Kimley»Horn

MEMORANDUM

To: Brianna Bohonok, Associate Principal, CirclePoint

From: Ace Malisos, Air Quality and Noise Manager, Kimley-Horn
Noemi Wyss AICP, Environmental Planner, Kimley-Horn
Kimley-Horn and Associates, Inc.

Date: March 30, 2023

Subject: Alameda County Rail Safety Enhancement Program – Air Quality Analysis
Alameda County ISMND

1.0 PURPOSE

The purpose of this memorandum is to identify the air quality emissions associated with construction and operations of eight at-grade rail crossings, located in the cities of San Leandro and Hayward in Alameda County and in unincorporated Alameda County, California. Crossings are existing and located from the central to southern portion of San Leandro to the southern portion of Hayward. This analysis has been undertaken to analyze whether the proposed project would result in any significant environmental impacts related to air quality.

2.0 PROPOSED PROJECT DESCRIPTION

The proposed project is located in the cities of San Leandro and Hayward in Alameda County and in unincorporated Alameda County, California. The project site consists of eight existing at-grade rail crossings. The crossings are along Union Pacific Railroad (UPRR) tracks where UPRR tracks intersect with local streets. Each of the crossings are listed in **Table 1** below, noting the jurisdiction and local street intersections. The Map ID number corresponds to crossing locations shown on **Figure 1**.

Table 1: Crossing Locations

Jurisdiction	Intersection	Map ID
San Leandro	Marina Boulevard (Coast Subdivision)	1
San Leandro	Washington Avenue	2
San Leandro	Hesperian Boulevard	3
Unincorporated Alameda County	Lewelling Boulevard	4
Hayward	Liedig Court – Trespass Location 1	5
Hayward	Tennyson High School Pedestrian Crossing (near Schafer Road)	6
Hayward	Tennyson Road	7
Hayward	Industrial Parkway	8
Source: Alameda CTC, 2021		

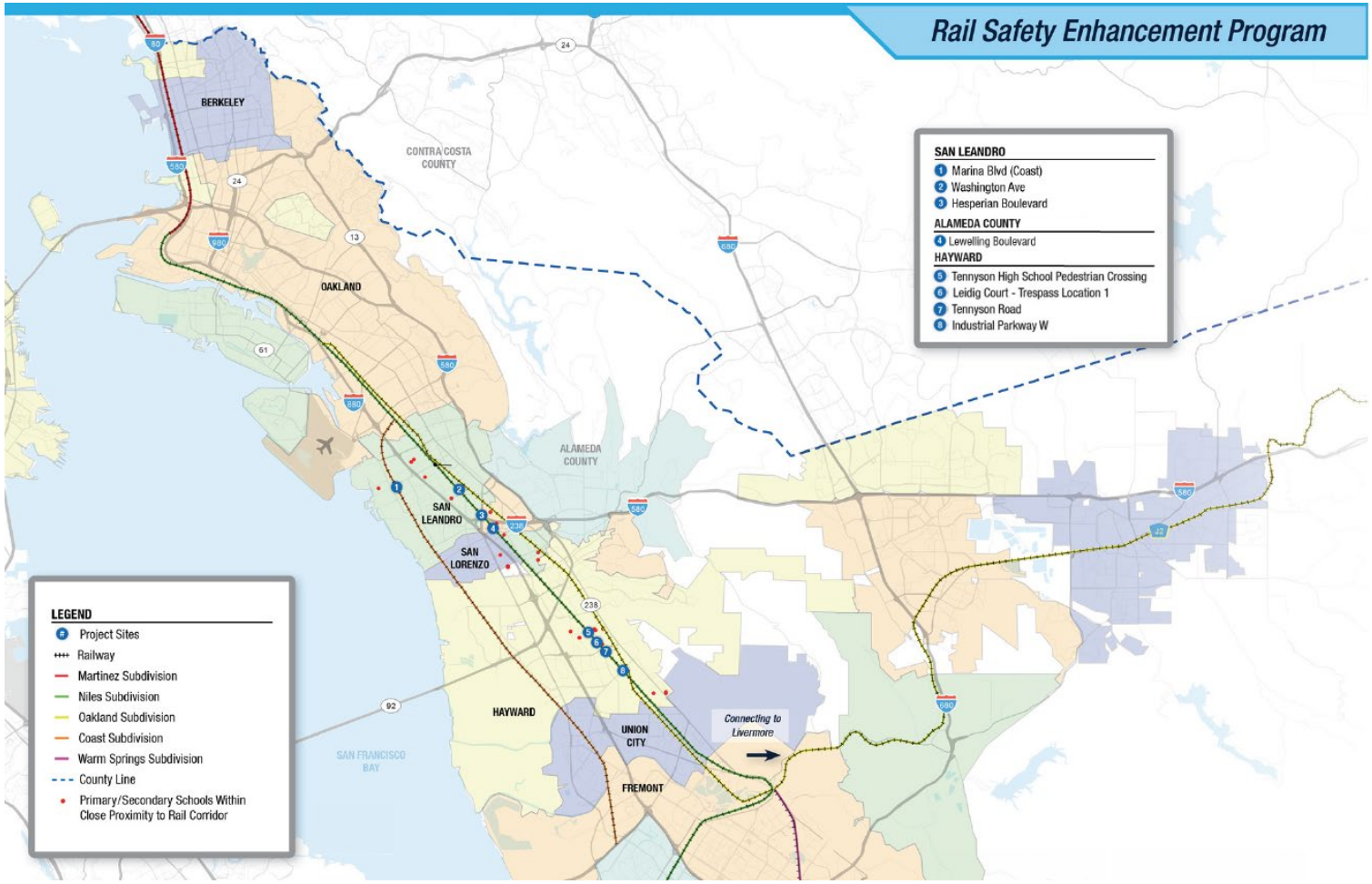

Figure 1: Project Site Map

The Hesperian Boulevard, Lewelling Boulevard, and Industrial Parkway crossings take place on major arterials while the rest of the crossing are located on smaller one- or two-lane streets. Each crossing location is largely paved and separated from adjacent land uses by walls or fencing. Each crossing generally includes a vehicular gate for each direction of travel, warning device, concrete crossing panels, and street lighting. The existing conditions at each crossing location are described in detail in **Table 2**.

