0.03 ppm (42 μg/$m^3$) | Ultraviolet Fluorescence | | | |
| Vinyl Chloride[12] | 24 Hour | 0.01 ppm (26 μg/$m^3$) | Gas Chromatography | | | |

**See footnotes on next page ...**

**For more information please call ARB-PIO at (916) 322-2990** **California Air Resources Board (5/4/16)**

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour $SO_2$ standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 $SO_2$ national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

**For more information please call ARB-PIO at (916) 322-2990** **California Air Resources Board (5/4/16)**

### 2.3.1. Ozone ($O_3$)

Ground-level ozone is the principal component of smog. Ozone is not directly emitted into the atmosphere, but instead forms through a photochemical reaction of reactive organic gases (ROG) and nitrogen oxides (NOx), which are known as ozone precursors. Ozone levels are highest from late spring through autumn when precursor emissions are high and meteorological conditions are warm and stagnant. Motor vehicles create the majority of ROG and NOx emissions in California. Evidence from the reviewed studies indicated that significant harmful health effects could occur among both adults and children if exposed to levels above these standards. Ozone exposure is also associated with symptoms such as coughing, chest tightness, shortness of breath, and the worsening of asthma symptoms. The greatest risk for harmful health effects belongs to outdoor workers, athletes, children, and others who spend greater amounts of time outdoors during periods where ozone levels exceed air quality standards. Elevated ozone levels can reduce crop and timber yields, as well as damage native plants. Ozone can also damage materials such as rubber, fabrics, and plastics.

### 2.3.2. Nitrogen Dioxide ($NO_2$)

$NO_2$, a reddish-brown gas, irritates the lungs. It can cause breathing difficulties at high concentrations. Like $O_3$, $NO_2$ is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and $NO_2$ are collectively referred to as nitrogen oxides (NOx) and are major contributors to $O_3$ formation. $NO_2$ also contributes to the formation of $PM_{10}$ (see discussion of $PM_{10}$ below). Elevated $NO_2$ levels can aggravate acute and chronic respiratory diseases. $NO_2$ concentrations in the air basin have been below ambient air quality standards; therefore, $NO_2$ concentrations from land use projects are not a concern.

### 2.3.3. Particulate Matter ($PM_{10}$ and $PM_{2.5}$)

Particulate matter (PM) is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials, such as metals, soot, soil, and dust. Particles 10 microns or less in diameter are defined as "respirable particulate matter" or "$PM_{10}$". Fine particles are 2.5 microns or less in diameter ($PM_{2.5}$) and can contribute significantly to regional haze and reduction of visibility. Inhalable particulates found in the region come from smoke, vehicle exhaust, and dust. Although particulates are found naturally in the air, most particulate matter found in the region is emitted either directly or indirectly by wood burning, motor vehicles, construction, agricultural activities, and wind erosion of disturbed areas.

Most $PM_{2.5}$ is comprised of combustion products such as smoke or vehicle exhaust. Respirable particulate matter, especially $PM_{2.5}$, is unhealthy to breathe and has been associated with premature mortality and other serious health effects. $PM_{10}$ poses a health concern because these particulates can be inhaled into and accumulate in the respiratory system. $PM_{2.5}$ is believed to pose the greatest health risks. Because of their small size (approximately three percent of the average width of a human hair), fine particles can lodge deeply into the lungs.

Extensive research reviewed by CARB indicates that exposure to outdoor $PM_{10}$ and $PM_{2.5}$ levels exceeding current ambient air quality standards is associated with increased risk of hospitalization for lung and heart-related respiratory illness, including emergency room visits for asthma. PM exposure is also associated with increased risk of premature deaths, especially in the elderly and people with pre-existing cardiopulmonary disease. In children, studies have shown associations between PM exposure and reduced lung function, increased respiratory symptoms, and illnesses. Besides reducing visibility, the acidic portion of PM (e.g., nitrates and sulfates) can harm crops, forests, aquatic, and other ecosystems.

### 2.3.4. Carbon Monoxide (CO)

Carbon monoxide (CO), a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue, and can impair central nervous system functions. CO is emitted from the incomplete combustion of fossil fuels. Automobile exhausts account for the majority of the CO emissions; however, burning wood in fireplaces and wood stoves can contribute a substantial amount as well. CO is a non-reactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic.

### 2.3.5. Sulfur Dioxide ($SO_2$)

Sulfur oxides, primarily $SO_2$, are a product of high-sulfur fuel combustion. The main sources of $SO_2$ are coal and oil used in power stations, in industries, and for domestic heating. $SO_2$ is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. $SO_2$ concentrations have been reduced to levels well below the state and national standards, but further reductions in emissions are needed to attain compliance with standards for $PM_{10}$, of which $SO_2$ is a contributor. Regional $SO_2$ concentrations have been well below ambient air quality standards; therefore, $SO_2$ concentrations from land use projects are not a concern.

### 2.3.6. Lead (Pb)

Lead is normally not an air quality issue for transportation projects unless the project involves disturbance of soils containing high levels of aerially deposited lead or painting or modification of structures with lead-based coatings. In these cases, construction impact analysis should describe monitoring and abatement requirements of Caltrans' Standard Specifications and Standard Special Provisions for aerially deposited lead or for lead paint removal and sandblasting. Identify any portions of the project site that will be subject to aerially deposited lead management or soil-bound lead management related to bridges during construction. Note whether the project is near an industrial lead emissions source, especially one related to a nonattainment designation, if applicable. Determine and document whether expected soil disturbance would generate lead concentrations high enough to trigger regulatory involvement. Disturbance of lead paint must meet U.S. EPA and air district rules (Caltrans Standard Specifications 14-9.02, 2015). Disclose any local and air district rules that apply to sandblasting and other activities related to lead paint removal or disturbance, if applicable.

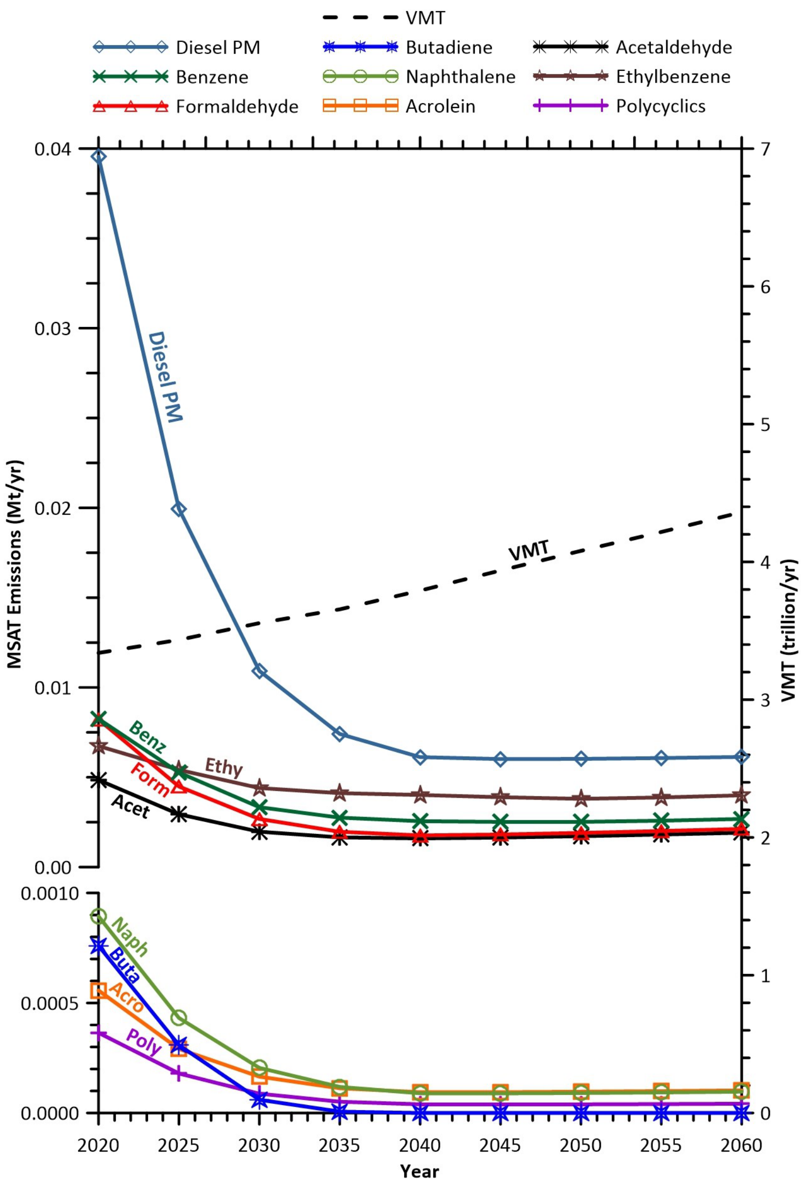
## 2.4. Mobile Source Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants. The U.S. EPA has assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of U.S. EPA's Integrated Risk Information System (IRIS) (https://www.epa.gov/iris). In addition, the U.S. EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-hazard contributors from the 2011 National Air Toxics Assessment (NATA) (https://www.epa.gov/national-air-toxics-assessment). These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While the Federal Highway Administration (FHWA) considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future U.S. EPA rules.

The 2007 U.S. EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using U.S. EPA's MOVES2014a model, even if vehicle activity (vehicle-miles traveled, VMT) increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emission rate for the priority MSATs is projected for the same time period, as shown in Figure 2.

Using EPA's MOVES3 model, as shown in Figure 2, FHWA estimates that even if VMT increases by 31 percent from 2020 to 2060 as forecast, a combined reduction of 76 percent in the total annual emissions for the priority MSAT is projected for the same time period.

**Figure 2. FHWA PROJECTED NATIONAL MSAT EMISSION TRENDS 2020 – 2060 FOR VEHICLES OPERATING ON ROADWAYS**




Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: EPA MOVES3 model runs conducted by FHWA, March 2021.

## 2.5. Climate Change

The term greenhouse gas (GHG) is used to describe atmospheric gases that absorb solar radiation and subsequently emit radiation in the thermal infrared region of the energy spectrum, trapping heat in the Earth's atmosphere. These gases include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), and water vapor, among others. A growing body of research attributes long-term changes in temperature, precipitation, and other elements of Earth's climate to large increases in GHG emissions since the mid-nineteenth century, particularly from human activity related to fossil fuel combustion. Anthropogenic GHG emissions of particular interest include $CO_2$, $CH_4$, $N_2O$, and fluorinated gases.

GHGs differ in how much heat each traps in the atmosphere (global warming potential, or GWP). $CO_2$ is the most important GHG, so amounts of other gases are expressed relative to CO2, using a metric called "carbon dioxide equivalent" ($CO_2e$). The global warming potential of $CO_2$ is assigned a value of 1, and the warming potential of other gases is assessed as multiples of CO2. For example, the 2007 International Panel on Climate Change Fourth Assessment Report calculates the GWP of $CH_4$ as 25 and the GWP of $N_2O$ as 298, over a 100-year time horizon. Generally, estimates of all GHGs are summed to obtain total emissions for a project or given time period, usually expressed in metric tons ($MTCO_2e$), or million metric tons ($MMTCO_2e$).

As evidence has mounted for the relationship of climate changes to rising GHGs, federal and state governments have established numerous policies and goals targeted to improving energy efficiency and fuel economy, and reducing GHG emissions. Nationally, electricity generation is the largest source of GHG emissions, followed by transportation. In California, however, transportation is the largest contributor to GHGs.

At the federal level, the National Environmental Policy Act (NEPA) (42 United States Code [USC] Part 4332) requires federal agencies to assess the environmental effects of their proposed actions prior to making a decision on the action or project.

To date, no national standards have been established for nationwide mobile-source GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level. However, the U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) issued the first corporate fuel economy (CAFE) standards in 2010, requiring cars and light-duty vehicles to achieve certain fuel economy targets by 2016, with the intention of gradually increasing the targets and the range of vehicles to which they would apply.

California has enacted aggressive GHG reduction targets, starting with Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. AB 32 is California's signature climate change legislation. It set the goal of reducing statewide GHG emissions to 1990 levels by 2020, and required the ARB to develop a Scoping Plan that describes the approach California will take to achieve that goal and to update it every 5 years. In 2015, Governor Jerry Brown enhanced the overall adaptation planning effort with Executive Order (EO) B-30-15, establishing an interim GHG reduction goal of 40 percent below 1990 levels by 2030, and requiring state agencies to factor climate change into all planning and investment decisions.

Senate Bill (SB) 375, the Sustainable Communities and Climate Protection Act of 2008, furthered state climate action goals by mandating coordinated transportation and land use planning through preparation of sustainable communities strategies (SCS). The ARB sets GHG emissions reduction targets for passenger vehicles for each region. Each regional metropolitan planning organization must include in its regional transportation plan an SCS proposing actions toward achieving the regional emissions reduction targets.

With these and other State Senate and Assembly bills and executive orders, California advances an innovative and proactive approach to dealing with GHG emissions and climate change.

In the U.S., the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (including passenger cars, light duty trucks, other trucks, buses, and motorcycles make up the largest source (second to electricity generation) of GHG emitting sources. The dominant GHG emitted is $CO_2$, mostly from fossil fuel combustion.

There are typically two terms used when discussing the impacts of climate change. "Greenhouse Gas Mitigation" is a term for reducing GHG emissions in order to reduce or "mitigate" the impacts of climate change. “Adaptation," refers to the effort of planning for and adapting to impacts resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels)[2].

There are four primary strategies for reducing GHG emissions from transportation sources: 1) improving the transportation system and operational efficiencies, 2) reducing the growth of vehicle miles traveled (VMT), 3) transitioning to lower GHG emitting fuels, and 4) improving vehicle technologies. To be most effective all four strategies should be pursued cooperatively. The following Regulatory Setting section outlines state and federal efforts to comprehensively reduce GHG emissions from transportation sources.

### 2.5.1. Regulatory Setting

#### *State*

With the passage of several pieces of legislation including State Senate and Assembly bills and Executive Orders, California launched an innovative and proactive approach to dealing with GHG emissions and climate change.

Assembly Bill 1493 (AB 1493), Pavley, Vehicular Emissions: Greenhouse Gases, 2002: This bill requires the California Air Resources Board (ARB) to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year.

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[2] http://climatechange.transportation.org/ghg_mitigation/

Executive Order (EO) S-3-05 (June 1, 2005): The goal of this EO is to reduce California's GHG emissions to 1) year 2000 levels by 2010, 2) year 1990 levels by 2020, and 3) 80 percent below the year 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32.

Assembly Bill 32 (AB 32), Núñez and Pavley, The Global Warming Solutions Act of 2006: AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases."

Executive Order S-20-06 (October 18, 2006): This order establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency (Cal/EPA) and state agencies with regard to climate change.

Executive Order S-01-07 (January 18, 2007): This order set forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

Senate Bill 97 (SB 97) Chapter 185, 2007, Greenhouse Gas Emissions: This bill required the Governor's Office of Planning and Research (OPR) to develop recommended amendments to the California Environmental Quality Act (CEQA) Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

Senate Bill 375 (SB 375), Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires the California Air Resources Board (CARB) to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization (MPO) for each region must then develop a "Sustainable Communities Strategy" (SCS) that integrates transportation, land-use, and housing policies to plan for the achievement of the emissions target for their region.

Senate Bill 391 (SB 391) Chapter 585, 2009 California Transportation Plan: This bill requires the State's long-range transportation plan to meet California's climate change goals under AB 32.

### *Federal*

Although climate change and GHG reduction are a concern at the federal level, currently no regulations or legislation have been enacted specifically addressing GHG emissions reductions and climate change at the project level. Neither the United States Environmental Protection Agency (U.S. EPA) nor the Federal Highway Administration (FHWA) has issued explicit guidance or methods to conduct project-level GHG analysis.[3] FHWA supports the approach that climate change considerations should be integrated throughout the transportation decision-making

[3] To date, no national standards have been established regarding mobile source GHGs, nor has U.S. EPA established any ambient standards, criteria or thresholds for GHGs resulting from mobile sources.

process–from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will assist in decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project-level decision-making. Climate change considerations can be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

The four strategies outlined by FHWA to lessen climate change impacts correlate with efforts that the state is undertaking to deal with transportation and climate change; these strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and a reduction in travel activity.

Climate change and its associated effects are also being addressed through various efforts at the federal level to improve fuel economy and energy efficiency, such as the "National Clean Car Program" and EO 13514 - Federal Leadership in Environmental, Energy and Economic Performance.

Executive Order 13514 (October 5, 2009): This order is focused on reducing greenhouse gases internally in federal agency missions, programs and operations, but also directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

U.S. EPA's authority to regulate GHG emissions stems from the U.S. Supreme Court decision in Massachusetts v. EPA (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, U.S. EPA finalized an endangerment finding in December 2009. Based on scientific evidence it found that six greenhouse gases constitute a threat to public health and welfare. Thus, it is the Supreme Court's interpretation of the existing Act and EPA's assessment of the scientific evidence that form the basis for EPA's regulatory actions. U.S. EPA in conjunction with NHTSA issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010.[4]

The U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations.

[4] http://www.c2es.org/federal/executive/epa/greenhouse-gas-regulation-faq

The final combined standards that made up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards implemented by this program are expected to reduce GHG emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016).

On August 28, 2012, U.S. EPA and NHTSA issued a joint Final Rulemaking to extend the National Program for fuel economy standards to model year 2017 through 2025 passenger vehicles. Over the lifetime of the model year 2017-2025 standards this program is projected to save approximately four billion barrels of oil and two billion metric tons of GHG emissions.

The complementary U.S. EPA and NHTSA standards that make up the Heavy-Duty National Program apply to combination tractors (semi-trucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). Together, these standards will cut greenhouse gas emissions and domestic oil use significantly. This program responds to President Barack Obama's 2010 request to jointly establish greenhouse gas emissions and fuel efficiency standards for the medium- and heavy-duty highway vehicle sector. The agencies estimate that the combined standards will reduce $CO_2$ emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of model year 2014 to 2018 heavy duty vehicles.

## *Project Analysis*

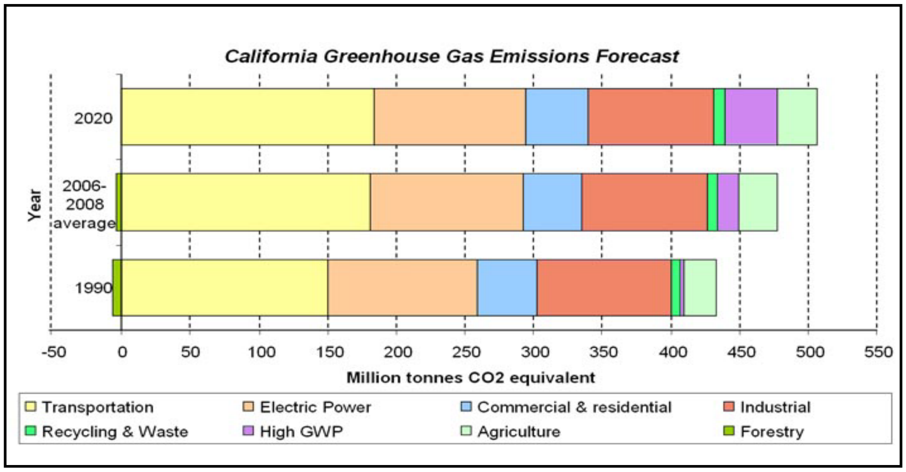
An individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may contribute to a potential impact through its incremental change in emissions when combined with the contributions of all other sources of GHG.[5] In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (CEQA Guidelines Sections 15064(h)(1) and 15130). To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects to make this determination is a difficult, if not impossible, task.

The AB 32 Scoping Plan mandated by AB 32 includes the main strategies California will use to reduce GHG emissions. As part of its supporting documentation for the Draft Scoping Plan, the

[5] This approach is supported by the AEP: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the South Coast Air Quality Management District (Chapter 6: The CEQA Guide, April 2011) and the U.S. Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).

ARB released the GHG inventory for California (forecast last updated: October 28, 2010). The forecast is an estimate of the emissions expected to occur in 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. The base year used for forecasting emissions is the average of statewide emissions in the GHG inventory for 2006, 2007, and 2008.

**Figure 3. California Greenhouse Gas Forecast**




Source: http://www.arb.ca.gov/cc/inventory/data/forecast.htm

The Department and its parent agency, the Transportation Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation, the Department has created and is implementing the Climate Action Program at Caltrans that was published in December 2006.[6]

## Section 3. Existing Conditions

The California Air Resources Board maintains the only monitoring station that collects ambient air quality data in the vicinity of Sacramento County. The nearest monitoring location (Figure 4, 1309 T street, Sacramento) is located in Sacramento County approximately 0.75 miles northeast of the project location. Data from the monitoring station is shown in Table 2.

[6] Caltrans Climate Action Program is located at the following web address: http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf

## Table 3-Criteria Air Pollutants Data (Sacramento T St Monitoring Station)

| Pollutant | Averaging Time | Applicable Standard | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Ozone ($O_3$) | 1-Hour | Maximum Concentration (ppm) | 0.107 | 0.097 | 0.100 | 0.112 | 0.091 |
| | | Number of Days State Standard Exceeded | 0 | 0 | 0 | 0 | 0 |
| | 8-Hour | Maximum Concentration (ppm) | 0.077 | 0.084 | 0.074 | 0.076 | 0.080 |
| | | Number of Days National Standard Exceeded (>0.07ppm) | 3 | 1 | 1 | 3 | 1 |
| | | Number of Days State Standard Exceeded (>0.07ppm) | 3 | 1 | 1 | 3 | 1 |
| Particulate Matter ($PM_{10}$) | 24-Hour | Maximum Concentration (μg/m$^3$) | 150.3 | 309.5 | 179.1 | 298 | 132 |
| | | Number of Days National Standard Exceeded | 0 | 6 | 1 | 4 | 0 |
| | | Number of Days State Standard Exceeded | 0 | 22 | 24 | 25 | 59 |
| | Annual | State Annual Average (20 μg/m$^3$) | 0 | 29.7 | 20.7 | 20.2 | 31.2 |
| Particulate Matter ($PM_{2.5}$) | 24-Hour | Maximum Concentration (μg/m$^3$) | 46.0 | 263.3 | 37.1 | 30.7 | 26.2 |
| | | Number of Days Standard Exceeded | 6.1 | 0 | 0 | 17.1 | 4.0 |
| | Annual | National Annual (12.0 μg/m$^3$) | 9.2 | 11.4 | 7.7 | 14.8 | 8.8 |
| Carbon Monoxide (CO)* | 1-Hour | Maximum Concentration (ppm) | 1.8 | 3.2 | 1.4 | 4.3 | 2.2 |
| | | Number of Days National Standard Exceeded | 0 | 0 | 0 | 0 | 0 |
| | | Number of Days State Standard Exceeded | 0 | 0 | 0 | 0 | 0 |
| | 8-Hour | Maximum Concentration (ppm) | 1.2 | 3.0 | 1.3 | 1.6 | 1.3 |
| | | Number of Days State Standard Exceeded | 0 | 0 | 0 | 0 | 0 |

* Carbon monoxide concentrations have not been measured at the T Street station since 2006; the nearest monitoring station is located approximately 1 mile north to the project location at 100 Bercut Dr, Sacramento

Source: http://www.epa.gov/airdata/

Sensitive receptors are locations where people susceptible to the effects of air pollution may stay for extended periods of time. These locations include land uses such as residential, schools, playgrounds, parks, childcare centers and hospitals. There are several land uses and many residences that are within close vicinity of the project (Table 4). The project limits are depicted with a map in Appendix D.

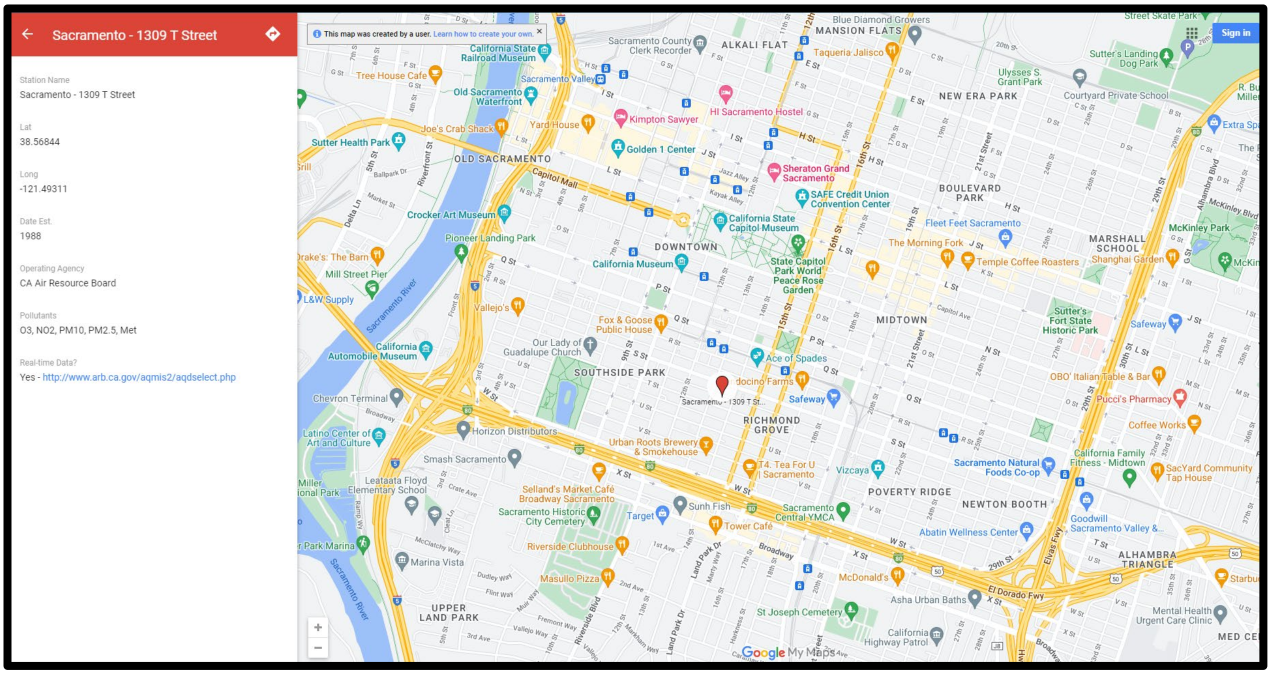



Figure 4. AQ Monitoring Station located in Downtown Sacramento

**Table 4-List of Sensitive Receptors within 500 feet of the project limits**

| Receptor | Description | Distance Between Receptor and Project (ft) |
|---|---|---|
| UC Davis | University | 500 |
| Toad Hollow Dog Park | Park | 300 |
| Play Fields Park | Park | 350 |
| Playground at New Harmony Mutual Housing Community | Playground | 350 |
| Merryhill Preschool | Preschool | 500 |
| Yolo High School | School | 450 |
| Westacre Park | Playground | 150 |
| River Otter Park | Park | 100 |
| Davis Urgent Care | Medical Facility | 400 |
| Concentra Urgent Care | Medical Facility | 250 |
| Davita West | Medical Facility | 250 |
| Sacramento Valley Charter School | School | 200 |
| River Bend Nusring Center | Medical Facility | 300 |

The No-Build (No Action) Alternative consists of those transportation projects that are already planned for construction by or before 2029. Consequently, the No-Build alternative represents future travel conditions in the YOL-80 Corridor Improvement study area without the YOL-80 Corridor Improvement project and is the baseline against which the other YOL-80 Corridor Improvement Project alternatives will be assessed to meet NEPA requirements.

# Section 4. Transportation Conformity

The Sacramento Area Council of Governments (SACOG) is an association of local governments in the six-county Sacramento Region. Its members include the counties of El Dorado, Placer, Sacramento, Sutter, Yolo, Yuba and the 22 cities within. SACOG provides transportation planning and funding for the region, and serves as a forum for the study and resolution of regional issues.

SACOG prepares the MTIP and MTP/SCS. The MTIP is a short-term listing of surface transportation projects that receive federal funds, require federal action, or are regionally significant. SACOG prepares and adopts the MTIP every two years.

Only projects included in the MTP/SCS may be incorporated into the MTIP. The MTIP derives all its projects either directly from the MTP/SCS or indirectly from the policies within it. The MTP/SCS is the long range policy and planning document while the MTIP is the short range implementing document that enables those planned project to begin work. Specifically, the MTIP lists those projects from the MTP/SCS that have committed or reasonably available funding and intend to begin a phase of work during the four years of the MTIP.

Transportation projects in nonattainment or maintenance areas receiving federal funding or approval must be found to conform to the current State Implementation Plan or SIP. Each region in the state submits its emissions budgets and strategies for reducing air emissions of pollutants that are above NAAQS to the CARB. After review and approval, CARB submits these plans for the entire State as the SIP for each nonattainment or maintenance pollutant. The primary requirements of the transportation conformity rule are that implementation of transportation plans or programs cannot produce more emissions of pollutants than budgeted in the latest SIP.

Transportation planning is coordinated with this "conformity" process. The MTIP must conform to the SIP by having an emissions budget from on-road mobile sources including estimated emissions from planned projects that does not exceed the emissions budget in the SIP. For an individual project to conform to the SIP, it must be contained in a conforming MTIP. SACOG analyzes the MTIP for air quality conformity and FHWA is responsible for determining that the MTIP conforms to the latest approved SIP.

Sacramento and Yolo Counties are currently designated as nonattainment for fine particulate matter ($PM_{2.5}$) and Ozone. Since this area is considered a nonattainment area for one of the NAAQS it is subject to the Federal Clean Air Act conformity requirements. With Federal Conformity requirements, PM2.5 analysis in this Air Quality Report suffices because of the level of Project Analysis' requirements. Furthermore, the YOL-80 Managed Lanes project is a capacity increasing project, which is required to meet conformity requirements including a project level analysis and an Interagency Consultation. This project was submitted to the conformity-working group on October 4, 2021and the group determined the project was not a POAQC on October 18, 2021 (see Appendix C).

# Section 5. Impact Analysis

The operational emissions analysis compares emissions for existing/baseline conditions to the forecasted conditions for the No-Build and Build alternatives given the Project's opening year (2029), RTP horizon year (2040), and design year (2049) with and without a HOV-HOV connector based on the traffic data provided from the Traffic Forecasting from Caltrans (Table 5). Air pollutant emissions associated with the roadways in the Project area were estimated using specific traffic data and conditions provided by the Caltrans District 3 traffic forecasting and the CT-EMFAC2021 emission model.

**Table 5. Project Total AADT, Truck AADT, and VMT for Opening, MTIP, and Design Years**

| **Opening Year 2029** | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
|---|---|---|---|---|---|---|---|
| AADT | 157,663 | 173,786 | 173,806 | 171,958 | 169,971 | 160,847 | 156,565 |
| *Truck% | *7.7 | | | | | | |
| Truck% | 7.4 | | | | | | |
| *Truck AADT | 11,667 | *13,352 | *13,354 | *13,212 | *13,059 | *12,359 | *12,029 |
| Truck AADT | | 12,860 | 12,862 | 12,725 | 12,578 | 11,903 | 11,586 |
| VMT | 3,880,995 | 4,237,651 | 4,239,821 | 4,196,181 | 4,176,124 | 3,953,571 | 3,867,187 |
| | | | | | | | |
| **MTIP Year 2040** | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
| AADT | 162,995 | 175,741 | 175,832 | 173,350 | 172,582 | 163,081 | 159,511 |
| *Truck% | *7.7 | | | | | | |
| Truck% | 7.4 | | | | | | |
| *Truck AADT | 12,062 | *13,504 | *13,511 | *13,320 | *13,261 | *12,531 | *12,257 |
| Truck AADT | | 13,005 | 13,012 | 12,828 | 12,771 | 12,068 | 11,804 |
| VMT | 4,026,381 | 4,324,520 | 4,329,187 | 4,272,099 | 4,252,533 | 4,025,319 | 3,931,677 |
| | | | | | | | |
| **Design Year 2049** | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
| AADT | 180,290 | 190,023 | 190,807 | 187,630 | 186,647 | 176,866 | 174,064 |
| *Truck% | *7.7 | | | | | | |
| Truck% | 7.4 | | | | | | |
| *Truck AADT | 13,341 | 14,599* | 14,624* | 14,465* | 14,318* | 13,587* | 13,372* |
| Truck AADT | | 14,062 | 14,120 | 13,885 | 13,812 | 13,088 | 12,881 |
| VMT | 4,495,673 | 4,683,131 | 4,691,980 | 4,642,888 | 4,599,005 | 4,381,640 | 4,276,831 |

*The numbers were resulted in no connector between I-80 and SR50 (option a)

## 5.1. Carbon Monoxide Analysis

U.S. EPA declared that Transportation Conformity requirements related to CO in Sacramento ended on June 1, 2018. That date marked 20 years from the redesignation of the areas to attainment and implementation of a maintenance plan. The approved maintenance plan for Sacramento did not extend the maintenance plan period beyond 20 years from redesignation. Consequently, Transportation Conformity requirements for CO ceased to apply after June 1, 2018 (i.e., 20 years after the effective date of the U.S. EPA's approval of the first ten-year maintenance plan and redesignation of the areas to attainment for the CO NAAQS.

## 5.2. $PM_{2.5}/PM_{10}$ Analysis

In November 2015, the U.S. EPA released an updated version of Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas (Guidance) for quantifying the local air quality impacts of transportation projects and comparing them to the PM NAAQS (75 FR 79370). The U.S. EPA originally released the quantitative guidance in December 2010, and released a revised version in November 2013 to reflect the approval of EMFAC 2011 and U.S. EPA's 2012 PM NAAQS final rule. The November 2015 version reflects MOVES2014 and its subsequent minor revisions such as MOVES2014a, to revise design value calculations to be more consistent with other U.S. EPA programs, and to reflect guidance implementation and experience in the field. Note that EMFAC, not MOVES, should be used for project hot-spot analysis in California. The Guidance requires a hot-spot analysis to be completed for a project of air quality concern (POAQC). The following explanations are why this project is not a POAQC in italic with the final rule in 40 CFR 93.123(b)(1) defines a POAQC as:

(i) New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;

*The 2029, 2040 and 2049 average annual daily traffic (AADT), along the project limits are projected to be above 150,000 average daily traffic, as shown in Table 3. The average diesel truck percentage within the project limit (see Table 5) was estimated about 7.7% without a HOV-HOV connector and 7.4% with a HOV-HOV connector. This is less than the percentage of diesel trucks (i.e., 8%) considered to be significant pursuant to the PM Guidance. Furthermore, the projected fleet mix will not change significantly through the horizon year.*

(ii) Projects affecting intersections that are at Level-of-Service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;

*The project would not introduce a significant number of diesel vehicles to the project area.*

(iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;

*The project does not comprise a bus or rail terminal or transfer point.*

(iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and

*The project does not comprise expansion of a bus or rail terminal.*

(v) Projects in or affecting locations, areas, or categories of sites which are identified in the PM2.5 and PM10 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

*The project is not in, nor will it affect, a location of violation or possible violation.*

The proposed project has undergone Interagency Consultation regarding POAQC determination.

Interagency Consultation participants concurred that the project is not a POAQC on October 15, 2021 by EPA and on October 18, 2021 by FHWA. The proposed project is not considered a POAQC because it does not meet the definition as defined in U.S. EPA's Transportation Conformity Guidance. Therefore, PM hot-spot analysis is not required. Documentation of concurrence are provided in this section and in Appendix C.

This project is located in a particulate matter $PM_{2.5}$ maintenance area and has been determined that the project is not a project of air quality concern (see Appendix C). Project-level hot-spot analysis for particulate matter is therefore not required for a conformity determination.

Table 6 and 7 show that the total daily $PM_{10}$ and $PM_{2.5}$ emissions with a HOV-HOV connector for the Build and No Build alternatives in the opening year and the horizon year would be higher than existing conditions. However, the increase of total daily $PM_{10}$ emissions considers not substantial as estimated about 9.1%, 6.4%, 3.1% of $PM_{10}$ of Alternative 2 with opening year 2029, MTP year 2040, and Design year 2049, respectively. For $PM_{2.5}$ with a HOV-HOV connector, it considers not large as estimated about 8.6%, 5.6%, 1.9% of Alternative 2 with opening year 2029, MTP year 2040, and Design year 2049, respectively. It would anticipate that the decreases of PM10/2.5 with build would be greater due to less traffic generated without a HOV-HOV connector. Therefore, the difference between Build and No Build would be not significant in terms of $PM_{10}$ and $PM_{2.5}$ in regard to the increase of total AADT between Build and No Build with a HOV-HOV connector. The approved RTP and TIP for the project area has no PM mitigation or control measures that relate to the project's construction or operation. Therefore, a written commitment to implement PM control measures is not required.

### Table 6. Total Daily $PM_{10}$ Emissions with *option a and option b

| **Opening Year 2029** | Baseline (Existing Yr 2019) | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
|---|---|---|---|---|---|---|---|---|
| *$PM_{10}$ (lb) | 610.8 | 632.2 | *597.4 | *597.2 | *593.4 | *589.7 | *561.5 | *544.0 |
| $PM_{10}$ (lb) | 610.8 | 632.2 | 689.9 | 687.9 | 672.9 | 648.6 | 628.6 | 628.4 |
| *%Change between Build/No-Build | NA | NA | -5.5 | -5.5 | -6.1 | -6.7 | -11.2 | -14.0 |
| %Change between Build/No-Build | NA | NA | 9.1 | 8.8 | 6.4 | 2.6 | -0.6 | -0.6 |
| *%Change between Existing/Build | NA | 3.5 | -2.2 | -2.2 | -2.9 | -3.5 | -8.1 | -10.9 |
| %Change between Existing/Build | NA | 3.5 | 13.0 | 12.6 | 10.2 | 6.2 | 2.9 | 2.9 |
| | | | | | | | | |
| **MTIP Year 2040** | Baseline (Existing Yr 2019) | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
| *$PM_{10}$ (lb) | 610.8 | 660.6 | *609.3 | *607.6 | *597.6 | *594.4 | *571.6 | *555.8 |
| $PM_{10}$ (lb) | 610.8 | 660.6 | 703.0 | 702.4 | 690.9 | 686.3 | 660.8 | 642.3 |
| *%Change between Build/No-Build | NA | NA | -7.8 | -8.0 | -9.5 | -10.0 | -13.5 | -15.9 |
| %Change between Build/No-Build | NA | NA | 6.4 | 6.3 | 4.6 | 3.9 | 0.1 | -2.8 |
| *%Change between Existing/Build | NA | 8.2 | -0.2 | -0.5 | -2.2 | -2.7 | -6.4 | -9.0 |
| %Change between Existing/Build | NA | 8.2 | 15.1 | 15.0 | 13.1 | 12.4 | 8.2 | 5.2 |
| | | | | | | | | |
| **Design Year 2049** | Baseline (Existing Yr 2019) | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
| *$PM_{10}$ (lb) | 610.8 | 746.3 | *668.6 | *671.5 | *665.5 | *659.4 | *630.8 | *613.8 |
| $PM_{10}$ (lb) | 610.8 | 746.3 | 772.0 | 775.0 | 764.4 | 762.8 | 729.1 | 709.0 |
| *%Change between Build/No-Build | NA | NA | -10.4 | -10.0 | -10.8 | -11.6 | -15.5 | -17.8 |
| %Change between Build/No-Build | NA | NA | 3.5 | 3.9 | 3.0 | 2.2 | -2.3 | -5.0 |
| *%Change between Existing/Build | NA | 22.2 | 9.5 | 9.9 | 9.0 | 8.0 | 3.3 | 0.5 |
| %Change between Existing/Build | NA | 22.2 | 26.4 | 26.9 | 25.1 | 24.9 | 19.4 | 6.1 |

*All results from emissions without a HOV-HOV connector (option a)

## Table 7. Total Daily $PM_{2.5}$ Emissions with *option a and option b

| Opening Year 2029 | Baseline (Existing Yr 2019) | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
|---|---|---|---|---|---|---|---|---|
| *$PM_{2.5}$ (lb) | 139.2 | 127.5 | *120.0 | *119.8 | *119.3 | *118.9 | *113.8 | *110.9 |
| PM2.5 (lb) | 139.2 | 127.5 | 138.5 | 137.6 | 135.5 | 134.5 | 131.4 | 128.0 |
| *%Change between Build/No-Build | NA | NA | -6.3- | -6.0 | -6.4 | -6.7 | -10.7 | -13.0 |
| %Change between Build/No-Build | NA | NA | 8.6 | 7.9 | 6.3 | 5.5 | 3.1 | 0.4 |
| *%Change between Existing/Build | NA | -8.4 | -13.7 | -13.9 | -14.3 | -14.6 | -18.2 | -20.3 |
| %Change between Build/No-Build | NA | -8.4 | -0.5 | -1.1 | -2.7 | -3.4 | -5.6 | -8.0 |
| | | | | | | | | |
| **MTIP Year 2040** | Baseline (Existing Yr 2019) | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
| *$PM_{2.5}$ (lb) | 139.2 | 128.2 | *117.5 | *116.8 | *114.6 | *113.9 | *110.9 | *108.0 |
| PM2.5 (lb) | 139.2 | 128.2 | 135.4 | 135.0 | 132.5 | 131.4 | 128.2 | 124.8 |
| *%Change between Build/No-Build | NA | NA | -8.3 | -8.9 | -10.6 | -11.2 | -13.5 | -15.8 |
| %Change between Build/No-Build | NA | NA | 5.6 | 5.3 | 3.4 | 0.8 | 0.1 | -2.7 |
| *%Change between Existing/Build | NA | -7.9 | -15.6 | -16.0 | -17.7 | -18.2 | -20.3 | -22.4 |
| %Change between Existing/Build | NA | -7.9 | -2.7 | -3.0 | -4.8 | -5.6 | -7.9 | -10.3 |
| | | | | | | | | |
| **Design Year 2049** | Baseline (Existing Yr 2019) | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
| *$PM_{2.5}$ (lb) | 139.2 | 145.4 | *128.4 | *129.1 | *128.1 | *127.0 | *122.5 | *118.4 |
| PM2.5 (lb) | 139.2 | 145.4 | 148.1 | 148.5 | 146.8 | 146.7 | 141.5 | 136.6 |
| *%Change between Build/No-Build | NA | NA | -11.7 | -11.2 | -11.9 | -12.7 | -15.7 | -18.6 |
| %Change between Build/No-Build | NA | NA | 1.9 | 2.1 | 1.0 | 0.9 | -2.7 | -6.1 |
| *%Change between Existing/Build | NA | 4.5 | -7.8 | -7.3 | -8.0 | -8.8 | -12.0 | -14.9 |
| %Change between Build/No-Build | NA | 4.5 | 6.4 | 6.7 | 5.5 | 5.4 | 1.7 | -1.9 |

*All results from emissions without a HOV-HOV connector (option a)

## 5.3. Climate Change

The proposed project will improve traffic flow and reduce congestion within the project limits. These improvements will most likely result in a slight increase in GHG emitted for the opening year 2029 and MTIP year 2040 since they will improve traffic flow with increasing vehicle miles traveled. However, in the design year 2049, GHG emissions Alt 2-7 are anticipated to be less produced than Alt 1 (Table 8). Please note that this project would produce lesser GHG due to less traffic anticipated without a HOV-HOV connector. For the comparison under NEPA with Build and No Build of Alternative 2, the project would produce more GHG in Opening year 2029 (10.9%) and result in reduction of GHG in Design year 2049 (-2.1%) with the connector. For the comparison under CEQA with Build and Baseline of Alternative 2, GHG would anticipate with increase of Opening year 2029 (11.0%) and decrease of Design year 2049 (-2.1%) with the connector. It is noted that GHG emissions would be improved with the project resulted in from the increase of 2.2 to 10.9% in Opening Year 2029 to the reduction indicating -1.4 to -5.1% in Design Year 2049 regarding all the alternatives 2-7 between build and no build (Table 7). Furthermore, the improved reduction of GHG would be anticipated between existing and build in the comparison of Opening year 2029 (2.3 ~ 11.0%) and Design year 2049 (-2.1 ~ -5.8%).

**Table 8. Daily GHG Emissions (US ton) with *option a and option b**

| **Opening Year 2029** | Baseline (Existing Yr 2019) | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
|---|---|---|---|---|---|---|---|---|
| *$CO_2$e (Metric ton) | 1039.5 | *1040.6 | *1005.1 | *986.4 | *970.5 | *915.7 | *902.1 | *1062.7 |
| CO2e (Metric ton) | 1039.5 | 1040.6 | 1154.0 | 1148.0 | 1132.0 | 1117.5 | 1063.4 | 1097.9 |
| *%Change between Build/No-Build | NA | NA | -3.4 | -5.2 | -6.7 | -12.0 | -13.3 | 2.1 |
| %Change between Build/No-Build | NA | NA | 10.9 | 10.3 | 8.8 | 7.4 | 2.2 | 5.5 |
| *%Change between Existing/Build | NA | 0.1 | -3.3 | -5.1 | -6.6 | -11.9 | -13.2 | 2.2 |
| %Change between Existing/Build | NA | 0.1 | 11.0 | 10.4 | 8.9 | 7.5 | 2.3 | 5.6 |
| | | | | | | | | |
| **Design Year 2049** | Baseline (Existing Yr 2019) | Alt 1 (No Build) | Alt 2 (HOV) | Alt 3 (HOT) | Alt 4 (HOT 3+) | Alt 5 (Express Lane) | Alt 6 (Transit) | Alt 7 (Take–A-Lane) |
| *$CO_2$e (Metric ton) | 1039.5 | *1031.4 | *939.0 | *931.2 | *920.5 | *909.5 | *880.2 | *863.6 |
| CO2e (Metric ton) | 1039.5 | 1031.4 | 1017.2 | 1006.6 | 993.4 | 979.2 | 996.4 | 981.3 |
| *%Change between Build/No-Build | NA | NA | -9.0 | -9.7 | -10.8 | -11.8 | -14.7 | -16.3 |
| %Change between Build/No-Build | NA | NA | -1.4 | -2.4 | -3.7 | -5.1 | -3.4 | -4.9 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *%Change between Existing/Build | NA | -0.8 | -9.7 | -10.4 | -11.5 | -12.5 | -15.3 | -16.9 |
| %Change between Existing/Build | NA | -0.8 | -2.1 | -3.2 | -4.4 | -5.8 | -4.1 | -5.6 |

## 5.4. Mobile Source Air Toxins

FHWA released updated guidance in Jan. 18, 2023 for determining when and how to address MSAT impacts in the NEPA process for transportation projects. FHWA identified three levels of analysis:

- No analysis for exempt projects or projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential MSAT effects; and
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Projects with no impacts generally include those that a) qualify as a categorical exclusion under 23 CFR 771.117, b) qualify as exempt under the FCAA conformity rule under 40 CFR 93.126, and c) are not exempt, but have no meaningful impacts on traffic volumes or vehicle mix.

Projects that have low potential MSAT effects are those that serve to improve highway, transit, or freight operations or movement without adding substantial new capacity or creating a facility that is likely to substantially increase emissions. The large majority of projects fall into this category.

Projects with high potential MSAT effects include those that:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of Diesel Particulate Matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000, or greater, by the design year; and
- Are proposed to be located in proximity to populated areas or, in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

The latest version of CT-EMFAC, CT-EMFAC2021, was used to estimate emissions of benzene, 1,3-butadiene, acetaldehyde, formaldehyde, acrolein, ethylbenzene, naphthalene, DPM, and POM. Please note that appendix D illustrates the extent of the area considered in the MSAT analysis. Traffic activity data were estimated for each of different periods of a representative day in the baseline, opening 2029, and horizon 2049 years. Emissions were estimated for all MSATs using CT-EMFAC2021, based on EMFAC2021 and speciation factors provided by ARB and U.S. EPA.

## Table 9. Daily MSAT Emissions (lbs) with *option a and option b

| Scenario/ Analysis Year | | 1,3-butadiene | Acetaldehyde | Acrolein | Benzene | Diesel PM | Ethylbenzene | Formaldehyde | Naphthalene | POM |
|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | Baseline (Existing Conditions) | 0.84 | 3.89 | 0.08 | 11.84 | 24.57 | 4.59 | 8.87 | 0.77 | 0.22 |
| 2029 | No-Build Alt1 | 0.36 | 1.82 | 0.04 | 6.23 | 7.32 | 2.77 | 4.09 | 0.34 | 0.10 |
| | *Build Alt 2 | *0.34 | *1.68 | *0.03 | *5.64 | *7.67 | *2.48 | *3.78 | *0.31 | *0.09 |
| | Build Alt 2 | 0.39 | 1.94 | 0.04 | 6.61 | 8.64 | 2.90 | 4.37 | 0.37 | 0.11 |
| | *Build Alt 3 | *0.33 | *1.64 | *0.03 | *5.52 | *7.56 | *2.42 | *3.69 | *0.31 | *0.09 |
| | Build Alt 3 | 0.38 | 1.88 | 0.04 | 6.42 | 8.59 | 2.82 | 4.24 | 0.36 | 0.10 |
| | *Build Alt 4 | *0.33 | *1.64 | *0.03 | *5.52 | *7.56 | *2.42 | *3.69 | *0.31 | *0.09 |
| | Build Alt 4 | 0.37 | 1.84 | 0.04 | 6.30 | 8.39 | 2.77 | 4.14 | 0.35 | 0.10 |
| | *Build Alt 5 | *0.32 | *1.64 | *0.03 | *5.53 | *7.04 | *2.45 | *3.69 | *0.30 | *0.09 |
| | Build Alt 5 | 0.37 | 1.83 | 0.04 | 6.26 | 8.23 | 2.76 | 4.12 | 0.35 | 0.10 |
| | *Build Alt 6 | 0.32 | 1.65 | 0.03 | 5.55 | 6.57 | 2.47 | 3.69 | 0.30 | 0.30 |
| | Build Alt 6 | 0.37 | 1.90 | 0.04 | 6.50 | 7.40 | 2.90 | 4.26 | 0.35 | 0.10 |
| | *Build Alt 7 | 0.36 | 1.80 | 0.04 | 6.17 | 7.16 | 2.72 | 4.06 | 0.33 | 0.10 |
| | Build Alt 7 | 0.42 | 2.08 | 0.04 | 7.23 | 8.07 | 3.20 | 4.70 | 0.39 | 0.12 |
| | *% Diff. between Alt 2 and No Build | -6.7 | -7.6 | -6.7 | -9.5 | 4.7 | -10.7 | -7.5 | -6.4 | -7.3 |
| | % Diff. between Alt 2 and No Build | 9.2 | 6.5 | 14.5 | 6.0 | 18.0 | 4.7 | 6.9 | 9.5 | 8.4 |
| | *% Diff. between Alt 3 and No Build | -8.8 | -9.7 | -8.5 | -11.5 | 3.3 | -12.6 | -9.6 | -8.6 | -9.7 |
| | % Diff. between Alt 3 and No Build | 6.2 | 3.4 | 12.1 | 3.0 | 17.4 | 1.7 | 3.7 | 6.8 | 5.3 |
| | *% Diff. between Alt 4 and No Build | -9.9 | -9.8 | -11.5 | -11.5 | -0.6 | -12.2 | -9.8 | -9.7 | -10.0 |
| | % Diff. between Alt 4 and No Build | 3.8 | 1.1 | 7.9 | 1.0 | 14.7 | 0.0 | 1.4 | 4.5 | 2.9 |
| | *% Diff. between Alt 5 and No Build | -10.5 | -9.5 | -11.5 | -11.3 | -3.9 | -11.6 | -9.6 | -10.3 | -10.4 |
| | % Diff. between Alt 5 and No Build | 2.8 | 0.5 | 6.7 | 0.4 | 12.5 | -0.5 | 0.8 | 3.4 | 2.2 |
| | *% Diff. between Alt 6 and No Build | -11.5 | -9.4 | -13.3 | -10.9 | -10.3 | -10.9 | -9.7 | -11.3 | -10.8 |
| | % Diff. between Alt 6 and No Build | 3.6 | 4.3 | 4.8 | 4.2 | 1.1 | 4.4 | 4.2 | 3.7 | 3.5 |
| | *% Diff. between Alt 7 and No Build | -0.1 | -0.7 | 0.6 | -1.1 | -2.2 | -1.7 | -0.6 | -0.7 | 0.0 |

| Scenario/ Analysis Year | | 1,3-butadiene | Acetaldehyde | Acrolein | Benzene | Diesel PM | Ethylbenzene | Formaldehyde | Naphthalene | POM |
|---|---|---|---|---|---|---|---|---|---|---|
| | % Diff. between Alt 7 and No Build | 17.1 | 14.7 | 20.6 | 16.0 | 10.2 | 15.3 | 15.0 | 16.4 | 16.4 |
| 2049 | No-Build Alt1 | 0.26 | 0.95 | 0.03 | 5.45 | 4.58 | 2.64 | 2.24 | 0.22 | 0.06 |
| | *Build Alt 2 | *0.18 | *0.68 | *0.02 | *3.72 | *4.99 | *1.78 | *1.60 | *0.16 | *0.04 |
| | Build Alt 2 | 0.21 | 0.78 | 0.02 | 4.28 | 5.70 | 2.05 | 1.82 | 0.18 | 0.05 |
| | *Build Alt 3 | *0.17 | *0.66 | *0.02 | *3.63 | *4.84 | *1.74 | *1.56 | *0.15 | *0.04 |
| | Build Alt 3 | 0.20 | 0.75 | 0.02 | 4.16 | 5.61 | 1.99 | 1.77 | 0.17 | 0.05 |
| | *Build Alt 4 | 0.17 | 0.65 | 0.02 | 3.60 | 4.69 | 1.73 | 1.54 | 0.15 | 0.04 |
| | Build Alt 4 | 0.20 | 0.75 | 0.02 | 4.13 | 5.38 | 1.98 | 1.75 | 0.17 | 0.05 |
| | *Build Alt 5 | 0.17 | 0.65 | 0.02 | 3.59 | 4.55 | 1.73 | 1.53 | 0.15 | 0.04 |
| | Build Alt 5 | 0.20 | 0.75 | 0.02 | 4.13 | 5.18 | 1.99 | 1.75 | 0.17 | 0.05 |
| | *Build Alt 6 | 0.20 | 0.77 | 0.02 | 4.32 | 4.10 | 2.09 | 1.80 | 0.18 | 0.05 |
| | Build Alt 6 | 0.24 | 0.89 | 0.02 | 5.05 | 4.63 | 2.44 | 2.09 | 0.20 | 0.05 |
| | *Build Alt 7 | 0.19 | 0.72 | 0.02 | 4.04 | 4.55 | 1.94 | 1.70 | 0.17 | 0.04 |
| | Build Alt 7 | 0.23 | 0.84 | 0.02 | 4.72 | 5.16 | 2.27 | 1.97 | 0.20 | 0.05 |
| | *% Diff. between Alt 2 and No Build | -29.7 | -28.8 | -30.5 | -31.8 | 8.9 | -32.6 | -28.8 | -29.5 | -28.7 |
| | % Diff. between Alt 2 and No Build | -18.3 | -18.7 | -18.6 | -21.5 | 24.4 | -22.5 | -18.7 | -18.6 | -18.0 |
| | *% Diff. between Alt 3 and No Build | -32.0 | -30.5 | -32.2 | -33.4 | 5.7 | -34.0 | -30.6 | -31.6 | -30.7 |
| | % Diff. between Alt 3 and No Build | -21.0 | -21.0 | -21.2 | -23.6 | 22.5 | -24.5 | -21.0 | -21.0 | -21.1 |
| | *% Diff. between Alt 4 and No Build | -33.0 | -31.2 | -33.1 | -34.0 | 2.2 | -34.5 | -31.3 | -32.5 | -31.4 |
| | % Diff. between Alt 4 and No Build | -22.2 | -21.8 | -22.0 | -24.3 | 17.4 | -25.0 | -21.9 | -22.3 | -21.1 |
| | *% Diff. between Alt 5 and No Build | -33.4 | -31.6 | -34.7 | -34.2 | -0.7 | -34.6 | -31.7 | -33.1 | -32.2 |
| | % Diff. between Alt 5 and No Build | -22.8 | -21.9 | -23.7 | -24.2 | 13.1 | -24.7 | -22.1 | -22.8 | -21.5 |
| | *% Diff. between Alt 6 and No Build | -21.1 | -19.5 | -21.2 | -20.8 | -10.6 | -20.9 | -19.6 | -20.4 | -19.9 |
| | % Diff. between Alt 6 and No Build | -6.9 | -6.9 | -8.5 | -7.4 | 1.1 | -7.5 | -7.0 | -7.0 | -6.1 |
| | *% Diff. between Alt 7 and No Build | -24.4 | -24.2 | -25.4 | -25.9 | -0.8 | -26.5 | -24.1 | -24.0 | -24.1 |
| | % Diff. between Alt 7 and No Build | -10.9 | -12.4 | -12.7 | -13.4 | 12.6 | -14.1 | -12.2 | -11.0 | -11.1 |

The proposed project would be categorized under high potential MSAT effects which require a Quantitative analysis to differentiate alternatives.