Table 2: Existing Conditions

Intersection	Description	Map ID
Marina Boulevard (Coast Subdivision)	Marina Boulevard extends northeast-southwest through this crossing with two lanes of travel in either direction separated by striping. A continuous sidewalk is present along the north side of Marina Boulevard but the sidewalk on the south side does not extend through the rail crossing in the southwest direction. Vegetation is limited to landscaping associated with adjacent businesses on the north side of Marina Boulevard. A transmission tower for power lines is located approximately 50 feet east of the crossing. The UPRR corridor contains two parallel rail lines in this location.	1
Washington Avenue	Washington Avenue extends north-south through this crossing with two lanes of travel in either direction separated by a mix of concrete median and plastic pylons. The area between Washington Avenue and Chapman Road to the west is unpaved and contains several mature trees. Continuous sidewalks run along each side of Washington Avenue. The UPRR corridor contains a single rail line in this location.	2
Hesperian Boulevard	Hesperian Boulevard extends in a north-south direction through this crossing with three lanes of travel in either direction separated by a concrete median. Sidewalks extend along each side of Hesperian, allowing pedestrians to cross the tracks at-grade. Vegetation is limited to small-scale landscaping associated with adjacent businesses and homes. The UPRR corridor contains a single rail line in this location.	3
Lewelling Boulevard	Lewelling Boulevard extends east-west through this crossing with two lanes of travel in each direction separated by a landscaped median. San Lorenzo High School is located immediately to the north and a residential neighborhood abuts the crossing to the south. Continuous sidewalks extend along Lewelling Boulevard on each side. The UPRR corridor contains a single rail line in this location.	4
Liedig Court – Trespass Location 1	Liedig Court extends in a northeast direction through this crossing with one lane of travel in each direction. Cesar Chavez Middle School is located immediately east, and a residential neighborhood abuts the crossing the west. Continuous sidewalk extends along the western side of Liedig Court. The UPRR corridor contains a single rail line in this location.	5

Intersection	Description	Map ID
Tennyson High School Pedestrian Crossing (near Schafer Road)	The existing pedestrian crossing at Tennyson High School extends from the sidewalk northeast of Huntwood Avenue near Schafer Road, northeast across the UPRR tracks to the high school. Huntwood Avenue runs parallel to the UPRR tracks and contains one lane of travel in either direction with Class II bicycle lanes striped on both sides. The pedestrian crossing contains stairs and an ADA-accessible ramp along with signage and lighting to warn of trains crossing. Given that no automobile traffic crosses the UPRR tracks in this location, no vehicular gate or arm is present. Many mature trees associated with the high school are present on the northeast side of the UPRR tracks.	6
Tennyson Road	Tennyson Road extends in a northeast-southwest direction through this crossing with two lanes of travel in each direction separated by a vegetated median. Class II bicycle lanes are striped in both directions along Tennyson Road and sidewalk facilities allow pedestrians to cross the UPRR tracks at grade. Cesar Chavez Middle School is located immediately to the north of this intersection and a residential neighborhood is located immediately to the east behind a wall. The UPRR corridor contains a single rail line in this location.	7
Industrial Parkway	Industrial Parkway extends in a northeast-southwest direction through this crossing with three lanes of travel in either direction separated by a vegetated median. A drainage ditch runs parallel to Industrial Parkway along the southeastern side. A single-family residential neighborhood abuts the crossing to the west behind a wall. Sidewalks are present north and south of the UPRR tracks along the northwestern side of Industrial Parkway, but no pedestrian facilities extend across the tracks. The UPRR corridor contains a single rail line in this location.	8
Source: Circlepoint, 2021		

The project consists of rail safety improvements to existing at-grade rail crossings. The improvements are designed to increase safety for all motorists and pedestrians. This includes restricting access to UPRR tracks, improving signage, accessibility improvements, and other safety features. The proposed safety improvements at each crossing are listed in **Table 3**.

Table 3: Proposed Safety Improvements

Intersection	Description	Excavation/Grading	Map ID
Marina Boulevard (Coast Subdivision)	• Remove portions of existing pavement/concrete • Install new sidewalk, roadway striping/pavement marking, roadside signs, medians, security access gates/fencing (within UPRR ROW),	Minor excavation would be required to replace old pavement and sidewalks on the project site and create new medians.	1

Intersection	Description	Excavation/Grading	Map ID
	pavement, ADA detectable pavers, "No Trespassing" signs, k-rail, and new curb along tracks		
Washington Avenue	• Remove portions of existing pavement/concrete • Install new roadway striping/pavement marking, roadside signs, medians, sidewalk, security access gates/fencing, ADA detectable pavers, and "No Trespassing" signs	Minor excavation and grading would be required to remove pavement and conform new sidewalks to existing. This work would generally be contained within UPRR right-of-way at this crossing.	2
Hesperian Boulevard	• Remove portions of existing pavement/concrete and portion of existing driveway • Install new sidewalk, roadway striping/pavement marking, roadside signs, curb and gutter, security access gates/fencing, pavement, and ADA detectable pavers. • Construct new driveway access	Excavation and grading would be required for the removal and installation of new pavement on either side of Hesperian Boulevard. Removal of the existing driveway and construction of a gutter on the southeast corner of the crossing would require grading within City of San Leandro right-of-way.	3
Lewelling Boulevard	• Install new roadway striping/pavement marking, security access gates/fencing, "No Trespassing" signs, and new pedestrian path	None	4
Leidig Court – Trespass Location 1	• Install new sidewalk, roadway striping/pavement marking, security access gates/fencing, pavement, ADA detectable pavers, and "No Trespassing" signs	Excavation and grading would be required for the removal of existing sidewalk and installation/conformation of new sidewalk. All excavation and grading would be contained within UPRR right-of-way for this crossing.	5
Tennyson High School Pedestrian Crossing (near Schafer Road)	• Remove portions of existing pavement/concrete • Install new trespass-resistant landscaping, sidewalk, pavement, security access gates/fencing, "No	Excavation and grading would be required for the removal of existing sidewalk and installation/conformation of new sidewalk.	6

Intersection	Description	Excavation/Grading	Map ID
	Trespassing" signs, new culvert, and ADA detectable pavers • Construct pedestrian overcrossing	Conformation to the existing sidewalk along Huntwood Avenue would occur within City of Hayward right-of-way.	
Tennyson Road	• Remove portions of existing pavement/concrete • Install new sidewalk, roadway striping/pavement marking, security access gates/fencing, pavement, ADA detectable pavers, and "No Trespassing" signs.	Excavation and grading would be required for the removal of existing sidewalk and installation/conformation of new sidewalk. All excavation and grading would be contained within UPRR right-of-way for this crossing.	7
Industrial Parkway	• Remove portions of existing pavement/concrete • Installation of new sidewalk, roadway striping/pavement marking, security access gates/fencing, curbs, extension of existing culvert, new median, replacement/addition of pavement, ADA-detectable pavers, "No Trespassing" signs	Excavation and grading would be required for the removal of existing sidewalk and installation/conformation of new sidewalk. While most of this work would occur within UPRR right-of-way, conformation to existing sidewalk on the northwest side of Industrial Parkway would occur within City of Hayward right-of-way.	8
Source: Alameda CTC, 2021			

Construction of the project is anticipated to take approximately 12 months, beginning in the fourth quarter of 2023 and concluding in 2024. For the purposes of this analysis, construction is assumed to begin in an earlier year as a conservative approach. Assuming an earlier year is conservative because a later construction year start date would result in lower emissions due to equipment fleet turnover and emission control regulations. Construction would occur in one phase with distinct activities/sub-phases (i.e., demolition, grading, paving). Emissions for each construction activity have been quantified based upon the phase duration and equipment types. Construction at each crossing will generally include:

- Temporary closure of the crossing with an appropriate detour for vehicles and cyclists
- Removal of outdated or non-functioning crossing control equipment, fencing, signage, pavement, and other materials

- Installation of new fencing, crossing control equipment, signage, sidewalks and pavement, and other safety features

The following crossings have unique elements or requirements for their construction:

- Hesperian Boulevard: New driveway access along Springlake Drive
- Tennyson High School Pedestrian Crossing: New pedestrian overcrossing

3.0 THRESHOLDS AND SIGNIGICANCE CRITERIA

Under the California Environmental Quality Act (CEQA), the Bay Area Air Quality Management District (BAAQMD) is an expert commenting agency on air quality within its jurisdiction or impacting its jurisdiction. Under the Federal Clean Air Act (FCAA), the BAAQMD has adopted Federal attainment plans for O_3 and $PM_{2.5}$. The BAAQMD reviews projects to ensure that they would not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any air quality standard; or (3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any Federal attainment plan.

The BAAQMD Options and Justification Report (dated October 2009) establishes thresholds based on substantial evidence, and the thresholds are consistent with the thresholds outlined within the 2010/2011 BAAQMD CEQA Air Quality Guidelines (and current 2017 CEQA Air Quality Guidelines). The thresholds have been developed by the BAAQMD in order to attain State and Federal ambient air quality standards. Therefore, projects below these thresholds would not violate an air quality standard and would not contribute substantially to an existing or projected air quality violation.

The BAAQMD's CEQA Air Quality Guidelines provides significance thresholds for both construction and operation of projects. Ultimately the lead agency determines the thresholds of significance for impacts. However, if a project proposes development in excess of the established thresholds, as outlined in **Table 4**, a significant air quality impact may occur and additional analysis is warranted to fully assess the significance of impacts.

The project is located in the San Francisco Bay Area Air Basin (Basin) which includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties, the southern portion of Sonoma County, and the southwestern portion of Solano County.

Table 4: Bay Area Air Quality Management District Emissions Thresholds

Criteria Air Pollutants and Precursors (Regional)	Construction-Related	Operational-Related	
	Average Daily Emissions (pounds/day)	Average Daily Emission (pounds/day)	Annual Average Emission (tons/year)
Reactive Organic Gases (ROG)	54	54	10
Nitrogen Oxides (NO_X)	54	54	10
Coarse Particulates (PM_{10})	82 (exhaust)	82	15
Fine Particulates ($PM_{2.5}$)	54 (exhaust)	54	10
PM_{10} / $PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average) 20.0 ppm (1-hour average)	
Source: Bay Area Air Quality Management District, 2017 CEQA Air Quality Guidelines, 2017.			

4.0 IMPACT ANALYSIS

4.1 Construction

Project construction activities would generate short-term emissions of criteria air pollutants. The criteria pollutants of primary concern within the project area include ozone-precursor pollutants (i.e., reactive organic gases [ROG] and nitrogen oxides [NO_x]) and particulate matter 10 microns in size or less (PM_{10}) and particulate matter 2.5 microns in size or less ($PM_{2.5}$). Construction-generated emissions are short term and temporary, lasting only while construction activities occur, but would be considered a significant air quality impact if the volume of pollutants generated exceeds the BAAQMD's thresholds of significance.

Construction results in the temporary generation of emissions during demolition, site preparation, site grading, road paving, motor vehicle exhaust associated with construction equipment and worker trips, and the movement of construction equipment, especially on unpaved surfaces. Emissions of airborne particulate matter are largely dependent on the amount of ground disturbance associated with site preparation activities, as well as weather conditions and the appropriate application of water.

The duration of construction activities associated with the project are estimated to last approximately 12 months. The project's construction-related emissions were calculated using the BAAQMD-approved CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. Project site demolition is anticipated to begin in the fourth quarter of 2023. Grading would occur in the first quarter of 2024

and construction and paving would occur starting in the third quarter of 2024 and continue until project completion in the fourth quarter of 2024.

The exact construction timeline is unknown; however, to be conservative, the earliest feasible dates were utilized in the modeling. This approach is conservative given that emissions factors decrease in future years due to regulatory and technological improvements and fleet turnover. See Appendix A: Air Quality Data for additional information regarding the construction assumptions used in this analysis. **Table 5** displays the maximum daily emissions in pounds per day that are expected to be generated from the construction of the proposed project in comparison to the daily thresholds established by the BAAQMD.

As shown in **Table 5**, construction of the project would not cause exceedances for ROG, NO_x, $PM_{2.5}$, and PM_{10}. The calculated emission results for ROG, NO_x, $PM_{2.5}$, and PM_{10} from CalEEMod demonstrate that the construction of this project would not exceed maximum daily thresholds created by the BAAQMD. The proposed project emissions would not worsen ambient air quality, create additional violations of federal and state standards, or delay the Basin's goal for meeting attainment standards. Construction impacts would be less than significant.

Table 5: Construction-Related Emissions

Year	Pollutant (maximum pounds per day)[1]					
	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_x)	Exhaust		Fugitive Dust	
			Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)
2023	3.47	28.32	33.43	1.33	1.17	0.22
2024	4.50	37.57	52.26	2.65	3.07	3.85
BAAQMD Significance Threshold [2, 3]	54	54	82	54	BMPs	BMPs
Exceed BAAQMD Threshold?	**No**	**No**	**No**	**No**	**N/A**	**N/A**

1.Emissions were calculated using CalEEMod. Mitigated emissions include compliance with the BAAQMD's Basic Construction Mitigation Measures Recommended for All Projects. These measures include the following: water exposed surfaces two times daily; cover haul trucks; clean track outs with wet powered vacuum street sweepers; limit speeds on unpaved roads to 15 miles per hour; complete paving as soon as possible after grading; limit idle times to 5 minutes; properly maintain mobile and other construction equipment; and post a publicly visible sign with contact information to register dust complaints and take corrective action within 48 hours.

Emission quantities in this table are the sum of all emissions generated by the construction of all eight project locations throughout Alameda County for each year.

2.Bay Area Air Quality Management District, California Environmental Quality Act Air Quality Guidelines, updated May 2017.

Year	Pollutant (maximum pounds per day)[1]					
	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_x)	Exhaust		Fugitive Dust	
			Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)
3.BMPs = Best Management Practices. The BAAQMD recommends the implementation of all Basic Construction Mitigation Measures, whether or not construction-related emissions exceed applicable significance thresholds. Implementation of Basic Construction Mitigation measures are considered to mitigate fugitive dust emissions to be less than significant.						
Source: Refer to the CalEEMod outputs provided in Appendix A, *Air Quality Modeling Data*.						

4.2 Operations

During operation, the improved crossings would function similar to the existing conditions. Vehicular traffic and pedestrians would be able to use the crossings as they do under existing conditions, but with improved safety. Operation of the project would not change the frequency or speed of existing trains along UPRR tracks or effect the volume of vehicles using the crossings. Since no change in vehicle or train trips and no new vehicle trips are generated by the project there would be no impact to air quality as a result of project operation.

4.3 Cumulative Emissions

The Basin is designated nonattainment for O_3, PM_{10}, and $PM_{2.5}$ for State standards and nonattainment for O_3 and $PM_{2.5}$ for Federal standards. As discussed above, the project's construction-related and emissions would not have the potential to exceed the BAAQMD significance thresholds for criteria pollutants and the project's operational emissions would not change from those of the existing conditions.