Considering the differences in projected corridor-level vehicle miles traveled (VMT) for each of the build alternatives, Alternatives 2 and 3 were analyzed for air quality purposes along with the No-Build Alternative based on a HOV-HOV connector and without (Table 9). Build Alternatives 2 and 3 have traffic forecasts very similar to each other and expected to be built as preferred alternatives in the future, the difference being the operation of HOV lanes (Alternative 2) versus HOT lanes (Alternatives 3) along the corridor was tabulated. Therefore, the impacts from Build Alternative 2 and 3 are used to represent the air quality impacts of this project provides the most conservative estimate of potential emissions among the seven alternatives.

The increases in MSAT emissions under Alternatives 2 and 3 in 2029 relative to the No Build Alternative would likely be associated with addition of HOV sections that would be built across the Sacramento and Yolo Counties in the vicinity. But, MSAT emissions in Design Year 2049 resulted in reductions of 8 out of 9 toxic chemicals (Table 9). Even if some increases of MSAT do occur relative to the No Build Alternative in Opening year 2029, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations. Furthermore, it would result in the greater decreased MSAT (minus % Differences in Table 9) in the absence of a HOV-HOV connector due to lesser induced traffic.

As shown in Figure 2, MSAT emission rates are anticipated to decrease substantially, especially for diesel PM, by the opening year of 2029 and even further by the horizon year of 2049. The area surrounding the project is not heavily industrialized and comprises only approximately six percent heavy trucks. The project would not substantially increase the percentage of trucks traveling along I-80 of the project limits, and local truck emissions may in fact decrease in future analysis years 2029 and 2049 due to penetration of electric heavy duty trucks. In sum, under all Build Alternatives in the opening year and design year it is expected there would be negligible increases in MSAT emissions relative to the No Build Alternative due to the dispersion across the SACOG region and to EPA's MSAT reduction programs.

Moreover, U.S. EPA regulations for vehicle engines and fuels will cause overall MSATs to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA’s MOVES3 model forecasts a combined reduction of over 76 percent in the total annual emission rate for the priority MSAT from 2020 to 2060 while vehicle-miles of travel are projected to increase by over 31 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

## INCOMPLETE OR UNAVAILABLE INFORMATION FOR PROJECT-SPECIFIC MSAT HEALTH IMPACTS ANALYSIS

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in mobile source air toxic (MSAT) emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, https://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). A number of HEI studies are summarized in Appendix D of FHWA's Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects) or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA states that with respect to diesel engine exhaust, "[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk." (EPA IRIS database, Diesel Engine Exhaust, Section II.C. https://iris.epa.gov/static/pdfs/0642_summary.pdf).

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable (https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD59852578000050C9DA/$file/07-1053-1120274.pdf).

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

# Section 6. Construction Impacts

Construction is expected to begin in 2024 and last less than four years. Although construction is planned to last approximately four years, no construction activities are anticipated to last more than five years at any individual site. Emissions from construction-related activities are thus considered temporary as defined in 40 CFR 93.123(c)(5); and are not required to be included in PM hot-spot analyses to meet conformity requirements. Construction-related emissions are generally short-term in duration but may still cause adverse air quality impacts.

## 6.1. Construction Dust

Dust would be generated during grading and construction operations. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed, amount of activity, soil conditions and meteorological conditions.

Although grading and construction activities would be temporary, they would have the potential to cause both nuisance and health air quality impacts. $PM_{10}$ is the pollutant of greatest concern associated with dust. If uncontrolled, elevated $PM_{10}$ levels could occur downwind of actively disturbed areas. In addition, dust fall on adjacent properties could be a nuisance. If uncontrolled, dust generated by grading and construction activities would have an adverse effect on air quality.

## 6.2. Construction Equipment Exhaust

Daily Maximum construction emissions were estimated using the latest version of Caltrans' CAL-CET2021 emissions model which uses emission factors from EMFAC2021 developed by CARB. Detailed construction plans were not available at the time of this analysis. Therefore, equipment quantities and construction phases provided by CAL-CET2021 (version 1.0.2) were used along with maximum Project durations provided by the Caltrans' design engineering team. Appendix E lists all the construction inputs provided and entered into CAL-CET2021. (see Appendix E for model inputs and outputs). Inputs to the model included the construction start date, total construction cost, estimated working days, and project length. Table 10 shows the maximum construction emissions per project phase.

**Table 10. Maximum Construction Emissions**

| Project Phase | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| Grubbing/Land Clearing | 10.0 lbs/day | 67.4 lbs/day | 214.1 lbs/day | 25.2 lbs/day |
| Roadway Excavation/Removal | 13.8 lbs/day | 107.7 lbs/day | 96.0 lbs/day | 15.0 lbs/day |
| Structure Excavation/Removal | 10.6 lbs/day | 59.2 lbs/day | 135.7 lbs/day | 16.4 lbs/day |
| Base/Subbase/Imported Borrow | 15.2 lbs/day | 129.7 lbs/day | 139.6 lbs/day | 20.2 lbs/day |
| Structure Concrete | 11.7 lbs/day | 67.8 lbs/day | 4.3 lbs/day | 4.2 lbs/day |
| Paving | 13.7 lbs/day | 105.9 lbs/day | 5.7 lbs/day | 5.5 lbs/day |
| Drainage/Utilities/Sub-Grade | 11.0 lbs/day | 48.5 lbs/day | 67.8 lbs/day | 4.4 lbs/day |
| Traffic Signalization | 17.4 lbs/day | 137.3 lbs/day | 6.6 lbs/day | 6.4 lbs/day |

| | | | | |
|---|---|---|---|---|
| Total (Tons/Construction project) | 2.0 | 13.5 | 6.1 | 1.3 |
| SMAQMD Standard Levels | - | 85 lbs/day | 80 lbs/day | 82 lbs/day |
| YSAQMD Standard Levels | 55 lbs/day | 55 lbs/day | 80 lbs/day | - |

Caltrans has statewide jurisdiction on projects within its right of way. Since the setting for projects varies extensity across the state, Caltrans has not and will not develop standard levels for CEQA. Further, because most air district thresholds have not been established by regulation or by delegation from a federal or state agency with regulatory authority over Caltrans, Caltrans is not required to adopt those standard levels in Caltrans' documents. The SMAQMD and YSAQMD standard levels are provided for reference.

Construction equipment and associated heavy-duty truck traffic generate diesel exhaust. Diesel exhaust poses both a health and nuisance impact to nearby receptors. These construction activities are expected to occur during a relatively short time. See the next section for a list of construction-related mitigation measures.

## 6.3. GHG Construction Emissions

Construction GHG emissions include emissions produced as a result of material processing, emissions produced by onsite construction equipment, and emissions arising from traffic delays due to construction. These emissions will be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be reduced to some degree by longer intervals between maintenance and rehabilitation events. Currently, neither Caltrans nor SMAQMD/YSAQMD have adopted GHG standard levels that apply to construction projects. For informational purposes, GHG emissions from project construction were estimated using CAL-CET2021 version 1.0.2. There will be approximately 5532 tons of $CO_2$ generated over the course of the entire construction project.

# Section 7. Avoidance, Minimization, and Mitigation Measures

## 7.1. Operational Minimization

No avoidance or minimization, measures are required, as the project would not produce substantial operational air quality impacts.

## 7.2. Construction Minimization

Caltrans special provisions and standard specifications include the requirement to minimize or eliminate dust through application of water or dust palliatives. The following construction dust and equipment exhaust emissions measures shall be implemented when practical, during all phases of construction work:

Control measures will be implemented as specified in Caltrans 2018 Standard Specifications Section 10-5 “Dust Control”, Section 14-9 “Air Quality” and Section 18 “Dust Palliatives”.

The proposed project would also comply with rules and regulations pertaining to the control of fugitive dust and prevention of public nuisance published by the SMAQMD and YSAQMD.

# Appendix A. Conformity Checklist

## Transportation Air Quality Conformity Findings Checklist

**PROJECT INFORMATION**

**Project Name:** YOLO 80 Corridor Improvements Project

**DIST-CO-RTE-PM:** 03-YOL/SAC-80, PM0.0/11.72 & 0.0/1.36 and US-50 PM0.0/0.617 in Sacramento County and US-50 PM0.0/0.3 in Yolo County

**EA:** 03-3H900 **Federal Aid Number:**

**Document Type:** ☐ 23 USC 326 CE ☐ 23 USC 327 CE ☒ EA ☐ EIS

**CHECKLIST**

**Step 1.** Is the project located in a nonattainment or maintenance area for ozone, nitrogen dioxide, carbon monoxide (CO), PM2.5, or PM10 per EPA's Green Book listing of non-attainment areas?

☐ If no, go to Step 18. **Transportation conformity does not apply to the project.**

☒ If yes, go to Step 2.

---

**Step 2.** Is the project exempt from conformity per 40 CFR 93.126 or 40 CFR 93.128?

☐ If yes, go to Step 18. **The project is exempt from all project-level conformity requirements (40 CFR 93.126 or 128)** (check one box below and identify the project type, if applicable).

☐ 40 CFR 93.126[1]

**Project type from Table 2:**

☐ 40 CFR 93.128

☒ If no, **go** to Step 3.

---

**Step 3.** Is the project exempt from regional conformity per 40 CFR 93.127?

☐ If yes, go to Step 8. **The project is exempt from regional conformity requirements (40 CFR 93.127)** (identify the project type).
**Project type:**

☒ If no, go to Step 4.

---

**Step 4.** Is the project located in a region with a currently conforming RTP and TIP?

☒ If yes, t**he project is included in a currently conforming RTP and TIP per 40 CFR 93.115. The project's design and scope have not changed significantly from what was assumed in RTP conformity analysis (40 CFR 93.115[b])** Go to Step 8.

☐ If no and the project is located in an isolated rural area, go to Step 5.

☐ If no and the project is not located in an isolated rural area, STOP and do not proceed until a conforming RTP and TIP are adopted.

[1] Please refer to Clarifications on Exempt Project Determinations to verify exempt project type from Table 2. Road diets, auxiliary lanes less than one-mile, and ramp metering may be exempt under "projects that correct, improve, or eliminate a hazardous location or feature."

**Step 5.** For isolated rural areas, is the project regionally significant per 40 CFR 93.101, based on review by Interagency Consultation?

☐ If yes, go to Step 6.

☐ If no, go to Step 8. **The project, located in an isolated rural area, is not regionally significant and does not require a regional emissions analysis (40 CFR 93.101 and 93.109[e]).**

**Step 6.** Is the project included in another regional conformity analysis that meets the isolated rural area analysis requirements per 40 CFR 93.109, including Interagency Consultation and public involvement?

☐ If yes, go to Step 8. **The project, located in an isolated rural area, has met its regional analysis requirements through inclusion in a previously-approved regional conformity analysis that meets current requirements (40 CFR 93.109[e]).**

☐ If no, go to Step 7.

**Step 7.** The project, located in an isolated rural area, requires a separate regional emissions analysis.

☐ **Regional emissions analysis for regionally significant project, located in an isolated rural area, is complete. Regional conformity analysis was conducted that includes the project and reasonably foreseeable regionally significant projects for at least 20 years. Interagency Consultation and public participation were conducted. Based on the analysis, the interim or emission budget conformity tests applicable to the area are met (40 CFR 93.109[e] and 95.105).**[2] Go to Step 8.

**Step 8.** Is the project located in a CO nonattainment or maintenance area? (South Coast Air Basin only)

☒ If no, go to Step 9. **CO conformity analysis is not required.**

☐ If yes, **hot-spot analysis requirements for CO per the** CO Protocol (or per EPA's modeling guidance, CAL3QHCR can be used with EMFAC emission factors[3]) **have been met. Project will not cause or contribute to a new localized CO violation (40 CFR 93.116 and 93.123)**[4]. Go to Step 9.

**Step 9.** Is the project located in a PM10 and/or a PM2.5 nonattainment or maintenance area?

☐ If no, go to Step 13. **PM2.5/PM10 conformity analysis is not required.**

☒ If yes, go to Step 10.

[2] The analysis must support this conclusion before going to the next step.
[3] Use of the CO Protocol is strongly recommended due to its use of screening methods to minimize the need for modeling. When modeling is needed, the Protocol simplifies the modeling approach. Use of CAL3QHCR must follow U.S. EPA's latest CO hot spot guidance, using EMFAC instead of MOVES; see: http://www.epa.gov/otaq/stateresources/transconf/projectlevel-hotspot.htm#co-hotspot.
[4] As of October 1, 2007, there are no CO nonattainment areas in California. Therefore, the requirements to not worsen existing violations and to reduce/eliminate existing violations do not apply.

**Step 10.** Is the project considered to be a Project of Air Quality Concern (POAQC), as described in EPA's Transportation Conformity Guidance for PM 10 and PM 2.5?

☒ If no, **the project is not a project of concern for PM10 and/or PM2.5 hot-spot analysis based on 40 CFR 93.116 and 93.123 and EPA's Hot-Spot Analysis Guidance. Interagency Consultation concurred with this determination on** October 18, 2021. Go to Step 12.

☐ If yes, go to Step 11.

**Step 11.** The project is a POAQC.

☐ **The project is a project of concern for PM10 and/or PM2.5 hot-spot analysis based on 40 CFR 93.116 and 93.123, and EPA's Hot-Spot Guidance. Interagency Consultation concurred with this determination on _____. Detailed PM hot-spot analysis, consistent with 40 CFR 93.116 and 93.123 and EPA's Hot-Spot Guidance, shows that the project would not cause or contribute to, or worsen, any new localized violation of PM10 and/or PM2.5 standards.** Go to Step 12.

**Step 12.** Does the approved PM SIP include any PM10 and/or PM2.5 control measures that apply to the project, and has a written commitment been made as part of the air quality analysis to implement the identified SIP control measures? [Control measures can be found in the applicable Federal Register notice at: https://www.epa.gov/state-and-local-transportation/conformity-adequacy-review-region-9#ca.]

☐ If yes, **a written commitment is made to implement the identified SIP control measures for PM10 and/or PM2.5 through construction or operation of this project (40 CFR 93.117).** Go to Step 14.

☒ If no, go to Step 13.

**Step 13a.** Have project-level mitigation or control measures for CO, PM10, and/or PM2.5, included as part of the project's design concept and scope, been identified as a condition of the RTP or TIP conformity determination? AND/OR

**Step 13b.** Are project-level mitigation or control measures for CO, PM10, and/or PM2.5 included in the project's NEPA document? AND

**Step 13c** (applies only if Step 13a and/or 13b are answered "yes")**.** Has a written commitment been made as part of the air quality analysis to implement the identified measures?

☐ If yes to 13a and/or 13b and 13c, **a written commitment is made to implement the identified mitigation or control measures for CO, PM10, and/or PM2.5 through construction or operation of this project. These mitigation or control measures are identified in the project's NEPA document and/or as conditions of the RTP or TIP conformity determination (40 CFR 93.125(a)).** Go to Step 14.

☒ If no, go to Step 14.

**Step 14.** Does the project qualify for a Categorical Exclusion pursuant to 23 USC 326?

☐ If yes, go to step 15.

☒ If no, the project requires preparation of a Categorical Exclusion, EA, or EIS pursuant to 23 USC 327. Go to Step 16.

**Step 15. Is any analysis required by steps 1-13 of this form?**[5]

☐ If yes, then Caltrans prepares the appropriate analysis and documentation for the project file and makes the conformity determination through its signature on the CE form. No FHWA involvement is required. See the AQCA Annotated Outline. Go to Step 18.

☐ If no, then Caltrans makes the conformity determination through its signature on the CE form. No FHWA involvement is required. Go to Step 18.

**Step 16.** Is the project located in a non-attainment/maintenance area for **ozone only** and considered not regionally significant/non-exempt?

☐ If yes, go to Step 18.[6]

☒ If no, then **an AQCA is needed**. See the AQCA Annotated Outline. Caltrans submits a conformity determination request to FHWA for FHWA's conformity determination. Go to Step 17.

**Step 17.** Send FHWA Request for Conformity Determination package and FHWA Submittal Package Checklist to DOTP- Air Quality (rodney.tavitas@dot.ca.gov) and DEA-Air Quality (daisy.laurino@dot.ca.gov) for completeness review. Please direct technical questions to DOTP-Air Quality office. Headquarters staff will coordinate with FHWA on behalf of the district.

**Date of FHWA air quality conformity determination:** April 26, 2024

**Step 18. STOP as all air quality conformity requirements have been met.**

**SIGNATURE**

| Christopher Dennis | CBR | 4/26/2024 |
|---|---|---|
| AQ Specialist | Signature | Date |

[5] Please note that not all projects that qualify for a categorical exclusion will be exempt from air quality conformity requirements. Many types of projects that may qualify for a CE (such as the addition of auxiliary lanes less than one-mile, weaving lanes less than one-mile, turning lanes less than one-mile, climbing lanes less than one-mile, parking, road diets, ramp metering, and even many bridge projects) MAY require some level of project level conformity analysis and may even require interagency consultation. Additionally, please note that for ALL projects the project file must include evidence that one of the three following situations apply: 1) Conformity does not apply to the project area; or 2) The project is exempt from all conformity analysis requirements; or 3) The project is subject to project-level conformity analysis (and possibly regional conformity analysis) and meets the criteria for a conformity determination. The project file must include all supporting documentation and this checklist.

[6] Project-level conformity analysis shows that the project will conform to the State Implementation Plan. Because the project area is Attainment/Unclassified for carbon monoxide (CO) and particulate matter (PM10 and PM2.5), no hot spot analysis is required for the project-level conformity determination by 40 CFR 93.116 and 93.123. The project comes from a conforming Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP). Include documentation of interagency consultation review in the final CE/EA/EIS, if applicable.

# Appendix B. SAGOC MTP/SCS, MTIP, and FTIP Information (ID: CAL21276)

SAGOC MTP/SCS and MTIP Information (ID: CAL21276)

| ID | County | Status (Planned, Programmed or Project Development Only) | Lead Agency | Budget Category | Title | Description | Total Project Cost (2018 dollars) | Year of Expenditure Cost for planned projects | Completion Timing |
|---|---|---|---|---|---|---|---|---|---|
| SUT10340 | SUT | Planned | Sutter County | B- Road & Highway Capacity | Riego Rd Widening | Widen Riego Rd to 4 lanes, Route 99 to Placer Co. | 3,142,000 | 4,550,553 | By 2035 |
| SUT18850 | SUT | Programmed | Sutter County | C- Maintenance & Rehabilitation | Bridge Preventive Maintenance Program | Bridge Preventive Maintenance Program, Various locations.: See http://www.dot.ca.gov/hq/LocalPrograms/hbrr99/HBP_MPO.html#SACOG web site for backup list of locations. | 1,046,028 | - | By 2030 |
| SUT18925 | SUT | Programmed | Sutter County | C- Maintenance & Rehabilitation | Bridge Replacement On Howsley Rd Over Pleasant Grove Creek Canal | Howsley Rd Over Pleasant Grove Creek Canal at Natomas Rd. Replace 2 lane bridge with 2 lane bridge. No added capacity.. Toll Credits for ENG | 15,003,179 | - | By 2030 |
| SUT18876 | SUT | Project Development Only | Sutter County | C- Maintenance & Rehabilitation | Howsley Rd Widening | Widen Howsley Rd between Pleasant Grove Rd and Natomas Rd | 3,960,000 | 4,059,000 | Post-2044 |
| SUT18875 | SUT | Programmed | Sutter County | C- Maintenance & Rehabilitation | Kent Road Bridge at Sutter Butte Canal. | Kent Road over Sutter Butte Canal, 0.2 Mi South of McDonald Ave.: Replace two lane bridge with two lane bridge.. Toll Credits for ENG, ROW, CON | 3,179,000 | - | By 2030 |
| SUT18856 | SUT | Programmed | Sutter County | C- Maintenance & Rehabilitation | Larkin Rd. Bridge Replacement | Larkin Rd. over South Birch Sutter-Butte Canal, 0.2 miles north of Encinal Rd.: Replace the existing 2-lane bridge with a new 2-lane bridge. | 1,158,000 | - | By 2030 |
| SUT10370 | SUT | Project Development Only | Sutter County | C- Maintenance & Rehabilitation | Lincoln Rd. Widening C | Widen: 2 lanes from Jones Rd. to Walton Rd. Includes: center lane. | 3,000,000 | 3,075,000 | Post-2044 |
| SUT18855 | SUT | Programmed | Sutter County | C- Maintenance & Rehabilitation | Nicolaus Ave. Bridge Replacement | Nicolaus Ave., over Coon Creek, 1 mile west of Pleasant Grove Rd.: Replace the existing 2-lane bridge with a new 2-lane bridge. | 1,422,000 | - | By 2030 |
| SUT18935 | SUT | Programmed | Sutter County | C- Maintenance & Rehabilitation | Nuestro Rd Over Snake River - Bridge Replacement | Nuestro Rd over Snake River, 0.7 miles east of East Butte Rd. Replace existing 2 lane bridge with new 2 lane bridge.. Toll Credits for ENG, ROW, CON | 1,513,100 | - | By 2030 |
| SUT18936 | SUT | Planned | Sutter County | C- Maintenance & Rehabilitation | Nuestro Road Bridge over Snake River | On Nuestro Road, 0.7 miles east of East Butte Road, Replace the existing structurally deficient bridge and the approach 300 feet east and west of the bridge for a total length of 640 feet. The width of the project site will be within the County right-of-way. | 1,339,550 | 1,373,039 | By 2030 |
| CAL18590 | SUT | Project Development Only | Sutter County | C- Maintenance & Rehabilitation | Route 99, New Interchange | Sutter County, north of Sacramento: along Route 99 between Riego Road and Sankey Road, construct new interchange | 22,000,000 | 22,550,000 | Post-2044 |
| SUT18934 | SUT | Programmed | Sutter County | C- Maintenance & Rehabilitation | Sanders Rd Over Sutter Co Extension Canal - Bridge Replacement | Sanders Rd over Sutter County Extension Canal, 1.2 miles west of Broadway. Replace existing 2 lane bridge with new 2 lane bridge.. Toll Credits for ENG, ROW, CON | 1,511,600 | - | By 2030 |
| SUT18937 | SUT | Planned | Sutter County | C- Maintenance & Rehabilitation | Sanders Road Bridge over Sutter Butte Canal | On Sanders Road, 1.2 miles west of Broadway, Replace the existing structurally deficient bridge and the approach 300 feet east and west of the bridge for a total length of 640 feet. The width of the project site will be within the County right-of-way. | 1,338,220 | 1,371,676 | By 2030 |
| SUT10500 | SUT | Project Development Only | Sutter County | C- Maintenance & Rehabilitation | Sankey Rd. | Widen: 4 lanes from Pleasant Grove Blvd. to Hwy. 99 / Hwy. 70. | 2,500,000 | 2,562,500 | Post-2044 |
| SUT18830 | SUT | Planned | Sutter County | C- Maintenance & Rehabilitation | SR 99 Intersection Improvements | Intersection improvements to add turn lanes, address drainage issues and sound attenuation as needed along both sides of State Route 99 at Bogue Rd, Lincoln Rd, Richland Rd and Franklin Rd. | 3,800,000 | 3,895,000 | By 2030 |
| SUT18873 | SUT | Programmed | Sutter County | C- Maintenance & Rehabilitation | Tisdale Rd, Over Westside Canal-Sutter County | Tisdale Rd., over Westside Canal, 100 E Cranmore Rd.: Replace the existing structurally deficient 2 lane bridge with a new 2 lane bridge.. Toll Credits for ENG, ROW, CON | 2,845,000 | - | By 2030 |
| CAL21276 | VAR | Programmed | Caltrans D3 | B- Road & Highway Capacity | I-80 and US 50 Managed Lanes | On I-80 just from the I-80/Kidwell Road interchange in Solano County, through Yolo County, and to the W. El Camino interchange; also on US 50 from the I-80/US 50 interchange to the I-5/US 50 interchange in Sacramento County: Construct improvements consisting of managed lanes in each direction, pedestrian/bicycle facilities, park-n-ride, and Intelligent Transportation System (ITS) elements.. Toll Credits for ENG, ROW, CON | 465,000,000 | - | By 2030 |
| CAL21424 | VAR | Programmed | Caltrans D3 | B- Road & Highway Capacity | YOL 80 Managed Lanes - Phase 1 | On I-80 from the I-80/Kidwell Road interchange in Solano County, through Yolo County, to the I-80/US 50 Interchange: Construct improvements consisting of managed lanes in each direction, pedestrian/bicycle improvements, and Intelligent Transportation System (ITS) elements. | 1,000,000 | - | By 2030 |