Cumulative Construction Impacts. Since the BAAQMD's thresholds indicate whether an individual project's emissions have the potential to affect cumulative regional air quality, it can be expected that the project-related construction emissions would not be cumulatively considerable since they would not exceed the thresholds. The BAAQMD recommends Basic Construction Mitigation Measures for all projects whether or not construction-related emissions exceed the thresholds of significance. Compliance with BAAQMD construction-related mitigation requirements are considered to reduce cumulative impacts at a Basin-wide level. As a result, construction emissions associated with the project would not result in a cumulatively considerable contribution to significant cumulative air quality impacts.

Cumulative Operational Impacts. The BAAQMD has not established separate significance thresholds for cumulative operational emissions. The nature of air emissions is largely a cumulative impact. As a result, no single project is sufficient in size, by itself, to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. The BAAQMD developed the operational thresholds of significance based on the level above which a project's individual emissions would result in a cumulatively considerable

contribution to the Basin's existing air quality conditions. Since the project would not result in an increase in operational emissions compared to the existing conditions the project would not cause an increase in the cumulative operational emissions in the Basin.

As shown in **Table 5**, the project's construction emissions would not exceed BAAQMD thresholds. Project operational emissions would not exceed those generated by the existing crossings. As a result, air quality emissions associated with the project would not result in a cumulatively considerable contribution to significant cumulative air quality impacts.

5.0 References

1. Bay Area Air Quality Management District (BAAQMD), *Planning Healthy Places*, 2016.
2. Bay Area Air Quality Management District (BAAQMD), *2017 CEQA Air Quality Guidelines*, 2017.
3. Bay Area Air Quality Management District (BAAQMD), *Air Quality Standards and Attainment Status,* 2017.
4. Bay Area Air Quality Management District (BAAQMD), *Clean Air Plan*, 2017.
5. Bay Area Air Quality Management District (BAAQMD), *Current Rules*, 2017.
6. Bay Area Air Quality Management District (BAAQMD), *Final 2017 Clean Air Plan*, 2017.
7. California Air Pollution Control Officers Association (CAPCOA), *CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act*, 2008.
8. California Air Pollution Control Officers Association (CAPCOA). *CalEEMod User's Guide*. 2016.
9. California Air Pollution Control Officers Association (CAPCOA), *Health Effects*, 2018.
10. California Air Resources Board (CARB), *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, 2000.
11. California Air Resources Board (CARB), *Air Quality and Land Use Handbook: A Community Health Perspective*, 2005.
12. California Air Resources Board (CARB), *Current Air Quality Standards*, 2016.
13. United States Environmental Protection Agency (U.S. EPA), *Nonattainment Areas for Criteria Pollutants*, 2018.

Appendix A

Air Quality Modeling Data

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Alameda CTC Rail Crossings Improvements

Alameda County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	30.50	1000sqft	0.70	30,500.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2024
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Aniticipated schedule for construction

Off-road Equipment - Minimal equipment required for rail crossing improvement installation

Off-road Equipment - Minimal construction equipment required for demo.

Off-road Equipment - Minimal equipment required for grading

Off-road Equipment - Anticipated equipment for paving.

Demolition - 200 cy of pavement approximately 400 tons

Grading -

Construction Off-road Equipment Mitigation - BAAQMD basic control measures

Trips and VMT - anticipated trips

Table Name	Column Name	Default Value	New Value

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstDustMitigation	CleanPavedRoadPercentReduction	0	6
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	100.00	40.00
tblConstructionPhase	NumDays	10.00	88.00
tblConstructionPhase	NumDays	2.00	100.00
tblConstructionPhase	NumDays	5.00	36.00
tblConstructionPhase	PhaseEndDate	3/5/2024	8/14/2024
tblConstructionPhase	PhaseEndDate	10/13/2023	1/31/2024
tblConstructionPhase	PhaseEndDate	10/17/2023	6/19/2024
tblConstructionPhase	PhaseEndDate	3/12/2024	10/2/2024
tblConstructionPhase	PhaseStartDate	10/18/2023	6/20/2024
tblConstructionPhase	PhaseStartDate	10/14/2023	2/1/2024
tblConstructionPhase	PhaseStartDate	3/6/2024	8/14/2024
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	6.00	1.00
tblOffRoadEquipment	UsageHours	7.00	6.00
tblTripsAndVMT	WorkerTripNumber	10.00	8.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	0.4342	3.5406	4.1792	7.9500e-003	0.1463	0.1691	0.3154	0.0278	0.1659	0.1937	0.0000	761.9844	761.9844	0.0642	5.4900e-003	765.2245
2024	0.9490	7.8861	11.9508	0.0206	1.2825	0.3500	1.5844	0.4813	0.3317	0.7679	0.0000	1,985.6124	1,985.6124	0.3885	0.0195	2,001.1261
Maximum	**0.9490**	**7.8861**	**11.9508**	**0.0206**	**1.2825**	**0.3500**	**1.5844**	**0.4813**	**0.3317**	**0.7679**	**0.0000**	**1,985.6124**	**1,985.6124**	**0.3885**	**0.0195**	**2,001.1261**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	0.4342	3.5406	4.1792	7.9500e-003	0.0881	0.1691	0.2572	0.0188	0.1659	0.1846	0.0000	761.9844	761.9844	0.0642	5.4900e-003	765.2245
2024	0.9490	7.8861	11.9508	0.0206	0.5824	0.3500	0.8844	0.2149	0.3317	0.5015	0.0000	1,985.6124	1,985.6124	0.3885	0.0195	2,001.1261
Maximum	**0.9490**	**7.8861**	**11.9508**	**0.0206**	**0.5824**	**0.3500**	**0.8844**	**0.2149**	**0.3317**	**0.5015**	**0.0000**	**1,985.6124**	**1,985.6124**	**0.3885**	**0.0195**	**2,001.1261**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**53.07**	**0.00**	**39.91**	**54.10**	**0.00**	**28.65**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

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Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0146	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0146**	**3.0000e-005**	**3.1100e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**		**6.6800e-003**	**6.6800e-003**	**2.0000e-005**	**0.0000**	**7.1100e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0146	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0146**	**3.0000e-005**	**3.1100e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**		**6.6800e-003**	**6.6800e-003**	**2.0000e-005**	**0.0000**	**7.1100e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/2/2023	1/31/2024	5	88	
2	Grading	Grading	2/1/2024	6/19/2024	5	100	
3	Building Construction	Building Construction	6/20/2024	8/14/2024	5	40	
4	Paving	Paving	8/14/2024	10/2/2024	5	36	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 43.75

Acres of Paving: 0.7

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	0	4.00	231	0.29
Building Construction	Forklifts	0	6.00	89	0.20
Building Construction	Skid Steer Loaders	1	8.00	65	0.37
Building Construction	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Cement and Mortar Mixers	1	6.00	9	0.56

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	6.00	187	0.41

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	2	5.00	0.00	40.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	2	13.00	5.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0973	0.0000	0.0973	0.0147	0.0000	0.0147			0.0000			0.0000
Off-Road	0.4193	3.4751	4.0457	7.3200e-003		0.1684	0.1684		0.1652	0.1652		696.0408	696.0408	0.0626		697.6066