# SACOG 2023-2026 MTIP Information (ID: CAL21276)

**Section 2 Individually Listed Projects and Grouped Project Listings (with Detailed Back-up)**

SACOG ID **CAL21276** **VAR** Lead Agency **Caltrans D3** **Project 1 of 63**

Project Title

I-80 and US 50 Managed Lanes

EA Number: 3H900 | Last Revised 23-16 | Completion Year **2029**

FED ID: 6203-062

PPNO: 8922

Project Description

On I-80 just from the I-80/Kidwell Road interchange in Solano County, through Yolo County, and to the W. El Camino interchange; also on US 50 from the I-80/US 50 interchange to the I-5/US 50 interchange in Sacramento County: Construct improvements consisting of a High Occupancy Toll (HOT) 3+ lane in each direction with direct connectors, pedestrian/bicycle facilities, park-n-ride, and Intelligent Transportation System (ITS) elements. Phase 1 EA 03-3H901 will utilize $105,000,000 from TCEP funds and $85,900,000 from federal INFRA funds. $85,900,000 from federal INFRA funds per Federal Project Number 6203(070). Total project cost $466,000,000). Toll Credits for ENG, ROW, CON

Emission Benefits in kg/day: [6.98] ROG, [-1.34] NOx, [2.13] PM 2.5

**Federal Project** Total Cost **$466,000,000**

| Fed FY | Revenue Source | Engineering | Right of Way | Construction | Total Revenue |
|---|---|---|---|---|---|
| <23 | | $8,000,000 | $0 | $0 | $8,000,000 |
| 2023 | INFRA | $3,000,000 | $0 | $0 | $3,000,000 |
| 2023 | Regional Surface Transportation Program | $950,000 | $0 | $0 | $950,000 |
| 2024 | Congestion Mitigation and Air Quality | $60,000 | $0 | $0 | $60,000 |
| 2024 | INFRA | $0 | $0 | $82,900,000 | $82,900,000 |
| 2024 | Regional Surface Transportation Program | $50,000 | $0 | $0 | $50,000 |
| 2024 | State Bond - Trade Corridor Program | $0 | $0 | $105,000,000 | $105,000,000 |
| >26 | | $6,000,000 | $9,440,000 | $250,600,000 | $266,040,000 |
| | | **$18,060,000** | **$9,440,000** | **$438,500,000** | **$466,000,000** |

**Sacramento Area Council of Governments**

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Thursday, April 11, 2024

## Sacramento Area Council of Governments - Federal Transportation Improvement Program
## (Dollars in Whole)
## State Highway System

| | | | | | |
|---|---|---|---|---|---|
| DIST: 03 | PPNO: 8922 | EA: 3H900 | CTIPS ID: 207-0000-1850 | TITLE (DESCRIPTION): I-80 and US 50 Managed Lanes (On I-80 just from the I-80/Kidwell Road interchange in Solano County, through Yolo County, and to the W. El Camino interchange; also on US 50 from the I-80/US 50 interchange to the I-5/US 50 interchange in Sacramento County: Construct improvements consisting of a High Occupancy Toll (HOT) 3+ lane in each direction with direct connectors, pedestrian/bicycle facilities, park-n-ride, and Intelligent Transportation System (ITS) elements. Phase 1 EA 03-3H901 will utilize $105,000,000 from TCEP funds and $85,900,000 from federal INFRA funds. $85,900,000 from federal INFRA funds per Federal Project Number 6203(070). Total project cost $466,000,000). Toll Credits for ENG, ROW, CON) | MPO Aprv: 04/11/2024<br>State Aprv:<br>Federal Aprv:<br><br>EPA TABLE II or III EXEMPT CATEGORY<br>Null |
| CT PROJECT ID: | | | MPO ID.: CAL21276 | | |
| COUNTY: Various Counties | ROUTE: | | PM: 0.000 / 0.000 | | |

IMPLEMENTING AGENCY: Caltrans
PROJECT MANAGER: Nawid Nessar PHONE: (530) 682-3679 EMAIL:

*PROJECT VERSION HISTORY (Printed Version is Shaded)* *(Dollars in whole)*

| Version | Status | Date | Updated By | Change Reason | Amend No. | Prog Con | Prog RW | PE |
|---|---|---|---|---|---|---|---|---|
| 12 | Official | 04/11/2024 | AHSACOG | Amendment - Cost/Scope/Sch. Change | 16 | 438,500,000 | 9,440,000 | 18,060,000 |
| 11 | Official | 03/08/2024 | AHSACOG | Amendment - Cost/Scope/Sch. Change | 15 | 438,000,000 | 10,000,000 | 17,950,000 |
| 10 | Official | 09/20/2023 | AHSACOG | Amendment - Cost/Scope/Sch. Change | 9 | 438,000,000 | 10,000,000 | 17,950,000 |
| 9 | Official | 09/15/2022 | AHSACOG | Adoption - Carry Over | 0 | 438,000,000 | 10,000,000 | 17,000,000 |
| 8 | Official | 05/11/2022 | AHSACOG | Amendment - Cost/Scope/Sch. Change | 14 | 438,000,000 | 10,000,000 | 17,000,000 |
| 7 | Official | 11/23/2021 | AHSACOG | Amendment - Cost/Scope/Sch. Change | 6 | 550,000,000 | 21,560,000 | 18,500,000 |
| 6 | Official | 09/03/2021 | AHSACOG | Amendment - Cost/Scope/Sch. Change | 5 | 550,000,000 | 21,560,000 | 18,500,000 |
| 5 | Official | 02/24/2021 | AHSACOG | Adoption - Carry Over | 0 | 550,000,000 | 21,560,000 | 14,500,000 |
| 4 | Official | 11/10/2020 | AHSACOG | Amendment - Cost/Scope/Sch. Change | 30 | 550,000,000 | 21,560,000 | 14,500,000 |

| * Federal Disc. - | | PRIOR | 22-23 | 23-24 | 24-25 | 25-26 | 26-27 | 27-28 | BEYOND | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| * Fund Source 1 of 8 | PE | 4,000,000 | | | | | | | | 4,000,000 |
| | RW | | | | | | | | | |
| * Fund Type: COVID Relief Funds - STIP | CON | | | | | | | | | |
| * Funding Agency: | Total: | 4,000,000 | | | | | | | | 4,000,000 |

| * CMAQ - | | PRIOR | 22-23 | 23-24 | 24-25 | 25-26 | 26-27 | 27-28 | BEYOND | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| * Fund Source 2 of 8 | PE | | | 60,000 | | | | | | 60,000 |
| | RW | | | | | | | | | |
| * Fund Type: Congestion Mitigation | CON | | | | | | | | | |
| * Funding Agency: | Total: | | | 60,000 | | | | | | 60,000 |

| * Federal Disc. - | | PRIOR | 22-23 | 23-24 | 24-25 | 25-26 | 26-27 | 27-28 | BEYOND | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| * Fund Source 3 of 8 | PE | | 3,000,000 | | | | | | | 3,000,000 |
| | RW | | | | | | | | | |
| * Fund Type: INFRA Grants Program | CON | | | | | | | | | |
| * Funding Agency: | Total: | | 3,000,000 | | | | | | | 3,000,000 |

| * State Bond - | | PRIOR | 22-23 | 23-24 | 24-25 | 25-26 | 26-27 | 27-28 | BEYOND | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| * Fund Source 4 of 8 | PE | | | | | | | | | |
| | RW | | | | | | | | | |
| * Fund Type: Trade Corridor Program | CON | | | 105,000,000 | | | | | | 105,000,000 |
| * Funding Agency: | Total: | | | 105,000,000 | | | | | | 105,000,000 |

| * CMAQ - | | PRIOR | 22-23 | 23-24 | 24-25 | 25-26 | 26-27 | 27-28 | BEYOND | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| * Fund Source 5 of 8 | PE | 4,000,000 | | | | | | | | 4,000,000 |
| | RW | | | | | | | | | |
| * Fund Type: Congestion Mitigation | CON | | | | | | | | | |
| * Funding Agency: | Total: | 4,000,000 | | | | | | | | 4,000,000 |

| * Future Need - | | PRIOR | 22-23 | 23-24 | 24-25 | 25-26 | 26-27 | 27-28 | BEYOND | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| * Fund Source 6 of 8 | PE | | | | | | 6,000,000 | | | 6,000,000 |
| | RW | | | | | | 9,440,000 | | | 9,440,000 |
| * Fund Type: Future Funds | CON | | | | | | 250,600,000 | | | 250,600,000 |

Products of CTIPS Page 1 04/22/2024 11:41:09

| | | | |
|---|---|---|---|
| * Funding Agency: | Total: | 266,040,000 | 266,040,000 |

## Sacramento Area Council of Governments - Federal Transportation Improvement Program
## (Dollars in Whole)
## State Highway System

| * RSTP - | | PRIOR | 22-23 | 23-24 | 24-25 | 25-26 | 26-27 | 27-28 | BEYOND | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| * Fund Source 7 of 8 | PE | | 950,000 | 50,000 | | | | | | 1,000,000 |
| | RW | | | | | | | | | |
| * Fund Type: STP Local | CON | | | | | | | | | |
| * Funding Agency: | Total: | | 950,000 | 50,000 | | | | | | 1,000,000 |

| * Federal Disc. - | | PRIOR | 22-23 | 23-24 | 24-25 | 25-26 | 26-27 | 27-28 | BEYOND | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| * Fund Source 8 of 8 | PE | | | | | | | | | |
| | RW | | | | | | | | | |
| * Fund Type: INFRA Grants Program | CON | | | 82,900,000 | | | | | | 82,900,000 |
| * Funding Agency: | Total: | | | 82,900,000 | | | | | | 82,900,000 |

| **Project Total:** | | PRIOR | 22-23 | 23-24 | 24-25 | 25-26 | 26-27 | 27-28 | BEYOND | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| | PE | 8,000,000 | 3,950,000 | 110,000 | | | 6,000,000 | | | 18,060,000 |
| | RW | | | | | | 9,440,000 | | | 9,440,000 |
| | CON | | | 187,900,000 | | | 250,600,000 | | | 438,500,000 |
| | Total: | 8,000,000 | 3,950,000 | 188,010,000 | | | 266,040,000 | | | 466,000,000 |

Comments:
Other ** Moved $60k of CMAQ in FFY24 from ROW to PE, adding TCEP in FFY24 for CON to prepare for CTC advancement. If TCEP not advanced, will update programming. This project was administratively split resulting in CAL21424, but now CAL21424 is administratively combined back into this project (CAL21276). No change in project scope or total project cost.

# Appendix C. 2021 and 2024 Interagency Consultation

**From:** Jackie Kahrs <jkahrs@sacog.org>
**Sent:** Friday, April 26, 2024 11:25 AM
**To:** antonio.johnson <antonio.johnson@dot.gov>; jasmine.amanin <jasmine.amanin@dot.gov>; michelle.ruan@dot.gov; mervin.acebo@dot.gov; Ledezma.Andrew@epa.gov; Oconnor, Karina (she/her/hers) <OConnor.Karina@epa.gov>; Tavitas, Rodney A@DOT <rodney.tavitas@dot.ca.gov>; Espinosa Araiza, Erika@DOT <Erika.Espinosa.Araiza@dot.ca.gov>; Fong, Alexander Y@DOT <alexander.fong@dot.ca.gov>; Cho, Youngil@DOT <Youngil.Cho@dot.ca.gov>; Kalandiyur, Nesamani@ARB <nesamani.kalandiyur@arb.ca.gov>; David Yang <DYang@airquality.org>; JANICE LAM <jlam@airquality.org>; mwright@airquality.org; Paul Philley <pphilley@airquality.org>; mloutzenhiser@airquality.org; sspaethe@fraqmd.org; YChang@placer.ca.gov; PHensleigh@ysaqmd.org; Rick Carter <rcarter@pctpa.net>; Jerry Barton <jbarton@edctc.org>; rania.serieh@edcgov.us; Miguel Mendoza <mmendoza@sacog.org>; Kathleen Hanley <khanley@sacog.org>; Lee, Jason@DOT <jason.lee@dot.ca.gov>; Becha, Karishma@DOT <Karishma.Becha@dot.ca.gov>; Vaca, Erika@DOT <Erika.Vaca@dot.ca.gov>; Maggioncalda, Emma@DOT <Emma.Maggioncalda@dot.ca.gov>
**Cc:** Clint Holtzen <CHoltzen@sacog.org>; Kacey Lizon <KLizon@sacog.org>; Erik Johnson <EJohnson@sacog.org>; Kathleen Hanley <khanley@sacog.org>; Kristina Svensk <KSvensk@sacog.org>; Dennis, Christopher@DOT <Christopher.Dennis@dot.ca.gov>; Bhattal, Gurtej@DOT <Gurtej.Bhattal@dot.ca.gov>; Randhawa, Jasdeep S@DOT <jasdeep.randhawa@dot.ca.gov>; Wilson, Dotrik T@DOT <Dotrik.Wilson@dot.ca.gov>; Laurino, Daisy Loida S@DOT <daisy.laurino@dot.ca.gov>; Brian Abbanat <babbanat@Yctd.org>; Autumn Bernstein <abernstein@yctd.org>; Kirk Trost <ktrost@ktrostlaw.com>; Melim, Suzanne M@DOT <suzanne.melim@dot.ca.gov>
**Subject:** Project Level Conformity: I-80 and US-50 Managed Lanes - Determination

EXTERNAL EMAIL. Links/attachments may not be safe.

Good Morning Project Level Conformity Group,

On April 26, 2024, the EPA and FHWA concurred with the determination that the I-80 and U.S.-50 Managed Lanes project is not a project of air quality concern.

Please contact me if you have any questions.

Thank you,

**Jackie Kahrs | Transportation Programs & Funding Analyst**
Sacramento Area Council of Governments
1415 L Street, Suite 300 | Sacramento, CA | 95814
(916) 340-6248
jkahrs@sacog.org

**From:** Shengyi Gao
**To:** "Vaughn, Joseph (FHWA)"; Alexander Fong; Johnson, Antonio (FHWA); Dave Johnston; David Yang; Douglas Coleman; Heather Phillips ; Janice Lam Snyder; Jerry Barton; John Ungvarsky; Jose Luis Caceres; Karina O"Connor; Kathleen Hanley; Lucas Sanchez; Mark Loutzenhiser; Pittenger, Patrick (FHWA); Paul Hensleigh; Paul Philley; Renee DeVere-Oki; Rodney Tavitas; Shalanda Christian; Sondra Spaethe; Wright Molly; Youngil Cho; Kalandiyur, Nesamani@ARB; Yu-Shuo Chang ; Hendrawan, Kevin@ARB
**Cc:** Lee, Jason@DOT
**Subject:** RE: POAQC of Caltrans I80 improvements project (CAL21276), due 10/15
**Date:** Monday, October 18, 2021 5:35:00 PM

---

Hi all,

The Project Level Conformity Group has determined that the Caltrans I80 improvements project (CAL21276) is NOT a Project of Air Quality Concern (POAQC).

EPA concurred on 10/15/2021 and FHWA concurred on 10/18/2021.

Thanks to you all!

Shengyi Gao
Sacramento Area Council of Governments
916.340.6239

---

**From:** Vaughn, Joseph (FHWA) <Joseph.Vaughn@dot.gov>
**Sent:** Monday, October 18, 2021 10:17 AM
**To:** Shengyi Gao <SGao@sacog.org>; Alexander Fong <alexander.fong@dot.ca.gov>; Johnson, Antonio (FHWA) <antonio.johnson@dot.gov>; Dave Johnston <dave.johnston@edcgov.us>; David Yang <DYang@airquality.org>; Douglas Coleman <douglas.coleman@dot.ca.gov>; Heather Phillips <Heather.Phillips@arb.ca.gov>; Janice Lam Snyder <JLam@airquality.org>; Jerry Barton <jbarton@edctc.org>; John Ungvarsky <Ungvarsky.John@epa.gov>; Jose Luis Caceres <JCaceres@sacog.org>; Karina O'Connor <oconnor.karina@epa.gov>; Kathleen Hanley <khanley@pctpa.net>; Lucas Sanchez <lucas.sanchez@dot.ca.gov>; Mark Loutzenhiser <mloutzenhiser@airquality.org>; Pittenger, Patrick (FHWA) <patrick.pittenger@dot.gov>; Paul Hensleigh <PHensleigh@ysaqmd.org>; Paul Philley <pphilley@airquality.org>; Renee DeVere-Oki <RDeVere-Oki@sacog.org>; Rodney Tavitas <rodney.tavitas@dot.ca.gov>; Shalanda Christian <shalanda_christian@dot.ca.gov>; Sondra Spaethe <sspaethe@fraqmd.org>; Wright Molly <mwright@airquality.org>; Youngil Cho <Youngil.Cho@dot.ca.gov>; Yu-Shuo Chang <YChang@placer.ca.gov>
**Cc:** Lee, Jason@DOT <jason.lee@dot.ca.gov>
**Subject:** RE: POAQC of Caltrans I80 improvements project (CAL21276), due 10/15



FHWA concurs that this is not a project of air quality concern. Thanks.

Joseph Vaughn

Environmental Specialist
FHWA, CA Division
(916) 498-5346

---

**From:** Shengyi Gao <SGao@sacog.org>
**Sent:** Monday, October 4, 2021 8:15 AM
**To:** Alexander Fong <alexander.fong@dot.ca.gov>; Johnson, Antonio (FHWA) <antonio.johnson@dot.gov>; Dave Johnston <dave.johnston@edcgov.us>; David Yang <DYang@airquality.org>; Douglas Coleman <douglas.coleman@dot.ca.gov>; Heather Phillips <Heather.Phillips@arb.ca.gov>; Janice Lam Snyder <JLam@airquality.org>; Jerry Barton <jbarton@edctc.org>; John Ungvarsky <Ungvarsky.John@epa.gov>; Jose Luis Caceres <JCaceres@sacog.org>; Vaughn, Joseph (FHWA) <Joseph.Vaughn@dot.gov>; Karina O'Connor <oconnor.karina@epa.gov>; Kathleen Hanley <khanley@pctpa.net>; Lucas Sanchez <lucas.sanchez@dot.ca.gov>; Mark Loutzenhiser <mloutzenhiser@airquality.org>; Pittenger, Patrick (FHWA) <patrick.pittenger@dot.gov>; Paul Hensleigh <PHensleigh@ysaqmd.org>; Paul Philley <pphilley@airquality.org>; Renee DeVere-Oki <RDeVere-Oki@sacog.org>; Rodney Tavitas <rodney.tavitas@dot.ca.gov>; Shalanda Christian <shalanda_christian@dot.ca.gov>; Sondra Spaethe <sspaethe@fraqmd.org>; Wright Molly <mwright@airquality.org>; Youngil Cho <Youngil.Cho@dot.ca.gov>; Yu-Shuo Chang <YChang@placer.ca.gov>
**Cc:** Lee, Jason@DOT <jason.lee@dot.ca.gov>
**Subject:** RE: POAQC of Caltrans I80 improvements project (CAL21276), due 10/15

**CAUTION:** This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Project Level Conformity Group,

Attached for interagency review is the Caltrans I80 improvements project (CAL21276)**.** As part of project level conformity under NEPA, it requires a determination of whether it is a project of air quality concern.

Please confirm that you concur that this is NOT a Project of Air Quality Concern (POAQC). **Please email questions and comments by 5 p.m., Friday, Oct. 15.**

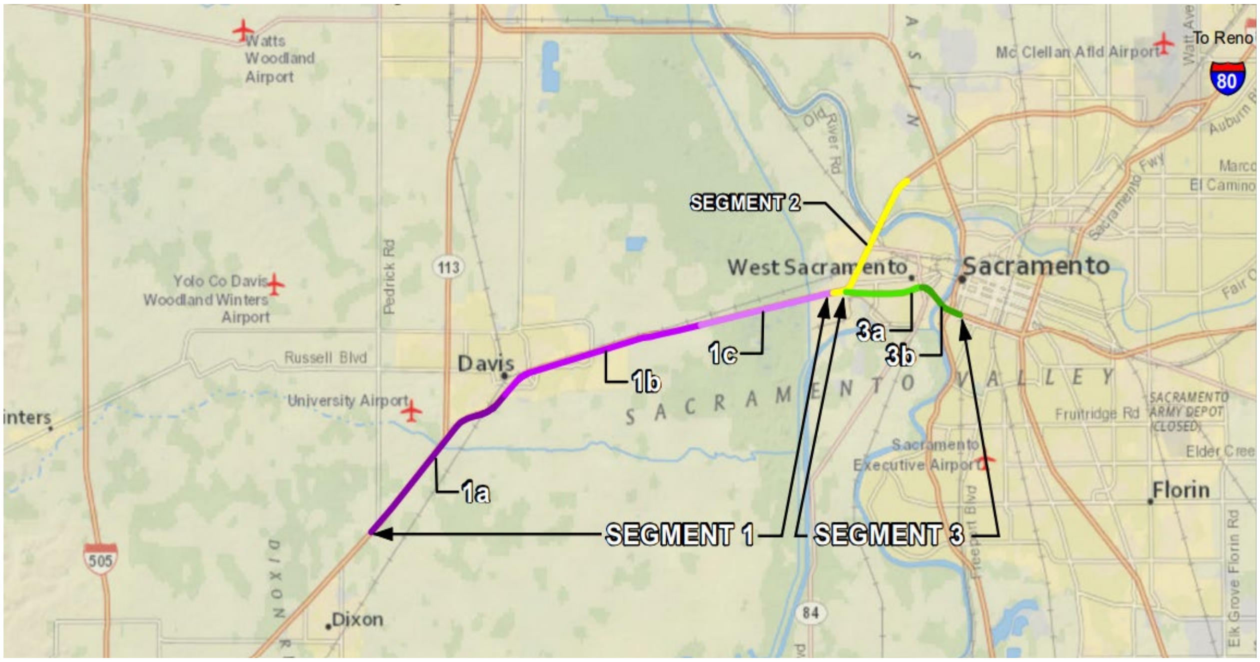
This project falls under the 23 USC 327 (formerly 6005) federal process. As such, it requires written concurrence by EPA (Karina O'Conner) and FHWA (Joseph Vaughn). Please remember to use "reply all," to make comments to the group. Otherwise, you may also contact the sponsor directly:

Jason Lee

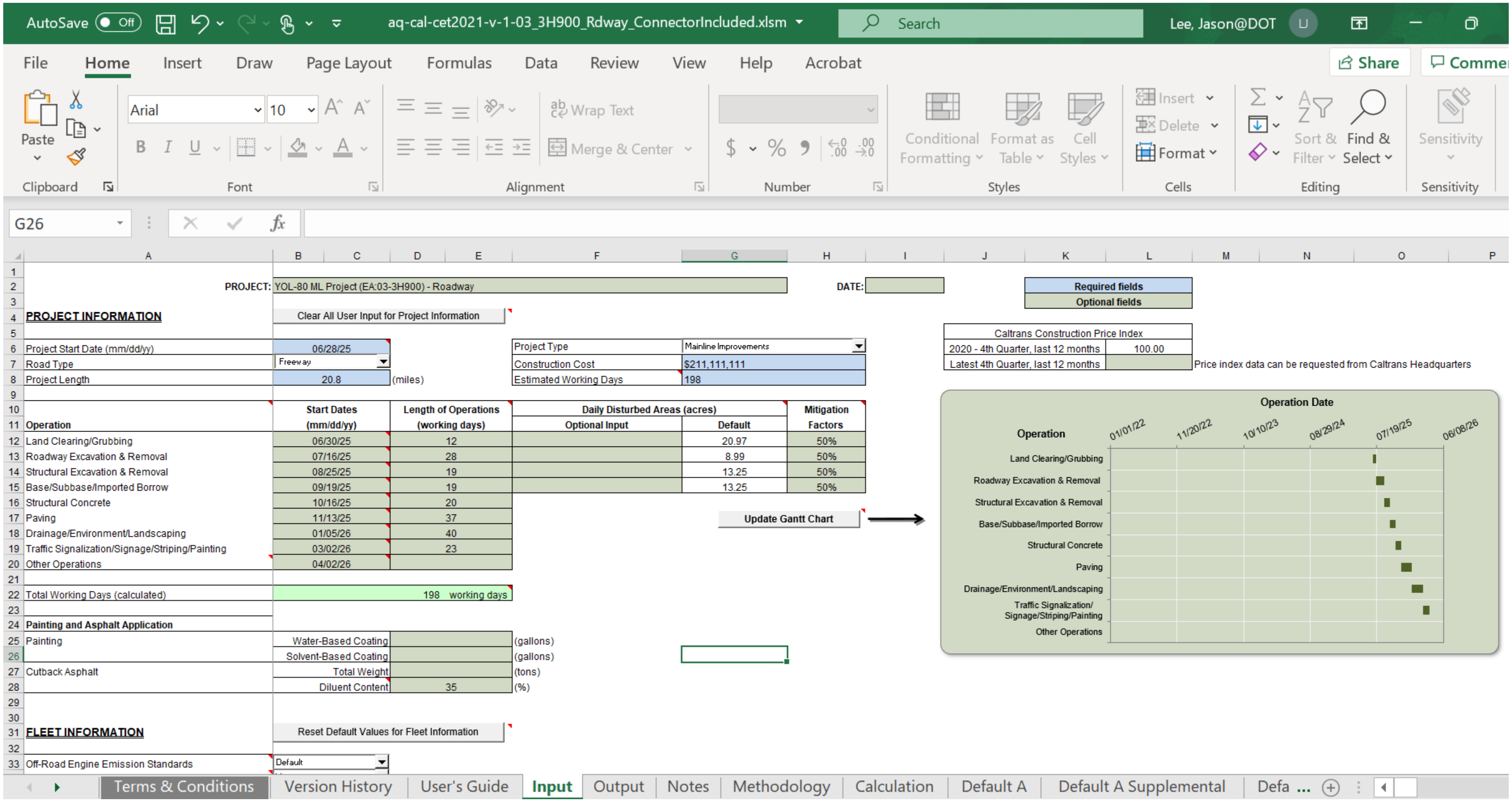
Caltrans

Tel: (530)720-1707

# Appendix D. Project Limits with Segments 1-3



# Appendix E. Road Construction Emission Model Inputs and Outputs



aq-cal-cet2021-v-1-03_3H900_Rdway_ConnectorIncluded.xlsm

PROJECT: YOL-80 ML Project (EA:03-3H900) - Roadway

DATE:

| Summary of Project Emissions and Consumption | TOG | ROG | CO | NOx | PM10 | PM2.5 | CO2 | CH4 | N2O | BC | HFC | Diesel Fuel | Gasoline Fuel | Electricity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Daily Average (lbs/day; gal fuel/day; kWh electricity/day)** | **14.166** | **12.961** | **77.937** | **93.692** | **56.138** | **10.261** | **44403** | **0.577** | **3.268** | **0.936** | **3.600** | **1,163** | **712** | **120.623** |
| **Maximum Daily Average (lbs/day; gal fuel/day; kWh electricity/da** | **19.534** | **17.423** | **164.296** | **137.327** | **214.065** | **25.219** | **96522** | **1.004** | **6.705** | **1.278** | **10.197** | **2,000** | **1,835** | **361.294** |
| **Annual Average (tons/year; gal fuel/year; kWh electricity/year)** | **0.701** | **0.642** | **3.858** | **4.638** | **2.779** | **0.508** | **2198** | **0.029** | **0.162** | **0.046** | **0.178** | **115,179** | **70,457** | **11,941.679** |

**Summary by Source** — Project Total Emissions and Consumption (tons; gal fuel; kWh electricity)

| Source | TOG | ROG | CO | NOx | PM10 | PM2.5 | CO2 | CH4 | N2O | BC | HFC | Diesel Fuel | Gasoline Fuel | Electricity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| On-Road | 0.299 | 0.241 | 4.397 | 3.537 | 0.045 | 0.043 | 3607 | 0.026 | 0.317 | 0.010 | 0.356 | 161,178 | 140,913 | 23,883.358 |
| Off-Road | 1.103 | 1.043 | 3.319 | 5.739 | 0.479 | 0.470 | 789 | 0.032 | 0.006 | 0.082 | - | 69,181 | - | - |
| Area-Wide Fugitive Dust | - | - | - | - | 5.034 | 0.503 | - | - | - | - | - | - | - | - |
| Painting and Asphalt Application | 0.000 | 0.000 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Project Total** | **1.402** | **1.283** | **7.716** | **9.275** | **5.558** | **1.016** | **4396** | **0.057** | **0.323** | **0.093** | **0.356** | **230,359** | **140,913** | **23,883.358** |

| | TOG | ROG | CO |
|---|---|---|---|
| | 14.166 | 12.961 | 77.937 |
| **Project Maximum*** | **19.534** | **17.423** | **164.296** |

* The overall project maximum average daily value is
Guide for more detail). Contributions to the project m

**Summary by Operation** — Total Emissions and Consumption by Operation (tons; gal fuel; kWh electricity)

| Project Phases | TOG | ROG | CO | NOx | PM10 | PM2.5 | CO2 | CH4 | N2O | BC | HFC | Diesel Fuel | Gasoline Fuel | Electricity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Clearing/Grubbing | 0.065 | 0.060 | 0.335 | 0.405 | 1.284 | 0.151 | 140 | 0.002 | 0.011 | 0.005 | 0.007 | 9,282 | 3,358 | 558.105 |
| Roadway Excavation & Removal | 0.211 | 0.193 | 1.012 | 1.507 | 1.344 | 0.209 | 642 | 0.009 | 0.053 | 0.015 | 0.038 | 38,828 | 18,417 | 2,974.746 |
| Structural Excavation & Removal | 0.101 | 0.094 | 0.370 | 0.563 | 1.289 | 0.156 | 222 | 0.004 | 0.016 | 0.005 | 0.013 | 13,370 | 5,996 | 929.855 |
| Base/Subbase/Imported Borrow | 0.160 | 0.144 | 1.069 | 1.232 | 1.326 | 0.192 | 595 | 0.007 | 0.048 | 0.005 | 0.043 | 33,101 | 18,545 | 2,756.234 |
| Structure Concrete | 0.126 | 0.117 | 0.550 | 0.678 | 0.043 | 0.042 | 233 | 0.004 | 0.013 | 0.008 | 0.019 | 12,290 | 6,729 | 796.717 |
| Paving | 0.278 | 0.253 | 1.520 | 1.959 | 0.105 | 0.103 | 963 | 0.012 | 0.075 | 0.020 | 0.082 | 50,479 | 31,487 | 4,415.199 |
| Drainage/Environment/Landscaping | 0.237 | 0.220 | 0.970 | 1.353 | 0.091 | 0.089 | 492 | 0.008 | 0.031 | 0.019 | 0.037 | 27,012 | 14,180 | 3,142.739 |
| Traffic Signalization/Signage/Striping/Painting | 0.225 | 0.200 | 1.889 | 1.579 | 0.076 | 0.074 | 1110 | 0.012 | 0.077 | 0.015 | 0.117 | 45,997 | 42,200 | 8,309.763 |
| Other Operation | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | - |
| **Total** | **1.402** | **1.283** | **7.716** | **9.275** | **5.558** | **1.016** | **4396** | **0.057** | **0.323** | **0.093** | **0.356** | **230,359** | **140,913** | **23,883.358** |

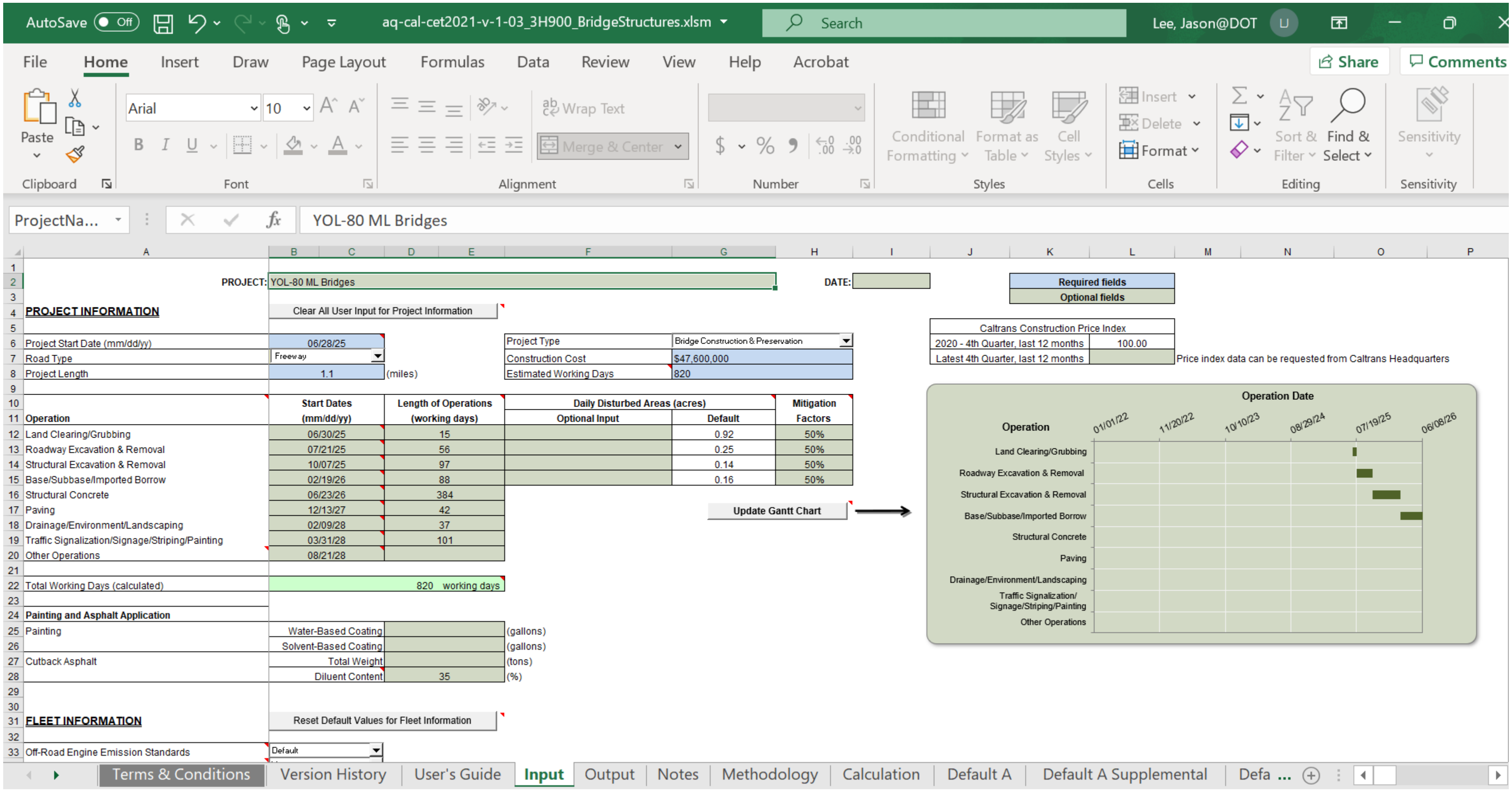
| | TOG | ROG | CO |
|---|---|---|---|
| | 10.826 | 10.044 | 55.864 |
| | 15.061 | 13.797 | 72.275 |
| | 10.643 | 9.899 | 38.953 |
| | 16.810 | 15.209 | 112.489 |
| | 12.583 | 11.737 | 55.044 |
| | 15.046 | 13.701 | 82.157 |
| | 11.851 | 11.000 | 48.512 |
| | 19.534 | 17.423 | 164.296 |
| | 0.000 | 0.000 | 0.000 |
| **Highest across Operations** | 19.534 | 17.423 | 164.296 |

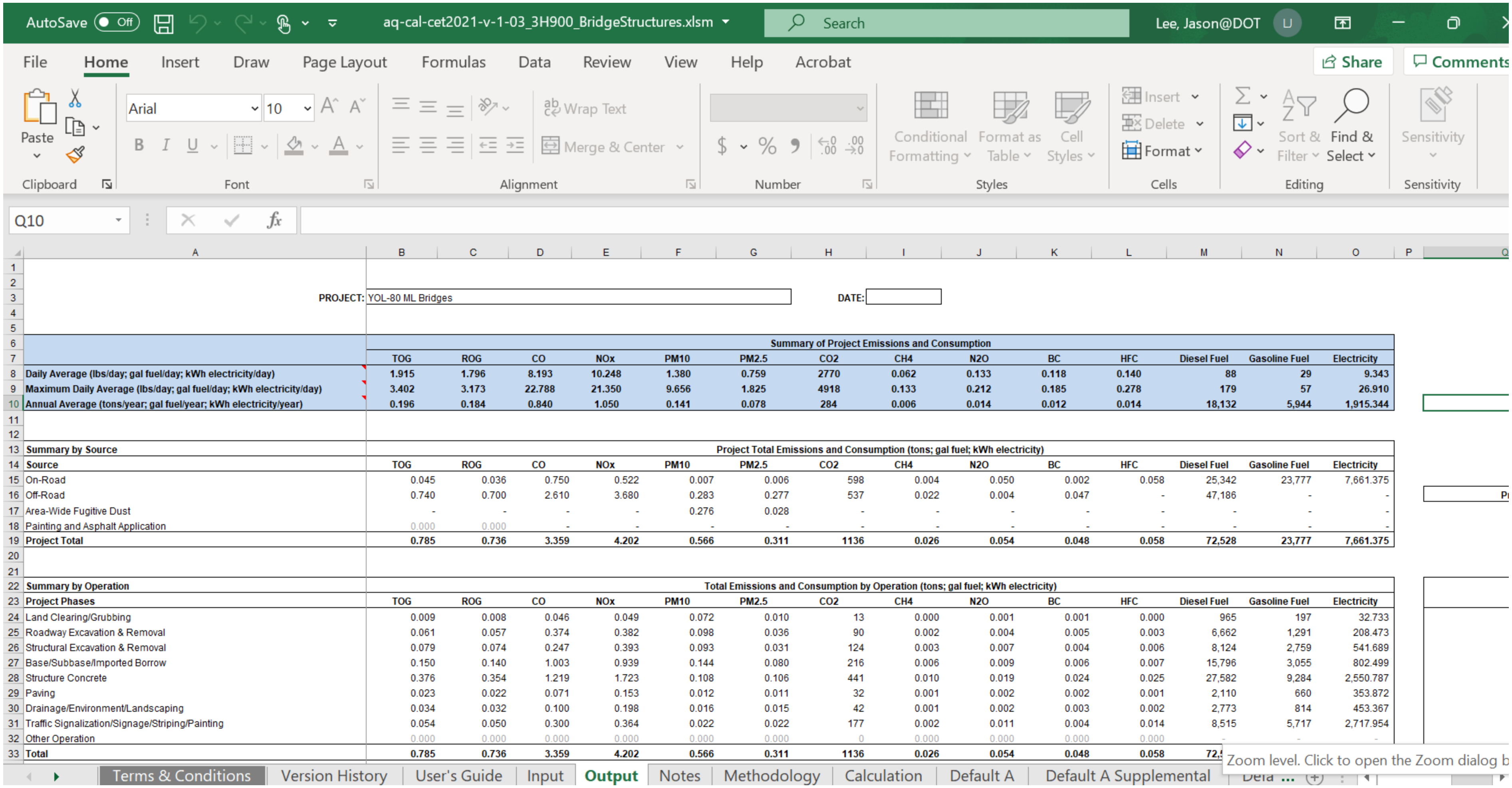
**Summary by Year** — Total Emissions and Consumption by Year (tons; gal fuel; kWh electricity)

| Year | TOG | ROG | CO | NOx | PM10 | PM2.5 | CO2 | CH4 | N2O | BC | HFC | Diesel Fuel | Gasoline Fuel | Electricity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2015 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | - |
| 2016 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | - |
| 2017 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | - |

| TOG | ROG | CO |
|---|---|---|
| 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 |

Terms & Conditions | Version History | User's Guide | Input | Output | Notes | Methodology | Calculation | Default A | Default A Supplemental | Defa ...


aq-cal-cet2021-v-1-03_3H900_BridgeStructures.xlsm
YOL-80 ML Bridges
PROJECT: YOL-80 ML Bridges
DATE:
Required fields
Optional fields
PROJECT INFORMATION
Clear All User Input for Project Information
Project Start Date (mm/dd/yy) 06/28/25
Road Type Freeway
Project Length 1.1 (miles)
Project Type Bridge Construction & Preservation
Construction Cost $47,600,000
Estimated Working Days 820
Caltrans Construction Price Index
2020 - 4th Quarter, last 12 months 100.00
Latest 4th Quarter, last 12 months
Price index data can be requested from Caltrans Headquarters
Operation
Start Dates (mm/dd/yy)
Length of Operations (working days)
Daily Disturbed Areas (acres)
Optional Input
Default
Mitigation Factors
Land Clearing/Grubbing 06/30/25 15 0.92 50%
Roadway Excavation & Removal 07/21/25 56 0.25 50%
Structural Excavation & Removal 10/07/25 97 0.14 50%
Base/Subbase/Imported Borrow 02/19/26 88 0.16 50%
Structural Concrete 06/23/26 384
Paving 12/13/27 42
Drainage/Environment/Landscaping 02/09/28 37
Traffic Signalization/Signage/Striping/Painting 03/31/28 101
Other Operations 08/21/28
Update Gantt Chart
Total Working Days (calculated) 820 working days
Painting and Asphalt Application
Painting Water-Based Coating (gallons)
Solvent-Based Coating (gallons)
Cutback Asphalt Total Weight (tons)
Diluent Content 35 (%)
Operation Date
01/01/22 11/20/22 10/10/23 08/29/24 07/19/25 06/08/26
FLEET INFORMATION
Reset Default Values for Fleet Information
Off-Road Engine Emission Standards Default
Terms & Conditions
Version History
User's Guide
Input
Output
Notes
Methodology
Calculation
Default A
Default A Supplemental



PROJECT: YOL-80 ML Bridges

DATE:

| | TOG | ROG | CO | NOx | PM10 | PM2.5 | CO2 | CH4 | N2O | BC | HFC | Diesel Fuel | Gasoline Fuel | Electricity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Summary of Project Emissions and Consumption** | | | | | | | | | | | | | | |
| Daily Average (lbs/day; gal fuel/day; kWh electricity/day) | 1.915 | 1.796 | 8.193 | 10.248 | 1.380 | 0.759 | 2770 | 0.062 | 0.133 | 0.118 | 0.140 | 88 | 29 | 9.343 |
| Maximum Daily Average (lbs/day; gal fuel/day; kWh electricity/day) | 3.402 | 3.173 | 22.788 | 21.350 | 9.656 | 1.825 | 4918 | 0.133 | 0.212 | 0.185 | 0.278 | 179 | 57 | 26.910 |
| Annual Average (tons/year; gal fuel/year; kWh electricity/year) | 0.196 | 0.184 | 0.840 | 1.050 | 0.141 | 0.078 | 284 | 0.006 | 0.014 | 0.012 | 0.014 | 18,132 | 5,944 | 1,915.344 |

| Summary by Source | Project Total Emissions and Consumption (tons; gal fuel; kWh electricity) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Source** | **TOG** | **ROG** | **CO** | **NOx** | **PM10** | **PM2.5** | **CO2** | **CH4** | **N2O** | **BC** | **HFC** | **Diesel Fuel** | **Gasoline Fuel** | **Electricity** |
| On-Road | 0.045 | 0.036 | 0.750 | 0.522 | 0.007 | 0.006 | 598 | 0.004 | 0.050 | 0.002 | 0.058 | 25,342 | 23,777 | 7,661.375 |
| Off-Road | 0.740 | 0.700 | 2.610 | 3.680 | 0.283 | 0.277 | 537 | 0.022 | 0.004 | 0.047 | - | 47,186 | - | - |
| Area-Wide Fugitive Dust | - | - | - | - | 0.276 | 0.028 | - | - | - | - | - | - | - | - |
| Painting and Asphalt Application | 0.000 | 0.000 | - | - | - | - | - | - | - | - | - | - | - | - |
| **Project Total** | **0.785** | **0.736** | **3.359** | **4.202** | **0.566** | **0.311** | **1136** | **0.026** | **0.054** | **0.048** | **0.058** | **72,528** | **23,777** | **7,661.375** |

| Summary by Operation | Total Emissions and Consumption by Operation (tons; gal fuel; kWh electricity) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Phases** | **TOG** | **ROG** | **CO** | **NOx** | **PM10** | **PM2.5** | **CO2** | **CH4** | **N2O** | **BC** | **HFC** | **Diesel Fuel** | **Gasoline Fuel** | **Electricity** |
| Land Clearing/Grubbing | 0.009 | 0.008 | 0.046 | 0.049 | 0.072 | 0.010 | 13 | 0.000 | 0.001 | 0.001 | 0.000 | 965 | 197 | 32.733 |
| Roadway Excavation & Removal | 0.061 | 0.057 | 0.374 | 0.382 | 0.098 | 0.036 | 90 | 0.002 | 0.004 | 0.005 | 0.003 | 6,662 | 1,291 | 208.473 |
| Structural Excavation & Removal | 0.079 | 0.074 | 0.247 | 0.393 | 0.093 | 0.031 | 124 | 0.003 | 0.007 | 0.004 | 0.006 | 8,124 | 2,759 | 541.689 |
| Base/Subbase/Imported Borrow | 0.150 | 0.140 | 1.003 | 0.939 | 0.144 | 0.080 | 216 | 0.006 | 0.009 | 0.006 | 0.007 | 15,796 | 3,055 | 802.499 |
| Structure Concrete | 0.376 | 0.354 | 1.219 | 1.723 | 0.108 | 0.106 | 441 | 0.010 | 0.019 | 0.024 | 0.025 | 27,582 | 9,284 | 2,550.787 |
| Paving | 0.023 | 0.022 | 0.071 | 0.153 | 0.012 | 0.011 | 32 | 0.001 | 0.002 | 0.002 | 0.001 | 2,110 | 660 | 353.872 |
| Drainage/Environment/Landscaping | 0.034 | 0.032 | 0.100 | 0.198 | 0.016 | 0.015 | 42 | 0.001 | 0.002 | 0.003 | 0.002 | 2,773 | 814 | 453.367 |
| Traffic Signalization/Signage/Striping/Painting | 0.054 | 0.050 | 0.300 | 0.364 | 0.022 | 0.022 | 177 | 0.002 | 0.011 | 0.004 | 0.014 | 8,515 | 5,717 | 2,717.954 |
| Other Operation | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | - |
| **Total** | **0.785** | **0.736** | **3.359** | **4.202** | **0.566** | **0.311** | **1136** | **0.026** | **0.054** | **0.048** | **0.058** | **72,5** | | |

# Appendix F. Sensitive Receptors Map

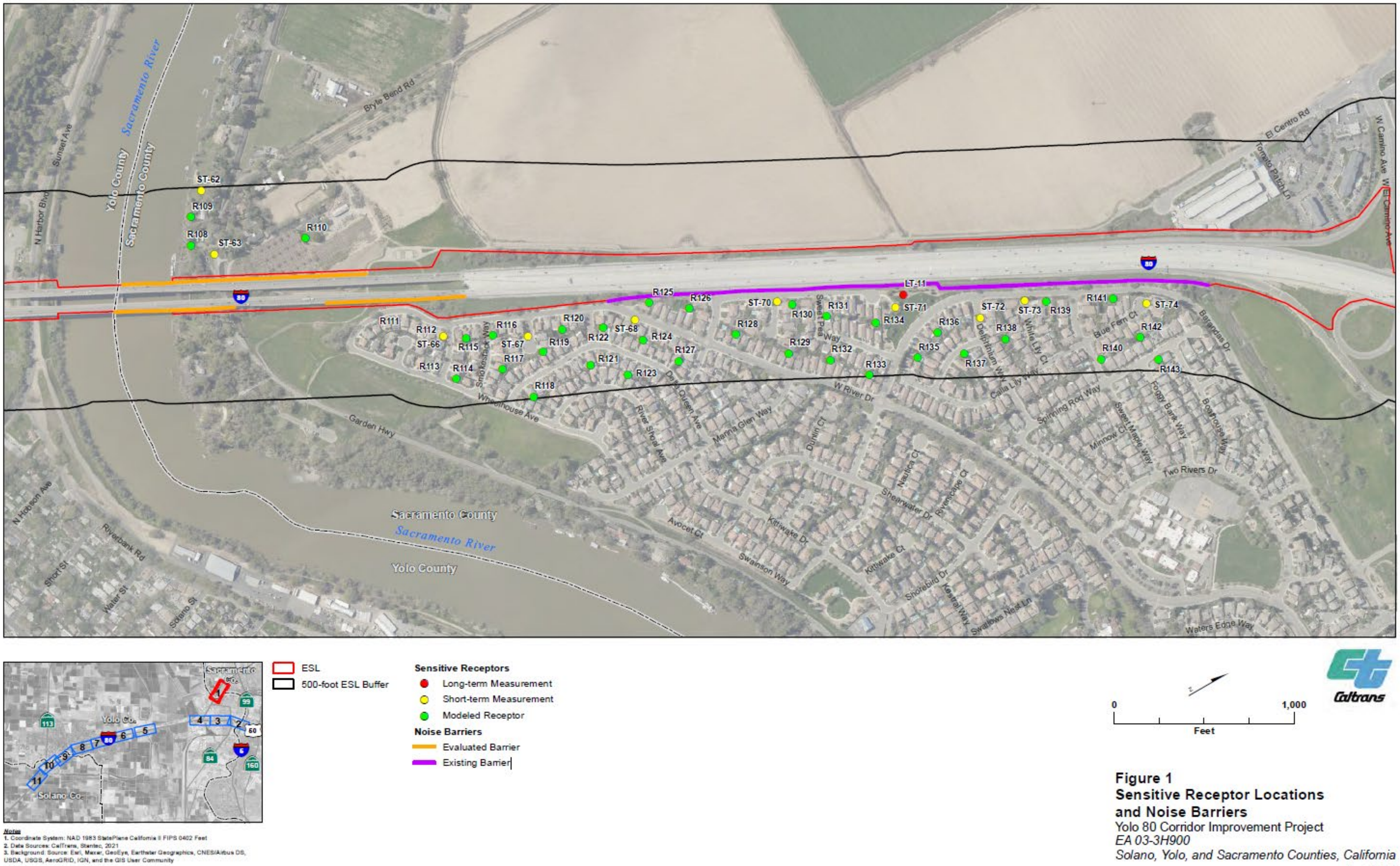
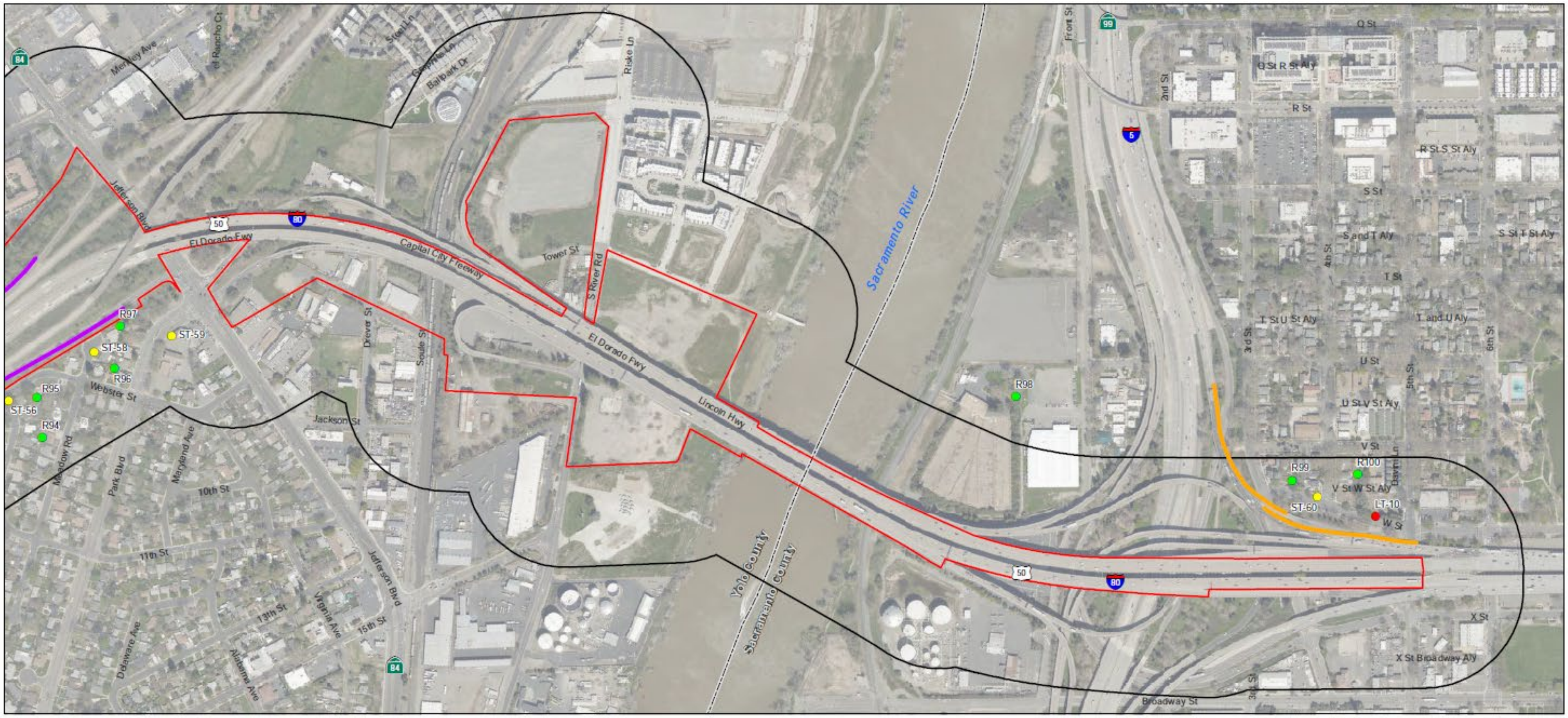
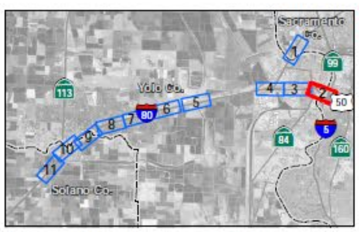



**Figure 1**
**Sensitive Receptor Locations and Noise Barriers**
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*




ESL
500-foot ESL Buffer

Sensitive Receptors
- Long-term Measurement
- Short-term Measurement
- Modeled Receptor