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.4193**	**3.4751**	**4.0457**	**7.3200e-003**	**0.0973**	**0.1684**	**0.2657**	**0.0147**	**0.1652**	**0.1799**		**696.0408**	**696.0408**	**0.0626**		**697.6066**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.6000e-004	0.0575	0.0135	2.7000e-004	7.9600e-003	5.1000e-004	8.4700e-003	2.1800e-003	4.9000e-004	2.6700e-003		29.1825	29.1825	6.2000e-004	4.6100e-003	30.5720
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0139	7.9100e-003	0.1201	3.6000e-004	0.0411	2.1000e-004	0.0413	0.0109	1.9000e-004	0.0111		36.7611	36.7611	9.4000e-004	8.8000e-004	37.0459
Total	**0.0149**	**0.0654**	**0.1336**	**6.3000e-004**	**0.0490**	**7.2000e-004**	**0.0498**	**0.0131**	**6.8000e-004**	**0.0138**		**65.9436**	**65.9436**	**1.5600e-003**	**5.4900e-003**	**67.6179**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0416	0.0000	0.0416	6.3000e-003	0.0000	6.3000e-003			0.0000			0.0000
Off-Road	0.4193	3.4751	4.0457	7.3200e-003		0.1684	0.1684		0.1652	0.1652	0.0000	696.0408	696.0408	0.0626		697.6066
Total	**0.4193**	**3.4751**	**4.0457**	**7.3200e-003**	**0.0416**	**0.1684**	**0.2100**	**6.3000e-003**	**0.1652**	**0.1715**	**0.0000**	**696.0408**	**696.0408**	**0.0626**		**697.6066**

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.6000e-004	0.0575	0.0135	2.7000e-004	7.6000e-003	5.1000e-004	8.1100e-003	2.0900e-003	4.9000e-004	2.5800e-003		29.1825	29.1825	6.2000e-004	4.6100e-003	30.5720
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0139	7.9100e-003	0.1201	3.6000e-004	0.0389	2.1000e-004	0.0391	0.0104	1.9000e-004	0.0106		36.7611	36.7611	9.4000e-004	8.8000e-004	37.0459
Total	**0.0149**	**0.0654**	**0.1336**	**6.3000e-004**	**0.0465**	**7.2000e-004**	**0.0473**	**0.0125**	**6.8000e-004**	**0.0131**		**65.9436**	**65.9436**	**1.5600e-003**	**5.4900e-003**	**67.6179**

3.2 Demolition - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0973	0.0000	0.0973	0.0147	0.0000	0.0147			0.0000			0.0000
Off-Road	0.3998	3.3052	4.0415	7.3200e-003		0.1507	0.1507		0.1475	0.1475		696.0373	696.0373	0.0616		697.5770
Total	**0.3998**	**3.3052**	**4.0415**	**7.3200e-003**	**0.0973**	**0.1507**	**0.2480**	**0.0147**	**0.1475**	**0.1622**		**696.0373**	**696.0373**	**0.0616**		**697.5770**

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Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.6000e-004	0.0578	0.0135	2.7000e-004	7.9600e-003	5.1000e-004	8.4800e-003	2.1800e-003	4.9000e-004	2.6700e-003		28.7548	28.7548	6.2000e-004	4.5400e-003	30.1244
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0130	7.0700e-003	0.1119	3.5000e-004	0.0411	2.0000e-004	0.0413	0.0109	1.8000e-004	0.0111		35.8490	35.8490	8.5000e-004	8.2000e-004	36.1140
Total	**0.0139**	**0.0649**	**0.1254**	**6.2000e-004**	**0.0490**	**7.1000e-004**	**0.0498**	**0.0131**	**6.7000e-004**	**0.0138**		**64.6038**	**64.6038**	**1.4700e-003**	**5.3600e-003**	**66.2384**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0416	0.0000	0.0416	6.3000e-003	0.0000	6.3000e-003			0.0000			0.0000
Off-Road	0.3998	3.3052	4.0415	7.3200e-003		0.1507	0.1507		0.1475	0.1475	0.0000	696.0373	696.0373	0.0616		697.5770
Total	**0.3998**	**3.3052**	**4.0415**	**7.3200e-003**	**0.0416**	**0.1507**	**0.1923**	**6.3000e-003**	**0.1475**	**0.1538**	**0.0000**	**696.0373**	**696.0373**	**0.0616**		**697.5770**

Mitigated Construction Off-Site

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.6000e-004	0.0578	0.0135	2.7000e-004	7.6000e-003	5.1000e-004	8.1200e-003	2.1000e-003	4.9000e-004	2.5900e-003		28.7548	28.7548	6.2000e-004	4.5400e-003	30.1244
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0130	7.0700e-003	0.1119	3.5000e-004	0.0389	2.0000e-004	0.0391	0.0104	1.8000e-004	0.0106		35.8490	35.8490	8.5000e-004	8.2000e-004	36.1140
Total	**0.0139**	**0.0649**	**0.1254**	**6.2000e-004**	**0.0465**	**7.1000e-004**	**0.0473**	**0.0125**	**6.7000e-004**	**0.0131**		**64.6038**	**64.6038**	**1.4700e-003**	**5.3600e-003**	**66.2384**

3.3 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.2167	0.0000	1.2167	0.4639	0.0000	0.4639			0.0000			0.0000
Off-Road	0.7736	7.5082	6.9605	0.0146		0.3016	0.3016		0.2863	0.2863		1,402.7429	1,402.7429	0.2902		1,409.9968
Total	**0.7736**	**7.5082**	**6.9605**	**0.0146**	**1.2167**	**0.3016**	**1.5183**	**0.4639**	**0.2863**	**0.7502**		**1,402.7429**	**1,402.7429**	**0.2902**		**1,409.9968**

Unmitigated Construction Off-Site

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0208	0.0113	0.1791	5.6000e-004	0.0657	3.1000e-004	0.0660	0.0174	2.9000e-004	0.0177		57.3585	57.3585	1.3700e-003	1.3100e-003	57.7824
Total	**0.0208**	**0.0113**	**0.1791**	**5.6000e-004**	**0.0657**	**3.1000e-004**	**0.0660**	**0.0174**	**2.9000e-004**	**0.0177**		**57.3585**	**57.3585**	**1.3700e-003**	**1.3100e-003**	**57.7824**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5202	0.0000	0.5202	0.1983	0.0000	0.1983			0.0000			0.0000
Off-Road	0.7736	7.5082	6.9605	0.0146		0.3016	0.3016		0.2863	0.2863	0.0000	1,402.7429	1,402.7429	0.2902		1,409.9968
Total	**0.7736**	**7.5082**	**6.9605**	**0.0146**	**0.5202**	**0.3016**	**0.8218**	**0.1983**	**0.2863**	**0.4846**	**0.0000**	**1,402.7429**	**1,402.7429**	**0.2902**		**1,409.9968**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0208	0.0113	0.1791	5.6000e-004	0.0623	3.1000e-004	0.0626	0.0166	2.9000e-004	0.0169	57.3585	57.3585	1.3700e-003	1.3100e-003	57.7824	
Total	**0.0208**	**0.0113**	**0.1791**	**5.6000e-004**	**0.0623**	**3.1000e-004**	**0.0626**	**0.0166**	**2.9000e-004**	**0.0169**	**57.3585**	**57.3585**	**1.3700e-003**	**1.3100e-003**	**57.7824**	