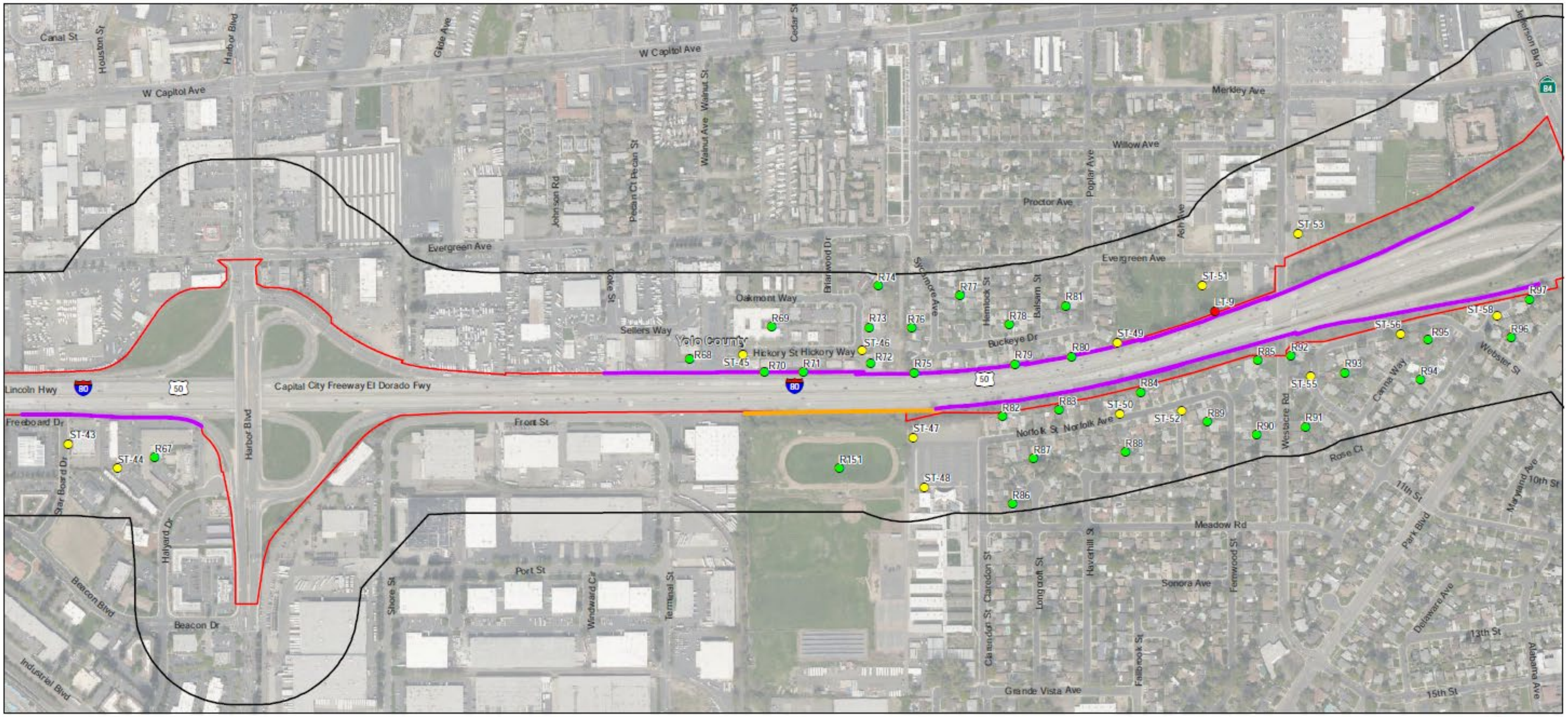
Noise Barriers
- Evaluated Barrier
- Existing Barrier

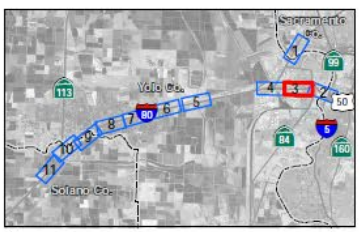
0 — 1,000
Feet

Caltrans

Notes
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure **2**
Sensitive Receptor Locations and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*




Notes
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

ESL
500-foot ESL Buffer

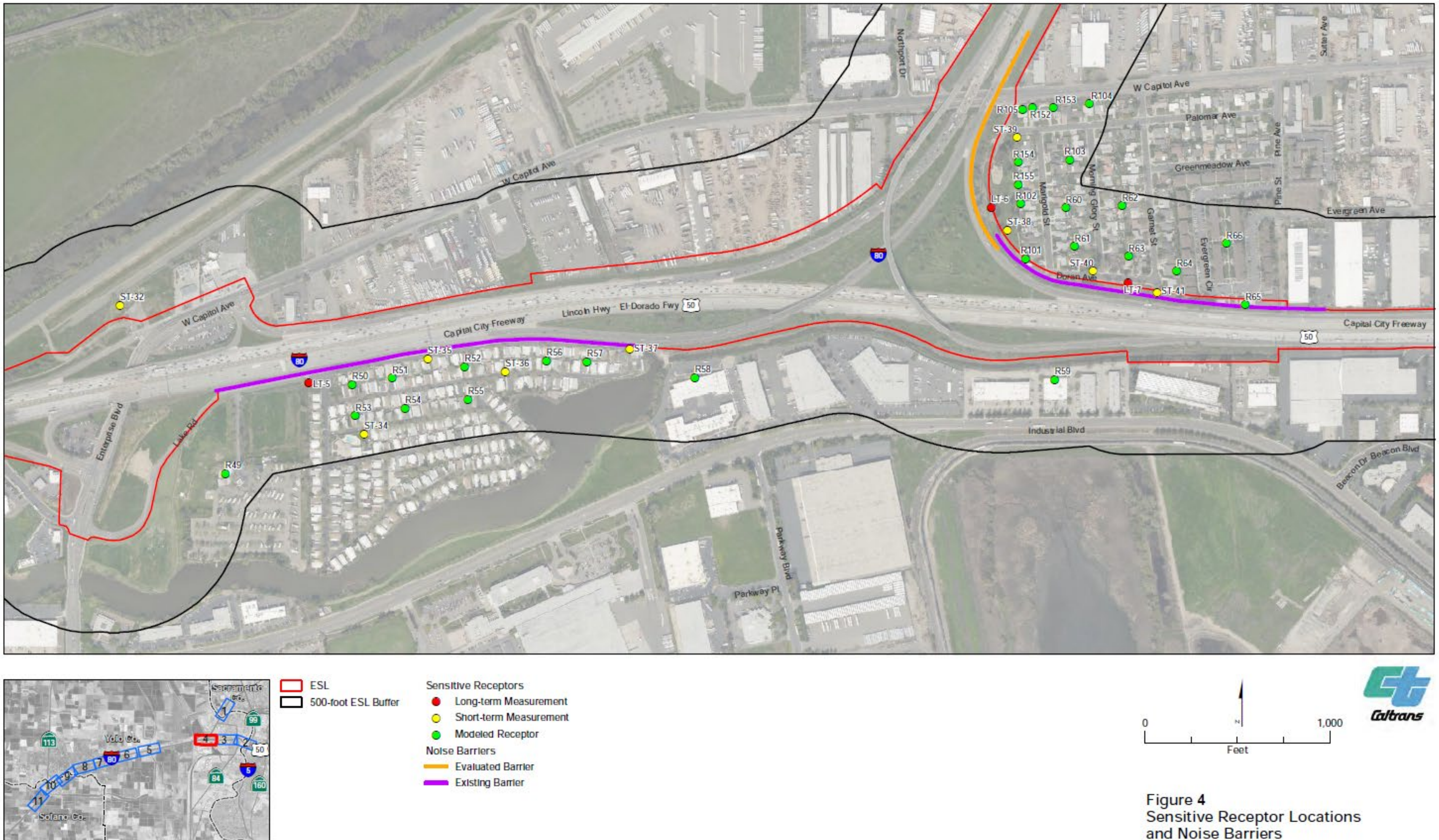
Sensitive Receptors
- Long-term Measurement
- Short-term Measurement
- Modeled Receptor

Noise Barriers
- Evaluated Barrier
- Existing Barrier

0 — 1,000 Feet

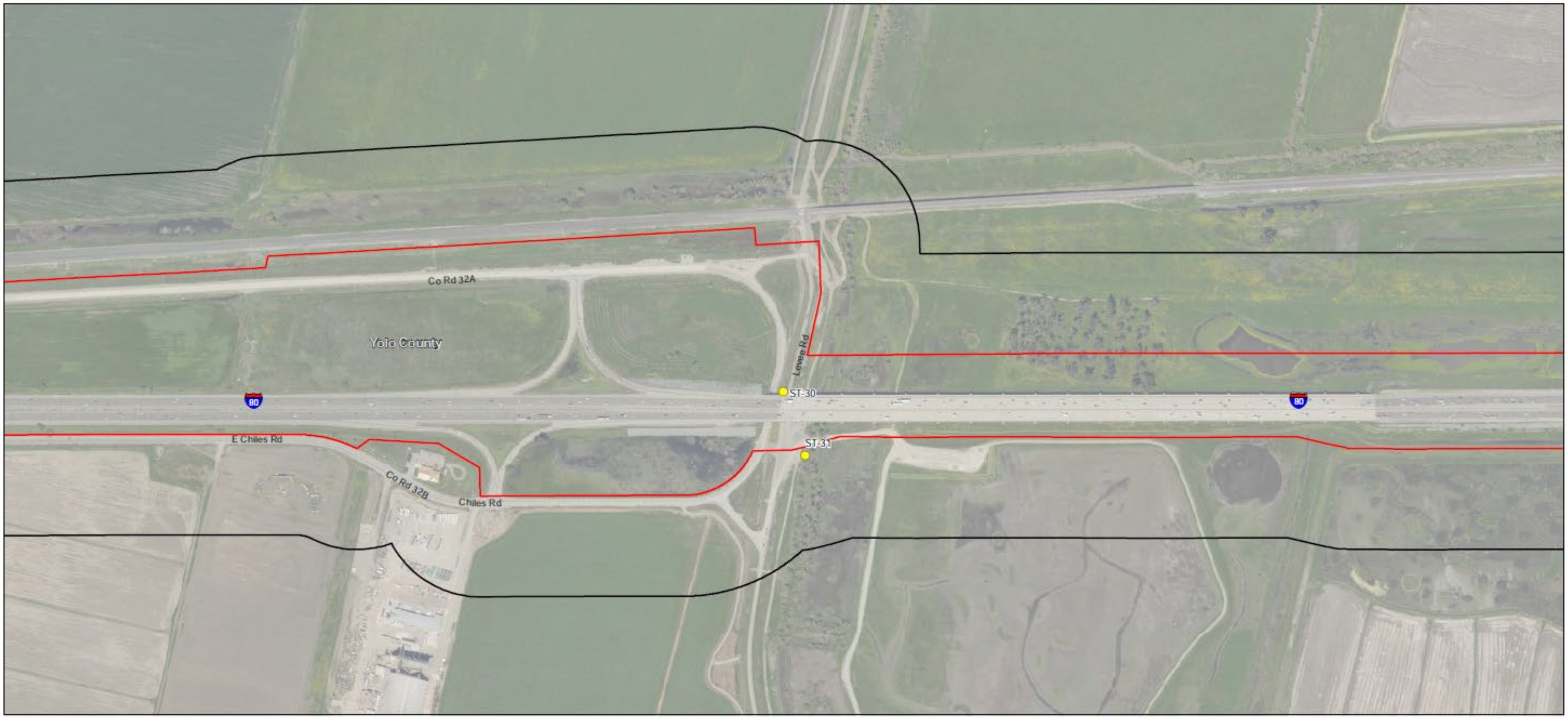
Caltrans

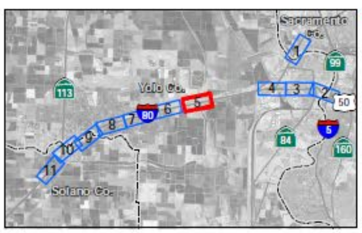
Figure **3**
Sensitive Receptor Locations and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*




Notes
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Figure 4**
Sensitive Receptor Locations and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*




ESL
500-foot ESL Buffer

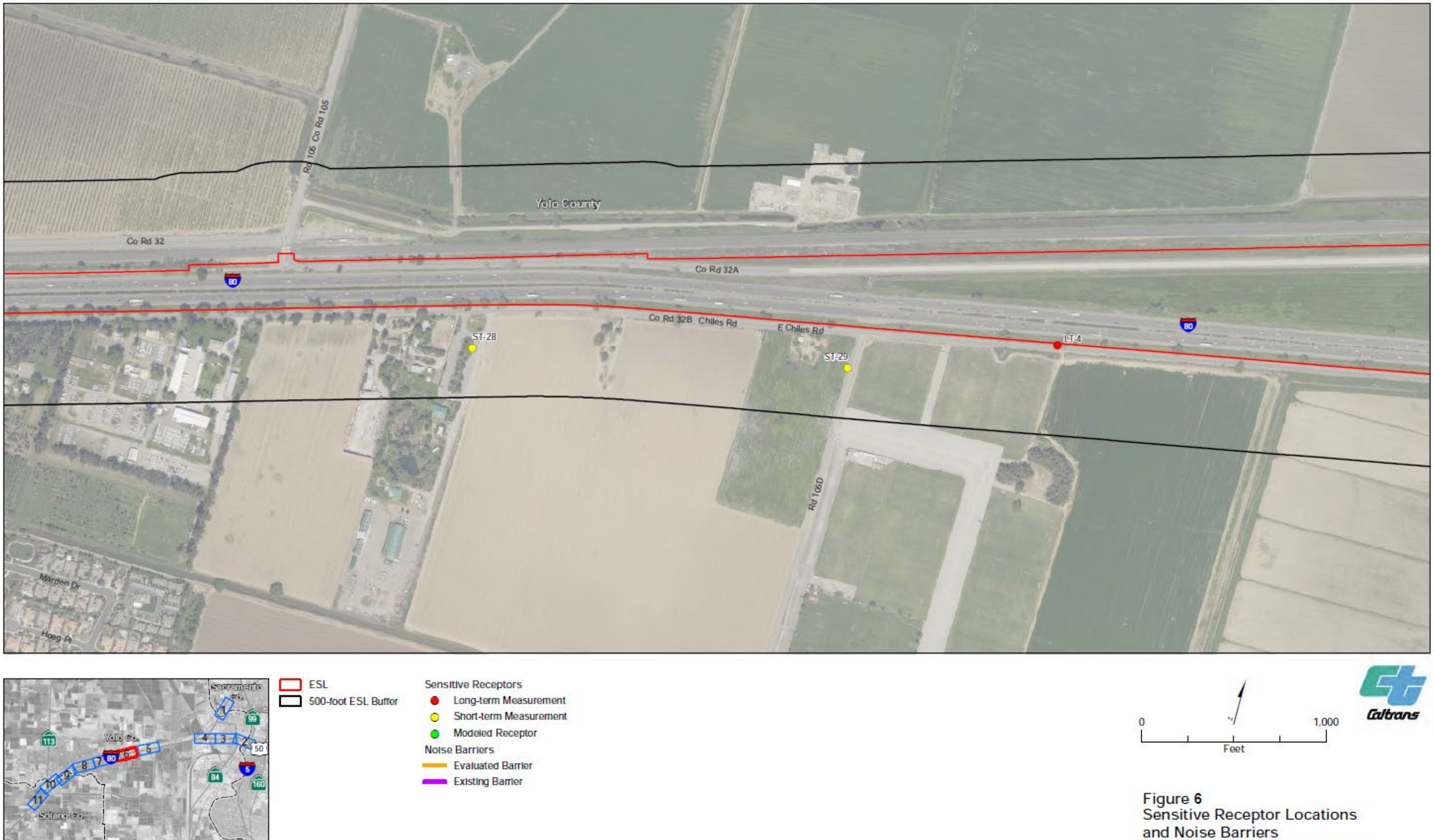
Sensitive Receptors
- Long-term Measurement
- Short-term Measurement
- Modeled Receptor

Noise Barriers
- Evaluated Barrier
- Existing Barrier

0 1,000
Feet

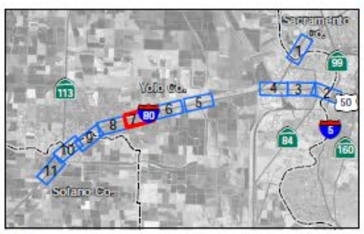
Notes
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure **5**
Sensitive Receptor Locations
and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*




Notes
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 6
Sensitive Receptor Locations
and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*


ESL
500-foot ESL Buffer

Sensitive Receptors
- Long-term Measurement
- Short-term Measurement
- Modeled Receptor

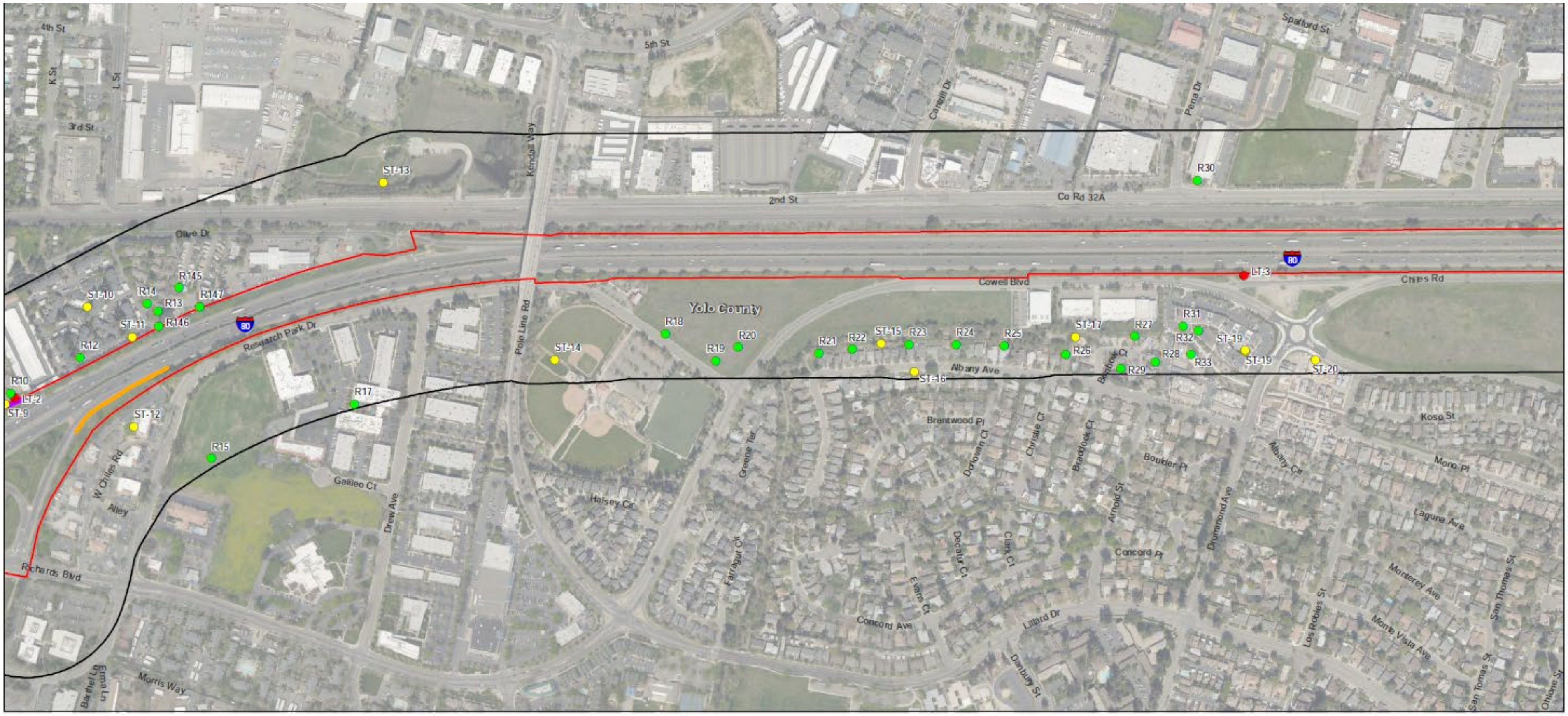
Noise Barriers
- Evaluated Barrier
- Existing Barrier

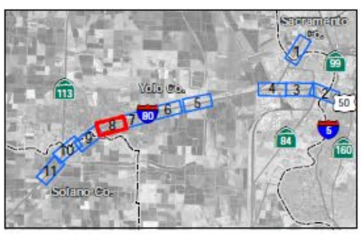
0 — 1,000 Feet

Caltrans

**Figure 7**
Sensitive Receptor Locations and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*
Sheet 7 of 11

Notes
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




**Notes**
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

ESL
500-foot ESL Buffer

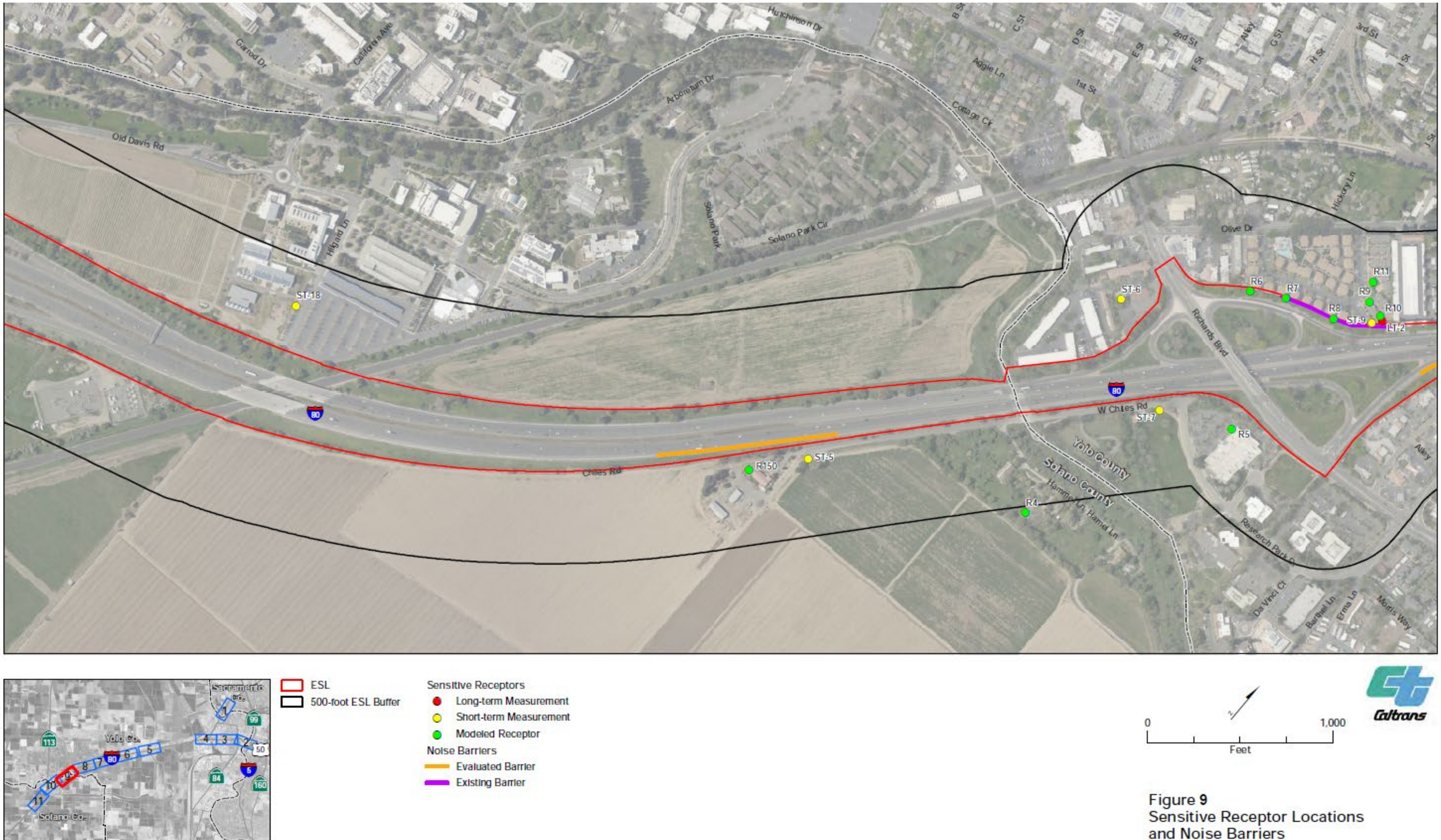
Sensitive Receptors
- Long-term Measurement
- Short-term Measurement
- Modeled Receptor

Noise Barriers
- Evaluated Barrier
- Existing Barrier

0 1,000
Feet

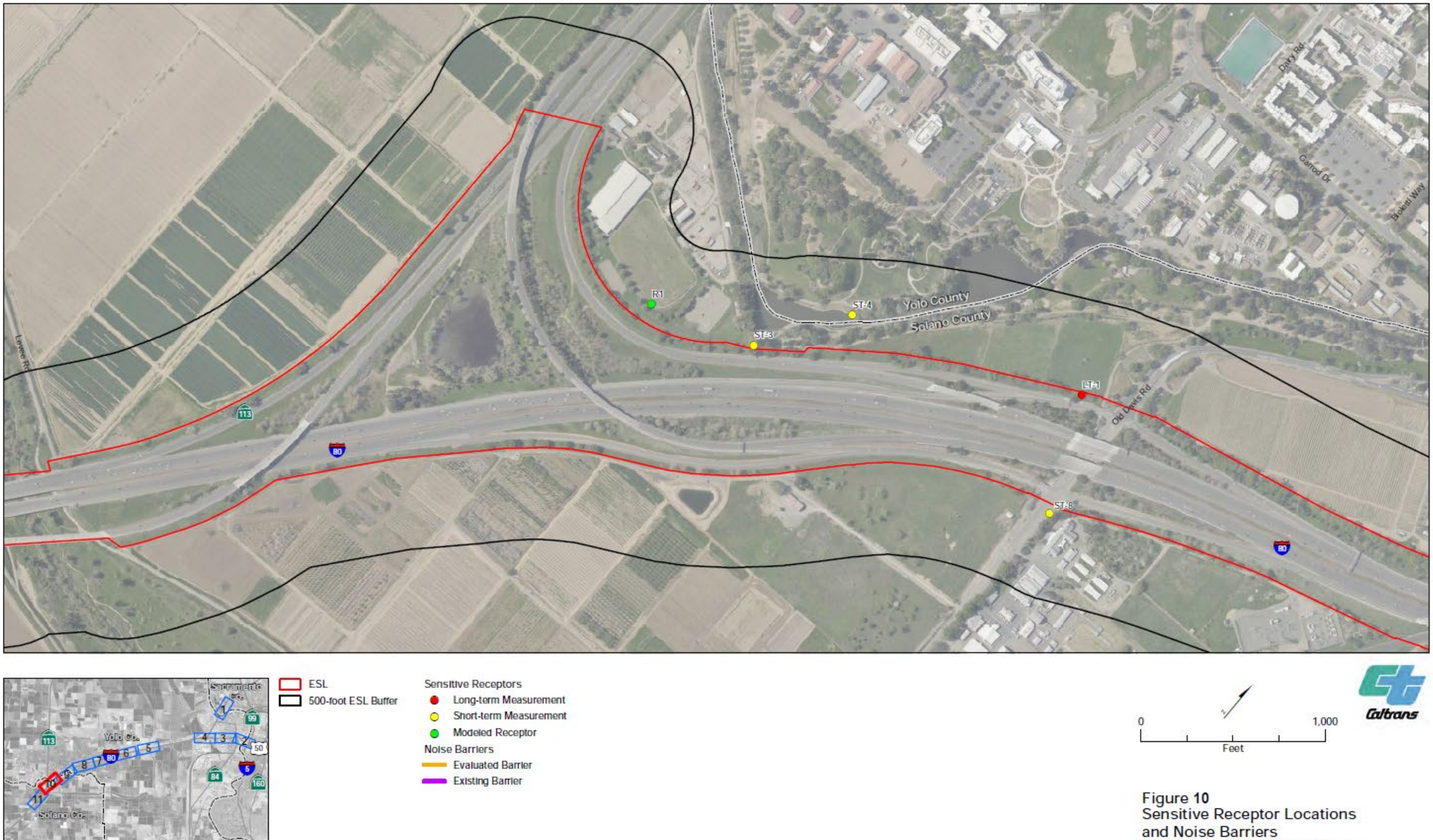
Caltrans

Figure 8
Sensitive Receptor Locations
and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*



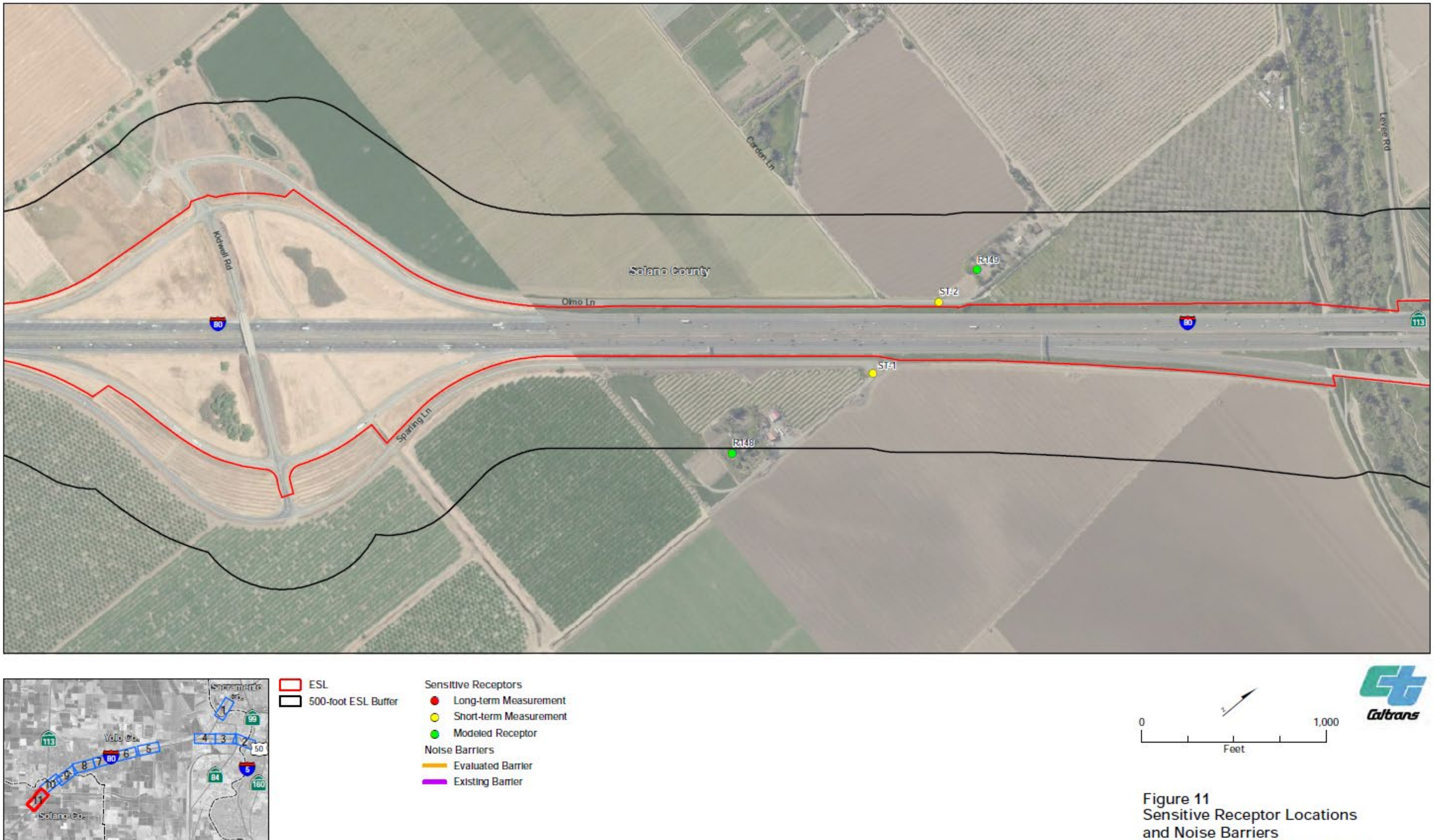

*Notes*
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure **9**
Sensitive Receptor Locations
and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*




Notes
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Figure 10**
Sensitive Receptor Locations and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*




Notes
1. Coordinate System: NAD 1983 StatePlane California II FIPS 0402 Feet
2. Data Sources: CalTrans, Stantec, 2021
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Figure 11**
Sensitive Receptor Locations and Noise Barriers
Yolo 80 Corridor Improvement Project
*EA 03-3H900*
*Solano, Yolo, and Sacramento Counties, California*

# Appendix G. Summary Tables of CT-EMFAC Results

| | | | |
|---|---|---|---|
| File Name: | Yolo (SV) - 2049 - Alt2 OptionB YOL80.EM | | |
| CT-EMFAC2021 Version: | 1.0.2.0 | | |
| Run Date: | 8/26/2023 17:01 | | |
| Area: | Yolo (SV) | | |
| Analysis Year: | 2049 | | |
| Season: | Annual | | |

==================================================================

| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.02 | 0.256 | 0.279 |
| Truck 2 | 0.054 | 0.691 | 0.008 |
| Non-Truck | 0.926 | 0.004 | 0.9 |

==================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

==================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,918 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3952666 | miles |

VMT Distribution by Speed Bin (mph):

| | |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 1.54% |
| 25 mph | 5.73% |
| 30 mph | 1.14% |
| 35 mph | 4.89% |
| 40 mph | 5.68% |
| 45 mph | 7.07% |
| 50 mph | 14.85% |
| 55 mph | 17.36% |
| 60 mph | 22.65% |
| 65 mph | 19.09% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

====================================================================================================================================

Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 3,830.90 | - | 8,968.60 | 13,714.20 | 40,657.10 | 67,170.80 | 148.086 | 0.074 |
| PM10 | 4,062.00 | - | 35,878.30 | 39,183.20 | 271,038.20 | 350,161.70 | 771.974 | 0.386 |
| NOx | 198,031.60 | - | - | - | - | 198,031.60 | 436.585 | 0.218 |
| CO | 1,555,065.40 | - | - | - | - | 1,555,065.40 | 3,428.33 | 1.714 |
| HC | 26,866.90 | 62,234.40 | - | - | - | 89,101.40 | 196.435 | 0.098 |
| TOG | 29,510.50 | 66,536.60 | - | - | - | 96,047.10 | 211.748 | 0.106 |
| ROG | 20,472.30 | 66,536.60 | - | - | - | 87,008.90 | 191.822 | 0.096 |
| 1,3-Butadiene | 94.8 | 0 | - | - | - | 94.8 | 0.209 | < 0.001 |
| Acetaldehyde | 351.9 | - | - | - | - | 351.9 | 0.776 | < 0.001 |
| Acrolein | 9.6 | - | - | - | - | 9.6 | 0.021 | < 0.001 |
| Benzene | 980.4 | 960.3 | - | - | - | 1,940.70 | 4.278 | 0.002 |
| Diesel PM | 2,585.80 | - | - | - | - | 2,585.80 | 5.701 | 0.003 |
| Ethylbenzene | 306.3 | 621.7 | - | - | - | 927.9 | 2.046 | 0.001 |
| Formaldehyde | 827.5 | - | - | - | - | 827.5 | 1.824 | < 0.001 |
| Naphthalene | 81.2 | 0 | - | - | - | 81.2 | 0.179 | < 0.001 |
| POM | 21.4 | - | - | - | - | 21.4 | 0.047 | < 0.001 |
| DEOG | 2,766.50 | - | - | - | - | 2,766.50 | 6.099 | 0.003 |
| CO2 | 1,004,578,875.60 | - | - | - | - | 1,004,578,875.60 | 2,214,717.17 | 1,107.36 |
| N2O | 40,958.70 | - | - | - | - | 40,958.70 | 90.299 | 0.045 |
| CH4 | 7,855.50 | - | - | - | - | 7,855.50 | 17.318 | 0.009 |
| BC | 425.1 | - | - | - | - | 425.1 | 0.937 | < 0.001 |
| HFC | - | 47.5 | - | - | - | 47.5 | 0.105 | < 0.001 |

====================================================================================================================================

Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 1,004.58 | 1,004.58 |
| N2O | 0.041 | 12.206 |
| CH4 | 0.008 | 0.196 |
| BC | < 0.001 | 0.196 |
| HFC | < 0.001 | 0.068 |
| Total CO2e | - | 1,017.24 |

====================================================================================================================================

Summary of Consumptions

| | | |
|---|---|---|
| Gasoline | 100,144.01 | gallons |
| Diesel | 18,375.59 | gallons |
| Natural Gas | 269.969 | diesel-equivalent gallons |
| Electricity | 241,193.27 | kilowatt-hours |

=========================================================END=========================================================================

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| File Name: | Yolo (SV) - 2049 - Alt3 OptionB YOL80.EM | | | | | | | |
| CT-EMFAC2021 Version: | 1.0.2.0 | | | | | | | |
| Run Date: | 8/26/2023 17:04 | | | | | | | |
| Area: | Yolo (SV) | | | | | | | |
| Analysis Year: | 2049 | | | | | | | |
| Season: | Annual | | | | | | | |

=====================================================================

| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.02 | 0.256 | 0.279 |
| Truck 2 | 0.054 | 0.691 | 0.008 |
| Non-Truck | 0.926 | 0.004 | 0.9 |

=====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

=====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,932 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3959654 | miles |

VMT Distribution by Speed Bin (mph):

| | |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 0.71% |
| 25 mph | 1.76% |
| 30 mph | 2.97% |
| 35 mph | 8.73% |
| 40 mph | 1.57% |
| 45 mph | 10.81% |
| 50 mph | 16.84% |
| 55 mph | 18.08% |
| 60 mph | 21.66% |
| 65 mph | 16.87% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

=====================================================================================================================================

Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 3,739.30 | - | 8,984.50 | 13,759.20 | 40,729.00 | 67,211.90 | 148.177 | 0.074 |
| PM10 | 3,964.20 | - | 35,941.80 | 39,311.80 | 271,517.50 | 350,735.20 | 773.239 | 0.387 |
| NOx | 189,460.20 | - | - | - | - | 189,460.20 | 417.688 | 0.209 |
| CO | 1,546,153.90 | - | - | - | - | 1,546,153.90 | 3,408.69 | 1.704 |
| HC | 25,973.90 | 60,699.90 | - | - | - | 86,673.80 | 191.083 | 0.096 |
| TOG | 28,533.10 | 64,896.00 | - | - | - | 93,429.10 | 205.976 | 0.103 |
| ROG | 19,784.30 | 64,896.00 | - | - | - | 84,680.30 | 186.688 | 0.093 |
| 1,3-Butadiene | 91.5 | 0 | - | - | - | 91.5 | 0.202 | < 0.001 |
| Acetaldehyde | 341.5 | - | - | - | - | 341.5 | 0.753 | < 0.001 |
| Acrolein | 9.3 | - | - | - | - | 9.3 | 0.021 | < 0.001 |
| Benzene | 947.5 | 936.6 | - | - | - | 1,884.10 | 4.154 | 0.002 |
| Diesel PM | 2,540.00 | - | - | - | - | 2,540.00 | 5.6 | 0.003 |
| Ethylbenzene | 296.1 | 606.3 | - | - | - | 902.4 | 1.989 | < 0.001 |
| Formaldehyde | 802.5 | - | - | - | - | 802.5 | 1.769 | < 0.001 |
| Naphthalene | 78.5 | 0 | - | - | - | 78.5 | 0.173 | < 0.001 |
| POM | 20.9 | - | - | - | - | 20.9 | 0.046 | < 0.001 |
| DEOG | 2,692.20 | - | - | - | - | 2,692.20 | 5.935 | 0.003 |
| CO2 | 994,090,344.50 | - | - | - | - | 994,090,344.50 | 2,191,593.92 | 1,095.80 |
| N2O | 40,645.20 | - | - | - | - | 40,645.20 | 89.607 | 0.045 |
| CH4 | 7,640.10 | - | - | - | - | 7,640.10 | 16.844 | 0.008 |
| BC | 411.7 | - | - | - | - | 411.7 | 0.908 | < 0.001 |
| HFC | - | 46.3 | - | - | - | 46.3 | 0.102 | < 0.001 |

=====================================================================================================================================

Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 994.09 | 994.09 |
| N2O | 0.041 | 12.112 |
| CH4 | 0.008 | 0.191 |
| BC | < 0.001 | 0.189 |
| HFC | < 0.001 | 0.066 |
| Total CO2e | - | 1,006.65 |

| | |
|---|---|
| File Name: | Yolo (SV) - 2049 - Alt4 OptionB YOL80.EM |
| CT-EMFAC2021 Version: | 1.0.2.0 |
| Run Date: | 8/26/2023 17:06 |
| Area: | Yolo (SV) |
| Analysis Year: | 2049 |
| Season: | Annual |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.02 | 0.256 | 0.279 |
| Truck 2 | 0.054 | 0.691 | 0.008 |
| Non-Truck | 0.926 | 0.004 | 0.9 |

=====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

=====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,846 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3916723 | miles |

VMT Distribution by Speed Bin (mph):

| | |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 1.03% |
| 25 mph | 1.26% |
| 30 mph | 2.29% |
| 35 mph | 10.31% |
| 40 mph | 6.40% |
| 45 mph | 5.97% |
| 50 mph | 18.52% |
| 55 mph | 18.66% |
| 60 mph | 20.03% |
| 65 mph | 15.53% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

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Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 3,638.90 | - | 8,887.00 | 13,991.70 | 40,287.40 | 66,805.00 | 147.28 | 0.074 |
| PM10 | 3,858.80 | - | 35,552.10 | 39,976.10 | 268,573.60 | 347,960.60 | 767.122 | 0.384 |
| NOx | 187,799.50 | - | - | - | - | 187,799.50 | 414.027 | 0.207 |
| CO | 1,543,673.90 | - | - | - | - | 1,543,673.90 | 3,403.22 | 1.702 |
| HC | 25,751.00 | 60,926.70 | - | - | - | 86,677.60 | 191.091 | 0.096 |
| TOG | 28,289.80 | 65,138.40 | - | - | - | 93,428.20 | 205.974 | 0.103 |
| ROG | 19,604.90 | 65,138.40 | - | - | - | 84,743.30 | 186.827 | 0.093 |
| 1,3-Butadiene | 90.6 | 0 | - | - | - | 90.6 | 0.2 | < 0.001 |
| Acetaldehyde | 339.8 | - | - | - | - | 339.8 | 0.749 | < 0.001 |
| Acrolein | 9.2 | - | - | - | - | 9.2 | 0.02 | < 0.001 |
| Benzene | 938.8 | 940.1 | - | - | - | 1,878.90 | 4.142 | 0.002 |
| Diesel PM | 2,448.20 | - | - | - | - | 2,448.20 | 5.397 | 0.003 |
| Ethylbenzene | 293.3 | 608.6 | - | - | - | 901.9 | 1.988 | < 0.001 |
| Formaldehyde | 798 | - | - | - | - | 798 | 1.759 | < 0.001 |
| Naphthalene | 77.8 | 0 | - | - | - | 77.8 | 0.172 | < 0.001 |
| POM | 20.6 | - | - | - | - | 20.6 | 0.046 | < 0.001 |
| DEOG | 2,673.40 | - | - | - | - | 2,673.40 | 5.894 | 0.003 |
| CO2 | 980,951,119.90 | - | - | - | - | 980,951,119.90 | 2,162,626.89 | 1,081.31 |
| N2O | 40,176.30 | - | - | - | - | 40,176.30 | 88.574 | 0.044 |
| CH4 | 7,584.60 | - | - | - | - | 7,584.60 | 16.721 | 0.008 |
| BC | 408 | - | - | - | - | 408 | 0.899 | < 0.001 |
| HFC | - | 46.5 | - | - | - | 46.5 | 0.102 | < 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 980.951 | 980.951 |
| N2O | 0.04 | 11.973 |
| CH4 | 0.008 | 0.19 |
| BC | < 0.001 | 0.188 |
| HFC | < 0.001 | 0.066 |
| Total CO2e | - | 993.367 |

| | | | |
|---|---|---|---|
| File Name: | Yolo (SV) - 2049 - Alt5 OptionB YOL80.EM | | |
| CT-EMFAC2021 Version: | 1.0.2.0 | | |
| Run Date: | 8/26/2023 17:09 | | |
| Area: | Yolo (SV) | | |
| Analysis Year: | 2049 | | |
| Season: | Annual | | |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.02 | 0.256 | 0.279 |
| Truck 2 | 0.054 | 0.691 | 0.008 |
| Non-Truck | 0.926 | 0.004 | 0.9 |

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| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

==========================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,766 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3876787 | miles |

VMT Distribution by Speed Bin (mph):

| | |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 1.06% |
| 25 mph | 0.78% |
| 30 mph | 2.91% |
| 35 mph | 10.44% |
| 40 mph | 6.31% |
| 45 mph | 11.94% |
| 50 mph | 17.09% |
| 55 mph | 15.24% |
| 60 mph | 20.33% |
| 65 mph | 13.90% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

==========================================================

Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 3,526.90 | - | 8,796.40 | 14,262.80 | 39,876.60 | 66,462.80 | 146.525 | 0.073 |
| PM10 | 3,740.90 | - | 35,189.60 | 40,750.50 | 265,835.20 | 345,516.20 | 761.733 | 0.381 |
| NOx | 185,466.10 | - | - | - | - | 185,466.10 | 408.883 | 0.204 |
| CO | 1,542,528.30 | - | - | - | - | 1,542,528.30 | 3,400.69 | 1.7 |
| HC | 25,469.50 | 61,108.70 | - | - | - | 86,578.20 | 190.872 | 0.095 |
| TOG | 27,982.10 | 65,333.00 | - | - | - | 93,315.20 | 205.725 | 0.103 |
| ROG | 19,376.90 | 65,333.00 | - | - | - | 84,709.90 | 186.753 | 0.093 |
| 1,3-Butadiene | 89.4 | 0 | - | - | - | 89.4 | 0.197 | < 0.001 |
| Acetaldehyde | 337.6 | - | - | - | - | 337.6 | 0.744 | < 0.001 |
| Acrolein | 9 | - | - | - | - | 9 | 0.02 | < 0.001 |
| Benzene | 927.4 | 942.9 | - | - | - | 1,870.30 | 4.123 | 0.002 |
| Diesel PM | 2,348.20 | - | - | - | - | 2,348.20 | 5.177 | 0.003 |
| Ethylbenzene | 289.7 | 610.4 | - | - | - | 900.1 | 1.984 | < 0.001 |
| Formaldehyde | 792 | - | - | - | - | 792 | 1.746 | < 0.001 |
| Naphthalene | 76.9 | 0 | - | - | - | 76.9 | 0.169 | < 0.001 |
| POM | 20.4 | - | - | - | - | 20.4 | 0.045 | < 0.001 |
| DEOG | 2,653.40 | - | - | - | - | 2,653.40 | 5.85 | 0.003 |
| CO2 | 966,891,544.10 | - | - | - | - | 966,891,544.10 | 2,131,630.83 | 1,065.82 |
| N2O | 39,711.90 | - | - | - | - | 39,711.90 | 87.55 | 0.044 |
| CH4 | 7,519.00 | - | - | - | - | 7,519.00 | 16.577 | 0.008 |
| BC | 403.4 | - | - | - | - | 403.4 | 0.889 | < 0.001 |
| HFC | - | 46.6 | - | - | - | 46.6 | 0.103 | < 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 966.892 | 966.892 |
| N2O | 0.04 | 11.834 |
| CH4 | 0.008 | 0.188 |
| BC | < 0.001 | 0.186 |
| HFC | < 0.001 | 0.067 |
| Total CO2e | - | 979.166 |

| | |
|---|---|
| File Name: | Yolo (SV) - 2049 - Alt6 OptionB YOL80.EM |
| CT-EMFAC2021 Version: | 1.0.2.0 |
| Run Date: | 8/26/2023 17:12 |
| Area: | Yolo (SV) |
| Analysis Year: | 2049 |
| Season: | Annual |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.02 | 0.256 | 0.279 |
| Truck 2 | 0.054 | 0.691 | 0.008 |
| Non-Truck | 0.926 | 0.004 | 0.9 |

=====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

=====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,369 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3678605 | miles |

VMT Distribution by Speed Bin (mph):

| | |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 9.25% |
| 20 mph | 0.77% |
| 25 mph | 9.56% |
| 30 mph | 0.39% |
| 35 mph | 9.47% |
| 40 mph | 1.61% |
| 45 mph | 8.76% |
| 50 mph | 12.27% |
| 55 mph | 18.07% |
| 60 mph | 22.95% |
| 65 mph | 6.90% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

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Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 3,564.80 | - | 8,346.80 | 14,444.00 | 37,838.10 | 64,193.70 | 141.523 | 0.071 |
| PM10 | 3,792.00 | - | 33,390.70 | 41,268.30 | 252,245.60 | 330,696.60 | 729.061 | 0.365 |
| NOx | 225,202.40 | - | - | - | - | 225,202.40 | 496.486 | 0.248 |
| CO | 1,611,486.60 | - | - | - | - | 1,611,486.60 | 3,552.72 | 1.776 |
| HC | 30,787.80 | 75,874.90 | - | - | - | 106,662.70 | 235.151 | 0.118 |
| TOG | 33,812.80 | 81,120.00 | - | - | - | 114,932.80 | 253.383 | 0.127 |
| ROG | 23,417.20 | 81,120.00 | - | - | - | 104,537.20 | 230.465 | 0.115 |
| 1,3-Butadiene | 108.1 | 0 | - | - | - | 108.1 | 0.238 | < 0.001 |
| Acetaldehyde | 403.2 | - | - | - | - | 403.2 | 0.889 | < 0.001 |
| Acrolein | 10.8 | - | - | - | - | 10.8 | 0.024 | < 0.001 |
| Benzene | 1,118.90 | 1,170.80 | - | - | - | 2,289.70 | 5.048 | 0.003 |
| Diesel PM | 2,101.80 | - | - | - | - | 2,101.80 | 4.634 | 0.002 |
| Ethylbenzene | 349.9 | 757.9 | - | - | - | 1,107.80 | 2.442 | 0.001 |
| Formaldehyde | 947.1 | - | - | - | - | 947.1 | 2.088 | 0.001 |
| Naphthalene | 92.8 | 0 | - | - | - | 92.8 | 0.205 | < 0.001 |
| POM | 24.5 | - | - | - | - | 24.5 | 0.054 | < 0.001 |
| DEOG | 3,102.10 | - | - | - | - | 3,102.10 | 6.839 | 0.003 |
| CO2 | 984,105,235.10 | - | - | - | - | 984,105,235.10 | 2,169,580.52 | 1,084.79 |
| N2O | 39,637.00 | - | - | - | - | 39,637.00 | 87.385 | 0.044 |
| CH4 | 8,790.80 | - | - | - | - | 8,790.80 | 19.38 | 0.01 |
| BC | 477.9 | - | - | - | - | 477.9 | 1.054 | < 0.001 |
| HFC | - | 57.9 | - | - | - | 57.9 | 0.128 | < 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 984.105 | 984.105 |
| N2O | 0.04 | 11.812 |
| CH4 | 0.009 | 0.22 |
| BC | < 0.001 | 0.22 |
| HFC | < 0.001 | 0.083 |
| Total CO2e | - | 996.439 |

| | |
|---|---|
| File Name: | Yolo (SV) - 2049 - Alt7 OptionB YOL80.EM |
| CT-EMFAC2021 Version: | 1.0.2.0 |
| Run Date: | 8/26/2023 17:14 |
| Area: | Yolo (SV) |
| Analysis Year: | 2049 |
| Season: | Annual |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.02 | 0.256 | 0.279 |
| Truck 2 | 0.054 | 0.691 | 0.008 |
| Non-Truck | 0.926 | 0.004 | 0.9 |

=====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

=====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,253 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3620698 | miles |

VMT Distribution by Speed Bin (mph):

| Speed Bin | VMT Distribution |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.82% |
| 15 mph | 6.80% |
| 20 mph | 3.99% |
| 25 mph | 1.87% |
| 30 mph | 2.91% |
| 35 mph | 0.37% |
| 40 mph | 7.72% |
| 45 mph | 3.91% |
| 50 mph | 11.16% |
| 55 mph | 16.65% |
| 60 mph | 31.88% |
| 65 mph | 11.92% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

=====================================================================================================================================

Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 3,726.10 | - | 8,215.40 | 12,772.70 | 37,242.50 | 61,956.70 | 136.591 | 0.068 |
| PM10 | 3,957.50 | - | 32,865.10 | 36,493.00 | 248,274.90 | 321,590.40 | 708.985 | 0.354 |
| NOx | 213,321.90 | - | - | - | - | 213,321.90 | 470.294 | 0.235 |
| CO | 1,506,448.20 | - | - | - | - | 1,506,448.20 | 3,321.15 | 1.661 |
| HC | 29,355.60 | 69,517.90 | - | - | - | 98,873.50 | 217.979 | 0.109 |
| TOG | 32,237.50 | 74,323.60 | - | - | - | 106,561.10 | 234.927 | 0.117 |
| ROG | 22,366.00 | 74,323.60 | - | - | - | 96,689.60 | 213.164 | 0.107 |
| 1,3-Butadiene | 103.4 | 0 | - | - | - | 103.4 | 0.228 | < 0.001 |
| Acetaldehyde | 379.4 | - | - | - | - | 379.4 | 0.837 | < 0.001 |
| Acrolein | 10.3 | - | - | - | - | 10.3 | 0.023 | < 0.001 |
| Benzene | 1,068.80 | 1,072.70 | - | - | - | 2,141.50 | 4.721 | 0.002 |
| Diesel PM | 2,341.50 | - | - | - | - | 2,341.50 | 5.162 | 0.003 |
| Ethylbenzene | 334.1 | 694.4 | - | - | - | 1,028.50 | 2.267 | 0.001 |
| Formaldehyde | 893.9 | - | - | - | - | 893.9 | 1.971 | < 0.001 |
| Naphthalene | 88.8 | 0 | - | - | - | 88.8 | 0.196 | < 0.001 |
| POM | 23.2 | - | - | - | - | 23.2 | 0.051 | < 0.001 |
| DEOG | 2,959.60 | - | - | - | - | 2,959.60 | 6.525 | 0.003 |
| CO2 | 969,246,637.40 | - | - | - | - | 969,246,637.40 | 2,136,822.92 | 1,068.41 |
| N2O | 38,865.00 | - | - | - | - | 38,865.00 | 85.683 | 0.043 |
| CH4 | 8,358.80 | - | - | - | - | 8,358.80 | 18.428 | 0.009 |
| BC | 456.4 | - | - | - | - | 456.4 | 1.006 | < 0.001 |
| HFC | - | 53 | - | - | - | 53 | 0.117 | < 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 969.247 | 969.247 |
| N2O | 0.039 | 11.582 |
| CH4 | 0.008 | 0.209 |
| BC | < 0.001 | 0.21 |
| HFC | < 0.001 | 0.076 |
| Total CO2e | - | 981.323 |

| | |
|---|---|
| File Name: | Yolo (SV) - 2029 - Alt1 OptionB YOL80I.EM |
| CT-EMFAC2021 Version: | 1.0.2.0 |
| Run Date: | 8/26/2023 16:38 |
| Area: | Yolo (SV) |
| Analysis Year: | 2029 |
| Season: | Annual |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.03 | 0.494 | 0.467 |
| Truck 2 | 0.044 | 0.918 | 0.02 |
| Non-Truck | 0.926 | 0.007 | 0.929 |