3.4 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3752	3.2407	5.0346	8.3300e-003		0.1371	0.1371		0.1350	0.1350		793.2319	793.2319	0.0930		795.5575
Total	**0.3752**	**3.2407**	**5.0346**	**8.3300e-003**		**0.1371**	**0.1371**		**0.1350**	**0.1350**		**793.2319**	**793.2319**	**0.0930**		**795.5575**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	5.0600e-003	0.2117	0.0639	9.8000e-004	0.0339	1.3300e-003	0.0352	9.7600e-003	1.2700e-003	0.0110		104.8974	104.8974	1.4600e-003	0.0157	109.6151
Worker	0.0337	0.0184	0.2910	9.0000e-004	0.1068	5.1000e-004	0.1073	0.0283	4.7000e-004	0.0288		93.2075	93.2075	2.2200e-003	2.1300e-003	93.8964
Total	**0.0388**	**0.2300**	**0.3549**	**1.8800e-003**	**0.1407**	**1.8400e-003**	**0.1425**	**0.0381**	**1.7400e-003**	**0.0398**		**198.1049**	**198.1049**	**3.6800e-003**	**0.0178**	**203.5115**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3752	3.2407	5.0346	8.3300e-003		0.1371	0.1371		0.1350	0.1350	0.0000	793.2319	793.2319	0.0930		795.5575
Total	**0.3752**	**3.2407**	**5.0346**	**8.3300e-003**		**0.1371**	**0.1371**		**0.1350**	**0.1350**	**0.0000**	**793.2319**	**793.2319**	**0.0930**		**795.5575**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0600e-003	0.2117	0.0639	9.8000e-004	0.0324	1.3300e-003	0.0338	9.4000e-003	1.2700e-003	0.0107		104.8974	104.8974	1.4600e-003	0.0157	109.6151
Worker	0.0337	0.0184	0.2910	9.0000e-004	0.1012	5.1000e-004	0.1017	0.0270	4.7000e-004	0.0274		93.2075	93.2075	2.2200e-003	2.1300e-003	93.8964

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.0388**	**0.2300**	**0.3549**	**1.8800e-003**	**0.1337**	**1.8400e-003**	**0.1355**	**0.0364**	**1.7400e-003**	**0.0381**		**198.1049**	**198.1049**	**3.6800e-003**	**0.0178**	**203.5115**

3.5 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4582	4.4013	6.3376	9.6700e-003		0.2107	0.2107		0.1947	0.1947		922.5775	922.5775	0.2901		929.8291
Paving	0.0509					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5091**	**4.4013**	**6.3376**	**9.6700e-003**		**0.2107**	**0.2107**		**0.1947**	**0.1947**		**922.5775**	**922.5775**	**0.2901**		**929.8291**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0260	0.0141	0.2238	7.0000e-004	0.0822	3.9000e-004	0.0825	0.0218	3.6000e-004	0.0222		71.6981	71.6981	1.7100e-003	1.6400e-003	72.2280
Total	**0.0260**	**0.0141**	**0.2238**	**7.0000e-004**	**0.0822**	**3.9000e-004**	**0.0825**	**0.0218**	**3.6000e-004**	**0.0222**		**71.6981**	**71.6981**	**1.7100e-003**	**1.6400e-003**	**72.2280**

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Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4582	4.4013	6.3376	9.6700e-003		0.2107	0.2107		0.1947	0.1947	0.0000	922.5775	922.5775	0.2901		929.8291
Paving	0.0509					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5091**	**4.4013**	**6.3376**	**9.6700e-003**		**0.2107**	**0.2107**		**0.1947**	**0.1947**	**0.0000**	**922.5775**	**922.5775**	**0.2901**		**929.8291**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0260	0.0141	0.2238	7.0000e-004	0.0779	3.9000e-004	0.0783	0.0207	3.6000e-004	0.0211		71.6981	71.6981	1.7100e-003	1.6400e-003	72.2280
Total	**0.0260**	**0.0141**	**0.2238**	**7.0000e-004**	**0.0779**	**3.9000e-004**	**0.0783**	**0.0207**	**3.6000e-004**	**0.0211**		**71.6981**	**71.6981**	**1.7100e-003**	**1.6400e-003**	**72.2280**

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.569946	0.056495	0.180011	0.112201	0.020944	0.005169	0.013608	0.012941	0.000792	0.000570	0.024535	0.000337	0.002451

5.0 Energy Detail

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0146	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Unmitigated	0.0146	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003

6.2 Area by SubCategory

Unmitigated

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	3.4900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.9000e-004	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Total	**0.0146**	**3.0000e-005**	**3.1100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**6.6800e-003**	**6.6800e-003**	**2.0000e-005**		**7.1100e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	3.4900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.9000e-004	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Total	**0.0146**	**3.0000e-005**	**3.1100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**6.6800e-003**	**6.6800e-003**	**2.0000e-005**		**7.1100e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

Alameda CTC Rail Crossings Improvements - Alameda County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Alameda CTC Rail Crossings Improvements

Alameda County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	30.50	1000sqft	0.70	30,500.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2024
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Aniticipated schedule for construction

Off-road Equipment - Minimal equipment required for rail crossing improvement installation

Off-road Equipment - Minimal construction equipment required for demo.

Off-road Equipment - Minimal equipment required for grading

Off-road Equipment - Anticipated equipment for paving.

Demolition - 200 cy of pavement approximately 400 tons

Grading -

Construction Off-road Equipment Mitigation - BAAQMD basic control measures

Trips and VMT - anticipated trips

Table Name	Column Name	Default Value	New Value

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstDustMitigation	CleanPavedRoadPercentReduction	0	6
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	100.00	40.00
tblConstructionPhase	NumDays	10.00	88.00
tblConstructionPhase	NumDays	2.00	100.00
tblConstructionPhase	NumDays	5.00	36.00
tblConstructionPhase	PhaseEndDate	3/5/2024	8/14/2024
tblConstructionPhase	PhaseEndDate	10/13/2023	1/31/2024
tblConstructionPhase	PhaseEndDate	10/17/2023	6/19/2024
tblConstructionPhase	PhaseEndDate	3/12/2024	10/2/2024
tblConstructionPhase	PhaseStartDate	10/18/2023	6/20/2024
tblConstructionPhase	PhaseStartDate	10/14/2023	2/1/2024
tblConstructionPhase	PhaseStartDate	3/6/2024	8/14/2024
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	6.00	1.00
tblOffRoadEquipment	UsageHours	7.00	6.00
tblTripsAndVMT	WorkerTripNumber	10.00	8.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	0.4343	3.5459	4.1747	7.9200e-003	0.1463	0.1691	0.3154	0.0278	0.1659	0.1937	0.0000	759.3804	759.3804	0.0643	5.6300e-003	762.6661
2024	0.9499	7.9066	11.9346	0.0205	1.2825	0.3500	1.5844	0.4813	0.3318	0.7679	0.0000	1,973.9912	1,973.9912	0.3890	0.0201	1,989.7053
Maximum	**0.9499**	**7.9066**	**11.9346**	**0.0205**	**1.2825**	**0.3500**	**1.5844**	**0.4813**	**0.3318**	**0.7679**	**0.0000**	**1,973.9912**	**1,973.9912**	**0.3890**	**0.0201**	**1,989.7053**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	0.4343	3.5459	4.1747	7.9200e-003	0.0881	0.1691	0.2572	0.0188	0.1659	0.1846	0.0000	759.3804	759.3804	0.0643	5.6300e-003	762.6661
2024	0.9499	7.9066	11.9346	0.0205	0.5824	0.3500	0.8844	0.2149	0.3318	0.5015	0.0000	1,973.9912	1,973.9912	0.3890	0.0201	1,989.7053
Maximum	**0.9499**	**7.9066**	**11.9346**	**0.0205**	**0.5824**	**0.3500**	**0.8844**	**0.2149**	**0.3318**	**0.5015**	**0.0000**	**1,973.9912**	**1,973.9912**	**0.3890**	**0.0201**	**1,989.7053**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	53.07	0.00	39.91	54.10	0.00	28.65	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