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| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 6,569 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3279245 | miles |

VMT Distribution by Speed Bin (mph):

| | |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 0.70% |
| 25 mph | 7.20% |
| 30 mph | 0.00% |
| 35 mph | 2.00% |
| 40 mph | 1.20% |
| 45 mph | 17.30% |
| 50 mph | 16.80% |
| 55 mph | 15.10% |
| 60 mph | 28.80% |
| 65 mph | 10.90% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

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Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 5,675.50 | - | 7,329.10 | 12,458.90 | 32,369.40 | 57,833.00 | 127.5 | 0.064 |
| PM10 | 6,037.10 | - | 29,309.90 | 35,595.00 | 215,790.70 | 286,732.70 | 632.137 | 0.316 |
| NOx | 327,637.20 | - | - | - | - | 327,637.20 | 722.316 | 0.361 |
| CO | 2,013,745.60 | - | - | - | - | 2,013,745.60 | 4,439.55 | 2.22 |
| HC | 65,662.10 | 74,132.10 | - | - | - | 139,794.10 | 308.193 | 0.154 |
| TOG | 70,872.50 | 79,256.80 | - | - | - | 150,129.30 | 330.978 | 0.165 |
| ROG | 37,037.00 | 79,256.80 | - | - | - | 116,293.80 | 256.384 | 0.128 |
| 1,3-Butadiene | 163.1 | 0 | - | - | - | 163.1 | 0.36 | < 0.001 |
| Acetaldehyde | 824 | - | - | - | - | 824 | 1.817 | < 0.001 |
| Acrolein | 16.5 | - | - | - | - | 16.5 | 0.036 | < 0.001 |
| Benzene | 1,683.40 | 1,143.90 | - | - | - | 2,827.30 | 6.233 | 0.003 |
| Diesel PM | 3,320.40 | - | - | - | - | 3,320.40 | 7.32 | 0.004 |
| Ethylbenzene | 517.4 | 740.4 | - | - | - | 1,257.80 | 2.773 | 0.001 |
| Formaldehyde | 1,853.00 | - | - | - | - | 1,853.00 | 4.085 | 0.002 |
| Naphthalene | 152 | 0 | - | - | - | 152 | 0.335 | < 0.001 |
| POM | 45.2 | - | - | - | - | 45.2 | 0.1 | < 0.001 |
| DEOG | 7,305.50 | - | - | - | - | 7,305.50 | 16.106 | 0.008 |
| CO2 | 1,024,217,277.20 | - | - | - | - | 1,024,217,277.20 | 2,258,012.43 | 1,129.01 |
| N2O | 46,321.40 | - | - | - | - | 46,321.40 | 102.121 | 0.051 |
| CH4 | 30,488.10 | - | - | - | - | 30,488.10 | 67.215 | 0.034 |
| BC | 957.4 | - | - | - | - | 957.4 | 2.111 | 0.001 |
| HFC | - | 944.2 | - | - | - | 944.2 | 2.082 | 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 1,024.22 | 1,024.22 |
| N2O | 0.046 | 13.804 |
| CH4 | 0.03 | 0.762 |
| BC | < 0.001 | 0.44 |
| HFC | < 0.001 | 1.35 |
| Total CO2e | - | 1,040.57 |

| | |
|---|---|
| File Name: | Yolo (SV) - 2029 - Alt2 OptionB YOL80I.EM |
| CT-EMFAC2021 Version: | 1.0.2.0 |
| Run Date: | 8/26/2023 16:41 |
| Area: | Yolo (SV) |
| Analysis Year: | 2029 |
| Season: | Annual |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.03 | 0.494 | 0.467 |
| Truck 2 | 0.044 | 0.918 | 0.02 |
| Non-Truck | 0.926 | 0.007 | 0.929 |

=====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

=====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,241 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3614707 | miles |

VMT Distribution by Speed Bin (mph):

| | |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 0.74% |
| 25 mph | 0.00% |
| 30 mph | 6.46% |
| 35 mph | 0.66% |
| 40 mph | 2.30% |
| 45 mph | 4.39% |
| 50 mph | 17.19% |
| 55 mph | 17.61% |
| 60 mph | 24.89% |
| 65 mph | 25.76% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

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Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 6,497.60 | - | 8,078.90 | 12,555.90 | 35,680.80 | 62,813.10 | 138.479 | 0.069 |
| PM10 | 6,905.90 | - | 32,308.20 | 35,871.70 | 237,865.80 | 312,951.60 | 689.94 | 0.345 |
| NOx | 362,534.50 | - | - | - | - | 362,534.50 | 799.252 | 0.4 |
| CO | 2,140,754.10 | - | - | - | - | 2,140,754.10 | 4,719.56 | 2.36 |
| HC | 71,559.00 | 75,234.20 | - | - | - | 146,793.30 | 323.624 | 0.162 |
| TOG | 77,171.10 | 80,435.10 | - | - | - | 157,606.20 | 347.462 | 0.174 |
| ROG | 40,315.50 | 80,435.10 | - | - | - | 120,750.60 | 266.209 | 0.133 |
| 1,3-Butadiene | 178.2 | 0 | - | - | - | 178.2 | 0.393 | < 0.001 |
| Acetaldehyde | 878 | - | - | - | - | 878 | 1.936 | < 0.001 |
| Acrolein | 18.9 | - | - | - | - | 18.9 | 0.042 | < 0.001 |
| Benzene | 1,835.30 | 1,160.90 | - | - | - | 2,996.20 | 6.605 | 0.003 |
| Diesel PM | 3,919.70 | - | - | - | - | 3,919.70 | 8.642 | 0.004 |
| Ethylbenzene | 565.3 | 751.4 | - | - | - | 1,316.70 | 2.903 | 0.001 |
| Formaldehyde | 1,980.70 | - | - | - | - | 1,980.70 | 4.367 | 0.002 |
| Naphthalene | 166.4 | 0 | - | - | - | 166.4 | 0.367 | < 0.001 |
| POM | 49 | - | - | - | - | 49 | 0.108 | < 0.001 |
| DEOG | 7,723.60 | - | - | - | - | 7,723.60 | 17.028 | 0.009 |
| CO2 | 1,136,101,836.80 | - | - | - | - | 1,136,101,836.80 | 2,504,675.64 | 1,252.34 |
| N2O | 51,155.50 | - | - | - | - | 51,155.50 | 112.778 | 0.056 |
| CH4 | 33,253.70 | - | - | - | - | 33,253.70 | 73.312 | 0.037 |
| BC | 1,038.00 | - | - | - | - | 1,038.00 | 2.288 | 0.001 |
| HFC | - | 958.2 | - | - | - | 958.2 | 2.113 | 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 1,136.10 | 1,136.10 |
| N2O | 0.051 | 15.244 |
| CH4 | 0.033 | 0.831 |
| BC | 0.001 | 0.477 |
| HFC | < 0.001 | 1.37 |
| Total CO2e | - | 1,154.03 |

| | | | |
|---|---|---|---|
| File Name: | Yolo (SV) - 2029 - Alt3 OptionB YOL80.EM | | |
| CT-EMFAC2021 Version: | 1.0.2.0 | | |
| Run Date: | 8/26/2023 16:43 | | |
| Area: | Yolo (SV) | | |
| Analysis Year: | 2029 | | |
| Season: | Annual | | |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.03 | 0.494 | 0.467 |
| Truck 2 | 0.044 | 0.918 | 0.02 |
| Non-Truck | 0.926 | 0.007 | 0.929 |

=====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

=====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,242 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3615206 | miles |

VMT Distribution by Speed Bin (mph):

| | |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 0.73% |
| 25 mph | 0.29% |
| 30 mph | 1.00% |
| 35 mph | 1.08% |
| 40 mph | 5.85% |
| 45 mph | 4.73% |
| 50 mph | 10.02% |
| 55 mph | 25.00% |
| 60 mph | 33.30% |
| 65 mph | 18.00% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

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Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 6,394.20 | - | 8,080.00 | 12,252.30 | 35,685.70 | 62,412.30 | 137.595 | 0.069 |
| PM10 | 6,794.60 | - | 32,312.70 | 35,004.20 | 237,898.70 | 312,010.20 | 687.865 | 0.344 |
| NOx | 353,552.20 | - | - | - | - | 353,552.20 | 779.449 | 0.39 |
| CO | 2,112,957.80 | - | - | - | - | 2,112,957.80 | 4,658.27 | 2.329 |
| HC | 70,101.60 | 73,040.30 | - | - | - | 143,141.90 | 315.574 | 0.158 |
| TOG | 75,546.30 | 78,089.50 | - | - | - | 153,635.80 | 338.709 | 0.169 |
| ROG | 39,207.50 | 78,089.50 | - | - | - | 117,297.00 | 258.596 | 0.129 |
| 1,3-Butadiene | 173.3 | 0 | - | - | - | 173.3 | 0.382 | < 0.001 |
| Acetaldehyde | 852.1 | - | - | - | - | 852.1 | 1.879 | < 0.001 |
| Acrolein | 18.5 | - | - | - | - | 18.5 | 0.041 | < 0.001 |
| Benzene | 1,786.10 | 1,127.00 | - | - | - | 2,913.10 | 6.422 | 0.003 |
| Diesel PM | 3,898.60 | - | - | - | - | 3,898.60 | 8.595 | 0.004 |
| Ethylbenzene | 550.4 | 729.5 | - | - | - | 1,280.00 | 2.822 | 0.001 |
| Formaldehyde | 1,922.30 | - | - | - | - | 1,922.30 | 4.238 | 0.002 |
| Naphthalene | 162.3 | 0 | - | - | - | 162.3 | 0.358 | < 0.001 |
| POM | 47.6 | - | - | - | - | 47.6 | 0.105 | < 0.001 |
| DEOG | 7,474.60 | - | - | - | - | 7,474.60 | 16.479 | 0.008 |
| CO2 | 1,130,284,513.90 | - | - | - | - | 1,130,284,513.90 | 2,491,850.64 | 1,245.93 |
| N2O | 50,729.10 | - | - | - | - | 50,729.10 | 111.839 | 0.056 |
| CH4 | 32,873.20 | - | - | - | - | 32,873.20 | 72.473 | 0.036 |
| BC | 1,011.10 | - | - | - | - | 1,011.10 | 2.229 | 0.001 |
| HFC | - | 930.3 | - | - | - | 930.3 | 2.051 | 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 1,130.29 | 1,130.29 |
| N2O | 0.051 | 15.117 |
| CH4 | 0.033 | 0.822 |
| BC | 0.001 | 0.465 |
| HFC | < 0.001 | 1.33 |
| Total CO2e | - | 1,148.02 |

| | | | |
|---|---|---|---|
| File Name: | Yolo (SV) - 2029 - Alt4 OptionB YOL80.EM | | |
| CT-EMFAC2021 Version: | 1.0.2.0 | | |
| Run Date: | 8/26/2023 16:46 | | |
| Area: | Yolo (SV) | | |
| Analysis Year: | 2029 | | |
| Season: | Annual | | |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.03 | 0.494 | 0.467 |
| Truck 2 | 0.044 | 0.918 | 0.02 |
| Non-Truck | 0.926 | 0.007 | 0.929 |

====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,165 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3576768 | miles |

VMT Distribution by Speed Bin (mph):

| | |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 1.01% |
| 25 mph | 0.00% |
| 30 mph | 0.67% |
| 35 mph | 1.15% |
| 40 mph | 1.54% |
| 45 mph | 5.49% |
| 50 mph | 16.86% |
| 55 mph | 25.37% |
| 60 mph | 34.32% |
| 65 mph | 13.59% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

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Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 6,239.20 | - | 7,994.10 | 11,940.70 | 35,306.30 | 61,480.30 | 135.541 | 0.068 |
| PM10 | 6,629.90 | - | 31,969.10 | 34,114.00 | 235,369.20 | 308,082.30 | 679.205 | 0.34 |
| NOx | 344,717.90 | - | - | - | - | 344,717.90 | 759.973 | 0.38 |
| CO | 2,086,514.30 | - | - | - | - | 2,086,514.30 | 4,599.98 | 2.3 |
| HC | 68,729.30 | 72,057.20 | - | - | - | 140,786.50 | 310.381 | 0.155 |
| TOG | 74,047.90 | 77,038.50 | - | - | - | 151,086.40 | 333.088 | 0.167 |
| ROG | 38,298.30 | 77,038.50 | - | - | - | 115,336.80 | 254.274 | 0.127 |
| 1,3-Butadiene | 169.4 | 0 | - | - | - | 169.4 | 0.373 | < 0.001 |
| Acetaldehyde | 833.2 | - | - | - | - | 833.2 | 1.837 | < 0.001 |
| Acrolein | 17.8 | - | - | - | - | 17.8 | 0.039 | < 0.001 |
| Benzene | 1,745.30 | 1,111.90 | - | - | - | 2,857.20 | 6.299 | 0.003 |
| Diesel PM | 3,807.50 | - | - | - | - | 3,807.50 | 8.394 | 0.004 |
| Ethylbenzene | 537.9 | 719.7 | - | - | - | 1,257.60 | 2.772 | 0.001 |
| Formaldehyde | 1,879.40 | - | - | - | - | 1,879.40 | 4.143 | 0.002 |
| Naphthalene | 158.8 | 0 | - | - | - | 158.8 | 0.35 | < 0.001 |
| POM | 46.5 | - | - | - | - | 46.5 | 0.103 | < 0.001 |
| DEOG | 7,301.80 | - | - | - | - | 7,301.80 | 16.098 | 0.008 |
| CO2 | 1,114,569,739.50 | - | - | - | - | 1,114,569,739.50 | 2,457,205.50 | 1,228.60 |
| N2O | 49,921.40 | - | - | - | - | 49,921.40 | 110.058 | 0.055 |
| CH4 | 32,375.90 | - | - | - | - | 32,375.90 | 71.377 | 0.036 |
| BC | 988.4 | - | - | - | - | 988.4 | 2.179 | 0.001 |
| HFC | - | 917.8 | - | - | - | 917.8 | 2.023 | 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 1,114.57 | 1,114.57 |
| N2O | 0.05 | 14.877 |
| CH4 | 0.032 | 0.809 |
| BC | < 0.001 | 0.455 |
| HFC | < 0.001 | 1.312 |
| Total CO2e | - | 1,132.02 |

| | |
|---|---|
| File Name: | Yolo (SV) - 2029 - Alt5 OptionB YOL80.EM |
| CT-EMFAC2021 Version: | 1.0.2.0 |
| Run Date: | 8/26/2023 16:49 |
| Area: | Yolo (SV) |
| Analysis Year: | 2029 |
| Season: | Annual |

=====================================================================

| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.03 | 0.494 | 0.467 |
| Truck 2 | 0.044 | 0.918 | 0.02 |
| Non-Truck | 0.926 | 0.007 | 0.929 |

=====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

=====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 7,082 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3535334 | miles |

VMT Distribution by Speed Bin (mph):

| Speed Bin | VMT Distribution |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 1.05% |
| 25 mph | 0.00% |
| 30 mph | 0.69% |
| 35 mph | 1.42% |
| 40 mph | 2.32% |
| 45 mph | 9.12% |
| 50 mph | 12.61% |
| 55 mph | 25.99% |
| 60 mph | 33.77% |
| 65 mph | 13.03% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

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Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 6,143.30 | - | 7,901.50 | 12,056.40 | 34,897.30 | 60,998.50 | 134.479 | 0.067 |
| PM10 | 6,528.80 | - | 31,598.80 | 34,444.30 | 232,642.70 | 305,214.60 | 672.883 | 0.336 |
| NOx | 341,247.40 | - | - | - | - | 341,247.40 | 752.322 | 0.376 |
| CO | 2,073,282.00 | - | - | - | - | 2,073,282.00 | 4,570.80 | 2.285 |
| HC | 68,079.60 | 72,006.00 | - | - | - | 140,085.60 | 308.836 | 0.154 |
| TOG | 73,360.10 | 76,983.70 | - | - | - | 150,343.80 | 331.451 | 0.166 |
| ROG | 37,958.20 | 76,983.70 | - | - | - | 114,941.90 | 253.403 | 0.127 |
| 1,3-Butadiene | 167.7 | 0 | - | - | - | 167.7 | 0.37 | < 0.001 |
| Acetaldehyde | 828.5 | - | - | - | - | 828.5 | 1.826 | < 0.001 |
| Acrolein | 17.6 | - | - | - | - | 17.6 | 0.039 | < 0.001 |
| Benzene | 1,729.00 | 1,111.10 | - | - | - | 2,840.10 | 6.261 | 0.003 |
| Diesel PM | 3,734.50 | - | - | - | - | 3,734.50 | 8.233 | 0.004 |
| Ethylbenzene | 532.6 | 719.2 | - | - | - | 1,251.80 | 2.76 | 0.001 |
| Formaldehyde | 1,867.80 | - | - | - | - | 1,867.80 | 4.118 | 0.002 |
| Naphthalene | 157.2 | 0 | - | - | - | 157.2 | 0.347 | < 0.001 |
| POM | 46.2 | - | - | - | - | 46.2 | 0.102 | < 0.001 |
| DEOG | 7,272.90 | - | - | - | - | 7,272.90 | 16.034 | 0.008 |
| CO2 | 1,100,222,809.50 | - | - | - | - | 1,100,222,809.50 | 2,425,575.93 | 1,212.79 |
| N2O | 49,364.20 | - | - | - | - | 49,364.20 | 108.83 | 0.054 |
| CH4 | 32,053.70 | - | - | - | - | 32,053.70 | 70.666 | 0.035 |
| BC | 980 | - | - | - | - | 980 | 2.16 | 0.001 |
| HFC | - | 917.1 | - | - | - | 917.1 | 2.022 | 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 1,100.22 | 1,100.22 |
| N2O | 0.049 | 14.711 |
| CH4 | 0.032 | 0.801 |
| BC | < 0.001 | 0.451 |
| HFC | < 0.001 | 1.311 |
| Total CO2e | - | 1,117.50 |

| | |
|---|---|
| File Name: | Yolo (SV) - 2029 - Alt6 OptionB YOL80.EM |
| CT-EMFAC2021 Version: | 1.0.2.0 |
| Run Date: | 8/26/2023 16:51 |
| Area: | Yolo (SV) |
| Analysis Year: | 2029 |
| Season: | Annual |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.03 | 0.494 | 0.467 |
| Truck 2 | 0.044 | 0.918 | 0.02 |
| Non-Truck | 0.926 | 0.007 | 0.929 |

====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 6,702 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3345638 | miles |

VMT Distribution by Speed Bin (mph):

| Speed Bin | VMT Distribution |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 0.00% |
| 20 mph | 1.16% |
| 25 mph | 6.77% |
| 30 mph | 0.28% |
| 35 mph | 3.33% |
| 40 mph | 13.69% |
| 45 mph | 3.19% |
| 50 mph | 17.13% |
| 55 mph | 16.65% |
| 60 mph | 27.38% |
| 65 mph | 10.42% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

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Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 5,801.50 | - | 7,477.50 | 13,286.50 | 33,024.80 | 59,590.30 | 131.374 | 0.066 |
| PM10 | 6,172.30 | - | 29,903.30 | 37,960.50 | 220,159.70 | 294,195.80 | 648.591 | 0.324 |
| NOx | 339,021.90 | - | - | - | - | 339,021.90 | 747.415 | 0.374 |
| CO | 2,083,389.20 | - | - | - | - | 2,083,389.20 | 4,593.09 | 2.297 |
| HC | 67,867.10 | 77,836.90 | - | - | - | 145,704.00 | 321.222 | 0.161 |
| TOG | 73,290.50 | 83,217.70 | - | - | - | 156,508.20 | 345.042 | 0.173 |
| ROG | 38,419.70 | 83,217.70 | - | - | - | 121,637.40 | 268.165 | 0.134 |
| 1,3-Butadiene | 169 | 0 | - | - | - | 169 | 0.373 | < 0.001 |
| Acetaldehyde | 859.7 | - | - | - | - | 859.7 | 1.895 | < 0.001 |
| Acrolein | 17.3 | - | - | - | - | 17.3 | 0.038 | < 0.001 |
| Benzene | 1,745.60 | 1,201.10 | - | - | - | 2,946.60 | 6.496 | 0.003 |
| Diesel PM | 3,357.70 | - | - | - | - | 3,357.70 | 7.402 | 0.004 |
| Ethylbenzene | 536.1 | 777.4 | - | - | - | 1,313.50 | 2.896 | 0.001 |
| Formaldehyde | 1,931.30 | - | - | - | - | 1,931.30 | 4.258 | 0.002 |
| Naphthalene | 157.6 | 0 | - | - | - | 157.6 | 0.347 | < 0.001 |
| POM | 46.8 | - | - | - | - | 46.8 | 0.103 | < 0.001 |
| DEOG | 7,648.00 | - | - | - | - | 7,648.00 | 16.861 | 0.008 |
| CO2 | 1,046,584,274.40 | - | - | - | - | 1,046,584,274.40 | 2,307,323.21 | 1,153.66 |
| N2O | 47,489.60 | - | - | - | - | 47,489.60 | 104.697 | 0.052 |
| CH4 | 31,377.10 | - | - | - | - | 31,377.10 | 69.175 | 0.035 |
| BC | 994.4 | - | - | - | - | 994.4 | 2.192 | 0.001 |
| HFC | - | 991.4 | - | - | - | 991.4 | 2.186 | 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 1,046.58 | 1,046.58 |
| N2O | 0.047 | 14.152 |
| CH4 | 0.031 | 0.784 |
| BC | < 0.001 | 0.457 |
| HFC | < 0.001 | 1.418 |
| Total CO2e | - | 1,063.40 |

| | |
|---|---|
| File Name: | Yolo (SV) - 2029 - Alt7 OptionB YOL80.EM |
| CT-EMFAC2021 Version: | 1.0.2.0 |
| Run Date: | 8/26/2023 16:53 |
| Area: | Yolo (SV) |
| Analysis Year: | 2029 |
| Season: | Annual |

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| Vehicle Category | VMT Fraction Across Category | Diesel VMT Fraction Within Category | Gas VMT Fraction Within Category |
|---|---|---|---|
| Truck 1 | 0.03 | 0.494 | 0.467 |
| Truck 2 | 0.044 | 0.918 | 0.02 |
| Non-Truck | 0.926 | 0.007 | 0.929 |

====================================================================

| | | | |
|---|---|---|---|
| Road Type: | Freeway | | |
| Silt Loading Factor: | CARB | 0.015 g/m2 | |
| Precipitation Correction: | None | P = NA | N = NA |

====================================================================

| | | |
|---|---|---|
| Road Length: | 20.8 | miles |
| Volume: | 6,524 | vehicles per hour |
| Number of Hours: | 24 | hours |
| VMT: | 3256781 | miles |

VMT Distribution by Speed Bin (mph):

| Speed Bin | VMT Distribution |
|---|---|
| <= 5 mph | 0.00% |
| 10 mph | 0.00% |
| 15 mph | 4.82% |
| 20 mph | 6.43% |
| 25 mph | 1.35% |
| 30 mph | 2.83% |
| 35 mph | 1.97% |
| 40 mph | 4.51% |
| 45 mph | 2.41% |
| 50 mph | 11.70% |
| 55 mph | 11.76% |
| 60 mph | 24.65% |
| 65 mph | 27.57% |
| 70 mph | 0.00% |
| 75 mph | 0.00% |

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Summary of Emissions

| Pollutant Name | Running Exhaust (grams) | Running Loss (grams) | Tire Wear (grams) | Brake Wear (grams) | Road Dust (grams) | Total (grams) | Total (pounds) | Total (US tons) |
|---|---|---|---|---|---|---|---|---|
| PM2.5 | 6,491.20 | - | 7,278.90 | 12,155.10 | 32,147.70 | 58,072.90 | 128.029 | 0.064 |
| PM10 | 6,909.40 | - | 29,109.10 | 34,727.10 | 214,312.50 | 285,058.00 | 628.445 | 0.314 |
| NOx | 368,813.10 | - | - | - | - | 368,813.10 | 813.094 | 0.407 |
| CO | 2,068,954.30 | - | - | - | - | 2,068,954.30 | 4,561.26 | 2.281 |
| HC | 73,932.30 | 84,326.70 | - | - | - | 158,259.10 | 348.901 | 0.174 |
| TOG | 80,007.20 | 90,156.20 | - | - | - | 170,163.40 | 375.146 | 0.188 |
| ROG | 43,380.60 | 90,156.20 | - | - | - | 133,536.80 | 294.398 | 0.147 |
| 1,3-Butadiene | 191.1 | 0 | - | - | - | 191.1 | 0.421 | < 0.001 |
| Acetaldehyde | 945.5 | - | - | - | - | 945.5 | 2.084 | 0.001 |
| Acrolein | 19.9 | - | - | - | - | 19.9 | 0.044 | < 0.001 |
| Benzene | 1,978.10 | 1,301.20 | - | - | - | 3,279.30 | 7.23 | 0.004 |
| Diesel PM | 3,658.60 | - | - | - | - | 3,658.60 | 8.066 | 0.004 |
| Ethylbenzene | 608.4 | 842.3 | - | - | - | 1,450.70 | 3.198 | 0.002 |
| Formaldehyde | 2,132.00 | - | - | - | - | 2,132.00 | 4.7 | 0.002 |
| Naphthalene | 177 | 0 | - | - | - | 177 | 0.39 | < 0.001 |
| POM | 52.6 | - | - | - | - | 52.6 | 0.116 | < 0.001 |
| DEOG | 8,340.40 | - | - | - | - | 8,340.40 | 18.387 | 0.009 |
| CO2 | 1,080,600,359.20 | - | - | - | - | 1,080,600,359.20 | 2,382,315.84 | 1,191.16 |
| N2O | 48,426.40 | - | - | - | - | 48,426.40 | 106.762 | 0.053 |
| CH4 | 32,411.30 | - | - | - | - | 32,411.30 | 71.455 | 0.036 |
| BC | 1,111.30 | - | - | - | - | 1,111.30 | 2.45 | 0.001 |
| HFC | - | 1,074.00 | - | - | - | 1,074.00 | 2.368 | 0.001 |

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Summary of GHG Emissions

| Pollutant Name | Emissions (metric tons) | CO2e (metric tons) |
|---|---|---|
| CO2 | 1,080.60 | 1,080.60 |
| N2O | 0.048 | 14.431 |
| CH4 | 0.032 | 0.81 |
| BC | 0.001 | 0.511 |
| HFC | 0.001 | 1.536 |
| Total CO2e | - | 1,097.89 |