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Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0146	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0146**	**3.0000e-005**	**3.1100e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**		**6.6800e-003**	**6.6800e-003**	**2.0000e-005**	**0.0000**	**7.1100e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0146	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0146**	**3.0000e-005**	**3.1100e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**		**6.6800e-003**	**6.6800e-003**	**2.0000e-005**	**0.0000**	**7.1100e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/2/2023	1/31/2024	5	88	
2	Grading	Grading	2/1/2024	6/19/2024	5	100	
3	Building Construction	Building Construction	6/20/2024	8/14/2024	5	40	
4	Paving	Paving	8/14/2024	10/2/2024	5	36	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 43.75

Acres of Paving: 0.7

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	0	4.00	231	0.29
Building Construction	Forklifts	0	6.00	89	0.20
Building Construction	Skid Steer Loaders	1	8.00	65	0.37
Building Construction	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Cement and Mortar Mixers	1	6.00	9	0.56

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	6.00	187	0.41

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	2	5.00	0.00	40.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	2	13.00	5.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0973	0.0000	0.0973	0.0147	0.0000	0.0147			0.0000			0.0000
Off-Road	0.4193	3.4751	4.0457	7.3200e-003		0.1684	0.1684		0.1652	0.1652		696.0408	696.0408	0.0626		697.6066

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.4193**	**3.4751**	**4.0457**	**7.3200e-003**	**0.0973**	**0.1684**	**0.2657**	**0.0147**	**0.1652**	**0.1799**		**696.0408**	**696.0408**	**0.0626**		**697.6066**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.0000e-004	0.0609	0.0137	2.7000e-004	7.9600e-003	5.1000e-004	8.4700e-003	2.1800e-003	4.9000e-004	2.6700e-003		29.2146	29.2146	6.2000e-004	4.6200e-003	30.6055
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0141	9.8300e-003	0.1154	3.3000e-004	0.0411	2.1000e-004	0.0413	0.0109	1.9000e-004	0.0111		34.1250	34.1250	1.0800e-003	1.0100e-003	34.4540
Total	**0.0150**	**0.0707**	**0.1291**	**6.0000e-004**	**0.0490**	**7.2000e-004**	**0.0498**	**0.0131**	**6.8000e-004**	**0.0138**		**63.3396**	**63.3396**	**1.7000e-003**	**5.6300e-003**	**65.0595**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0416	0.0000	0.0416	6.3000e-003	0.0000	6.3000e-003			0.0000			0.0000
Off-Road	0.4193	3.4751	4.0457	7.3200e-003		0.1684	0.1684		0.1652	0.1652	0.0000	696.0408	696.0408	0.0626		697.6066
Total	**0.4193**	**3.4751**	**4.0457**	**7.3200e-003**	**0.0416**	**0.1684**	**0.2100**	**6.3000e-003**	**0.1652**	**0.1715**	**0.0000**	**696.0408**	**696.0408**	**0.0626**		**697.6066**

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.0000e-004	0.0609	0.0137	2.7000e-004	7.6000e-003	5.1000e-004	8.1100e-003	2.0900e-003	4.9000e-004	2.5800e-003		29.2146	29.2146	6.2000e-004	4.6200e-003	30.6055
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0141	9.8300e-003	0.1154	3.3000e-004	0.0389	2.1000e-004	0.0391	0.0104	1.9000e-004	0.0106		34.1250	34.1250	1.0800e-003	1.0100e-003	34.4540
Total	**0.0150**	**0.0707**	**0.1291**	**6.0000e-004**	**0.0465**	**7.2000e-004**	**0.0473**	**0.0125**	**6.8000e-004**	**0.0131**		**63.3396**	**63.3396**	**1.7000e-003**	**5.6300e-003**	**65.0595**

3.2 Demolition - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0973	0.0000	0.0973	0.0147	0.0000	0.0147			0.0000			0.0000
Off-Road	0.3998	3.3052	4.0415	7.3200e-003		0.1507	0.1507		0.1475	0.1475		696.0373	696.0373	0.0616		697.5770
Total	**0.3998**	**3.3052**	**4.0415**	**7.3200e-003**	**0.0973**	**0.1507**	**0.2480**	**0.0147**	**0.1475**	**0.1622**		**696.0373**	**696.0373**	**0.0616**		**697.5770**

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Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.0000e-004	0.0612	0.0137	2.7000e-004	7.9600e-003	5.1000e-004	8.4800e-003	2.1800e-003	4.9000e-004	2.6800e-003		28.7865	28.7865	6.2000e-004	4.5500e-003	30.1575
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0132	8.7700e-003	0.1079	3.2000e-004	0.0411	2.0000e-004	0.0413	0.0109	1.8000e-004	0.0111		33.2839	33.2839	9.8000e-004	9.5000e-004	33.5900
Total	**0.0141**	**0.0700**	**0.1217**	**5.9000e-004**	**0.0490**	**7.1000e-004**	**0.0498**	**0.0131**	**6.7000e-004**	**0.0138**		**62.0704**	**62.0704**	**1.6000e-003**	**5.5000e-003**	**63.7475**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0416	0.0000	0.0416	6.3000e-003	0.0000	6.3000e-003			0.0000			0.0000
Off-Road	0.3998	3.3052	4.0415	7.3200e-003		0.1507	0.1507		0.1475	0.1475	0.0000	696.0373	696.0373	0.0616		697.5770
Total	**0.3998**	**3.3052**	**4.0415**	**7.3200e-003**	**0.0416**	**0.1507**	**0.1923**	**6.3000e-003**	**0.1475**	**0.1538**	**0.0000**	**696.0373**	**696.0373**	**0.0616**		**697.5770**

Mitigated Construction Off-Site

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Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.0000e-004	0.0612	0.0137	2.7000e-004	7.6000e-003	5.1000e-004	8.1200e-003	2.1000e-003	4.9000e-004	2.5900e-003		28.7865	28.7865	6.2000e-004	4.5500e-003	30.1575
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0132	8.7700e-003	0.1079	3.2000e-004	0.0389	2.0000e-004	0.0391	0.0104	1.8000e-004	0.0106		33.2839	33.2839	9.8000e-004	9.5000e-004	33.5900
Total	**0.0141**	**0.0700**	**0.1217**	**5.9000e-004**	**0.0465**	**7.1000e-004**	**0.0473**	**0.0125**	**6.7000e-004**	**0.0131**		**62.0704**	**62.0704**	**1.6000e-003**	**5.5000e-003**	**63.7475**

3.3 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.2167	0.0000	1.2167	0.4639	0.0000	0.4639			0.0000			0.0000
Off-Road	0.7736	7.5082	6.9605	0.0146		0.3016	0.3016		0.2863	0.2863		1,402.7429	1,402.7429	0.2902		1,409.9968
Total	**0.7736**	**7.5082**	**6.9605**	**0.0146**	**1.2167**	**0.3016**	**1.5183**	**0.4639**	**0.2863**	**0.7502**		**1,402.7429**	**1,402.7429**	**0.2902**		**1,409.9968**

Unmitigated Construction Off-Site

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Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0212	0.0140	0.1727	5.2000e-004	0.0657	3.1000e-004	0.0660	0.0174	2.9000e-004	0.0177		53.2543	53.2543	1.5600e-003	1.5100e-003	53.7440
Total	**0.0212**	**0.0140**	**0.1727**	**5.2000e-004**	**0.0657**	**3.1000e-004**	**0.0660**	**0.0174**	**2.9000e-004**	**0.0177**		**53.2543**	**53.2543**	**1.5600e-003**	**1.5100e-003**	**53.7440**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5202	0.0000	0.5202	0.1983	0.0000	0.1983			0.0000			0.0000
Off-Road	0.7736	7.5082	6.9605	0.0146		0.3016	0.3016		0.2863	0.2863	0.0000	1,402.7429	1,402.7429	0.2902		1,409.9968
Total	**0.7736**	**7.5082**	**6.9605**	**0.0146**	**0.5202**	**0.3016**	**0.8218**	**0.1983**	**0.2863**	**0.4846**	**0.0000**	**1,402.7429**	**1,402.7429**	**0.2902**		**1,409.9968**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0212	0.0140	0.1727	5.2000e-004	0.0623	3.1000e-004	0.0626	0.0166	2.9000e-004	0.0169	53.2543	53.2543	1.5600e-003	1.5100e-003	53.7440	
Total	**0.0212**	**0.0140**	**0.1727**	**5.2000e-004**	**0.0623**	**3.1000e-004**	**0.0626**	**0.0166**	**2.9000e-004**	**0.0169**	**53.2543**	**53.2543**	**1.5600e-003**	**1.5100e-003**	**53.7440**	

3.4 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3752	3.2407	5.0346	8.3300e-003		0.1371	0.1371		0.1350	0.1350		793.2319	793.2319	0.0930		795.5575
Total	**0.3752**	**3.2407**	**5.0346**	**8.3300e-003**		**0.1371**	**0.1371**		**0.1350**	**0.1350**		**793.2319**	**793.2319**	**0.0930**		**795.5575**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vendor	4.8100e-003	0.2243	0.0660	9.8000e-004	0.0339	1.3300e-003	0.0352	9.7600e-003	1.2800e-003	0.0110		105.0758	105.0758	1.4400e-003	0.0158	109.8049
Worker	0.0344	0.0228	0.2806	8.4000e-004	0.1068	5.1000e-004	0.1073	0.0283	4.7000e-004	0.0288		86.5382	86.5382	2.5400e-003	2.4600e-003	87.3339
Total	**0.0392**	**0.2471**	**0.3466**	**1.8200e-003**	**0.1407**	**1.8400e-003**	**0.1425**	**0.0381**	**1.7500e-003**	**0.0398**		**191.6139**	**191.6139**	**3.9800e-003**	**0.0182**	**197.1388**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3752	3.2407	5.0346	8.3300e-003		0.1371	0.1371		0.1350	0.1350	0.0000	793.2319	793.2319	0.0930		795.5575
Total	**0.3752**	**3.2407**	**5.0346**	**8.3300e-003**		**0.1371**	**0.1371**		**0.1350**	**0.1350**	**0.0000**	**793.2319**	**793.2319**	**0.0930**		**795.5575**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.8100e-003	0.2243	0.0660	9.8000e-004	0.0324	1.3300e-003	0.0338	9.4000e-003	1.2800e-003	0.0107		105.0758	105.0758	1.4400e-003	0.0158	109.8049
Worker	0.0344	0.0228	0.2806	8.4000e-004	0.1012	5.1000e-004	0.1017	0.0270	4.7000e-004	0.0274		86.5382	86.5382	2.5400e-003	2.4600e-003	87.3339

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Total	**0.0392**	**0.2471**	**0.3466**	**1.8200e-003**	**0.1337**	**1.8400e-003**	**0.1355**	**0.0364**	**1.7500e-003**	**0.0381**		**191.6139**	**191.6139**	**3.9800e-003**	**0.0182**	**197.1388**

3.5 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4582	4.4013	6.3376	9.6700e-003		0.2107	0.2107		0.1947	0.1947		922.5775	922.5775	0.2901		929.8291
Paving	0.0509					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5091**	**4.4013**	**6.3376**	**9.6700e-003**		**0.2107**	**0.2107**		**0.1947**	**0.1947**		**922.5775**	**922.5775**	**0.2901**		**929.8291**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0265	0.0176	0.2158	6.5000e-004	0.0822	3.9000e-004	0.0825	0.0218	3.6000e-004	0.0222		66.5678	66.5678	1.9600e-003	1.8900e-003	67.1799
Total	**0.0265**	**0.0176**	**0.2158**	**6.5000e-004**	**0.0822**	**3.9000e-004**	**0.0825**	**0.0218**	**3.6000e-004**	**0.0222**		**66.5678**	**66.5678**	**1.9600e-003**	**1.8900e-003**	**67.1799**

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Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4582	4.4013	6.3376	9.6700e-003		0.2107	0.2107		0.1947	0.1947	0.0000	922.5775	922.5775	0.2901		929.8291
Paving	0.0509					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5091**	**4.4013**	**6.3376**	**9.6700e-003**		**0.2107**	**0.2107**		**0.1947**	**0.1947**	**0.0000**	**922.5775**	**922.5775**	**0.2901**		**929.8291**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0265	0.0176	0.2158	6.5000e-004	0.0779	3.9000e-004	0.0783	0.0207	3.6000e-004	0.0211		66.5678	66.5678	1.9600e-003	1.8900e-003	67.1799
Total	**0.0265**	**0.0176**	**0.2158**	**6.5000e-004**	**0.0779**	**3.9000e-004**	**0.0783**	**0.0207**	**3.6000e-004**	**0.0211**		**66.5678**	**66.5678**	**1.9600e-003**	**1.8900e-003**	**67.1799**

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.569946	0.056495	0.180011	0.112201	0.020944	0.005169	0.013608	0.012941	0.000792	0.000570	0.024535	0.000337	0.002451

5.0 Energy Detail

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0146	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Unmitigated	0.0146	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003

6.2 Area by SubCategory

Unmitigated

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	3.4900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.9000e-004	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Total	**0.0146**	**3.0000e-005**	**3.1100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**6.6800e-003**	**6.6800e-003**	**2.0000e-005**		**7.1100e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	3.4900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0108					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.9000e-004	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		6.6800e-003	6.6800e-003	2.0000e-005		7.1100e-003
Total	**0.0146**	**3.0000e-005**	**3.1100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**6.6800e-003**	**6.6800e-003**	**2.0000e-005**		**7.1100e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

Alameda CTC Rail Crossings Improvements - Alameda County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation