



May 13, 2019

Mr. Tom Holstein
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Caltrans D4 Office of Local Assistance
111 Grand Avenue
Oakland, CA 94612

Subject: Transmittal Letter

***Dublin Boulevard - Federal Project No. RTPL 5432(019)
Air Quality Technical Report***

Dear Mr. Holstein

The City of Dublin (Dublin), in cooperation with the City of Livermore (Livermore), Alameda County (County), Alameda County Transportation Commission (ACTC), and the California Department of Transportation (Caltrans) as assigned by the Federal Highway Administration (FHWA), proposes to extend Dublin Boulevard approximately 1.5 miles eastward through eastern Dublin and an unincorporated portion of the County, terminating at the boundary between the County and Livermore city limits (Project).

In support of the environmental process providing California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) clearance for the Project, the City of Dublin is transmitting 1 signed copy of the following technical memorandum:

- **Air Quality Technical Report** – Dublin Boulevard-North Canyons Parkway Extension Project – Federal Project No. RTPL 5432(019) – Illingworth & Rodkin – May 2019.

The City of Dublin has reviewed and agrees with the findings of the enclosed report.

If you have any questions, please contact me at (925) 833-6630.

Sincerely,

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AIR QUALITY REPORT

Dublin Boulevard-North Canyons Parkway Extension



East of the Dublin Boulevard/Fallon Road Intersection to North of Interstate 580 (I-580)
to the North Canyons Parkway/Doolan Road crossing north of I-580

District 4-ALA-RTPL-5432(019)

Project ID 21473/ALA150003

Prepared by



AIR QUALITY REPORT

ALAMEDA COUNTY, CALIFORNIA

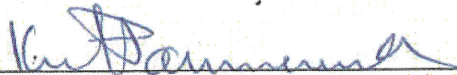
CALIFORNIA DEPARTMENT OF TRANSPORTATION DISTRICT 4

District 4-ALA-RTPL-5432(019)

Project ID 21473/ALA150003

Reviewed by:  Date: 20 June 2019

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Prepared by:  Date: May 15, 2019

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Please call or write to the California Department of Transportation, Attn: Thomas Holstein, Office of Local Assistance, 111 Grand Avenue, Oakland, CA 94623-0660; or use the California Relay Service TTY number, 711, or 1-800-735-2929.

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Acronyms and Abbreviations

Term	Definition
°F	Degrees Fahrenheit
AADT	Average annual daily traffic
AB	Assembly bill
ABAG	Association of Bay Area Governments
ADT	Average daily traffic
Alameda CTC	Alameda County Transportation Commission
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
ATM	Active Traffic Management
BACM	Best available control measures
BAAQMD	Bay Area Air Quality Management District
BMP	Best Management Practice
CAAQS	California Ambient Air Quality Standards
Cal/EPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAP	Climate Action Program
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH ₄	Methane
CO	Carbon monoxide
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
County	Alameda County
DPM	Diesel Particulate Matter

Term	Definition
EO	Executive Order
FCAA	Federal Clean Air Act
FHWA	Federal Highway Administration
ft	Feet
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GHG	Greenhouse gas
HCF	Hydrofluorocarbon
IPCC	International Panel on Climate Change
ITS	Intelligent Transportation Systems
LOS	Level of service
LRTP	Long Range Transportation Plan
mi	Miles
MOVES	Motor Vehicle Emission Simulator
MMTCO _{2e}	Million metric tons of carbon dioxide equivalents
mph	Miles per hour
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MSAT	Mobile Source Air Toxics
MTC	Metropolitan Transportation Commission
N ₂ O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
NO ₂	Nitrogen dioxide
NOA	Naturally occurring asbestos
NO _x	Nitrogen oxide
O&M	Operations and maintenance

Term	Definition
O ₃	Ozone
OMB	White House Office of Management & Budget
OPR	Office of Planning and Research
Pb	Lead
PM	Particulate matter
PM ₁₀	Particulate matter less than 10 microns in diameter
PM _{2.5}	Particulate matter less than 2.5 microns in diameter
ppm	Parts per million
Protocol	Transportation Project-Level Carbon Monoxide Protocol
ROGs	Reactive organic gases
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
SB	Senate Bill
SIP	State Implementation Plan
SO ₂	Sulfur dioxide
TACs	Toxic air contaminants
TDM	Transportation Demand Management
TSM	Transportation System Management
TMP	Transportation Management Plan
TIP	Transportation Improvement Program
USC	United States Code
USDOT	United States Department of Transportation
U.S. EPA	United States Environmental Protection Agency
UV	Ultraviolet
VHT	Vehicle hours traveled
VMT	Vehicle miles traveled
VOCs	Volatile organic compounds
vph	Vehicles per hour

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1. Proposed Project Description

1.1 Introduction

The City of Dublin, in coordination with the City of Livermore, Alameda County Transportation Commission, and Alameda County, proposes to construct an extension of Dublin Boulevard in Dublin, across an unincorporated area in Alameda County, to North Canyons Parkway in Livermore. The purpose of the project is to improve east-west local roadway connectivity between the City of Dublin and the City of Livermore; improve mobility, multimodal access and efficiency for all roadway users. The purpose of the project is also to support an integrated corridor management strategy. The total length of the project is 1.5 miles. Caltrans is the lead agency under NEPA and the City of Dublin is the lead agency under CEQA.

1.2 Location and Background

The project is in the San Francisco Bay Area Air Basin and falls under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD) and the Metropolitan Transportation Commission (MTC). Section 3.1 describes the climate, meteorology, and topography of the project area and Section 3.2 describes the existing air quality in the area.

This project is included in the MTC Regional Transportation Plan (RTP), Plan Bay Area 2040, and Alameda Countywide Transportation Plan (ID# 17-01-0048). It is also included in MTCs 2017 Transportation Improvement Program (TIP). The estimated total cost for this project is approximately \$89 million. The project is being funded in large part by voter-approved sales tax Measure B and Measure BB, providing \$6,267,000 and \$11,200,000 respectively, with the balance of the project being funded with local traffic impact fees. Figure 1 shows the project location and surrounding area.

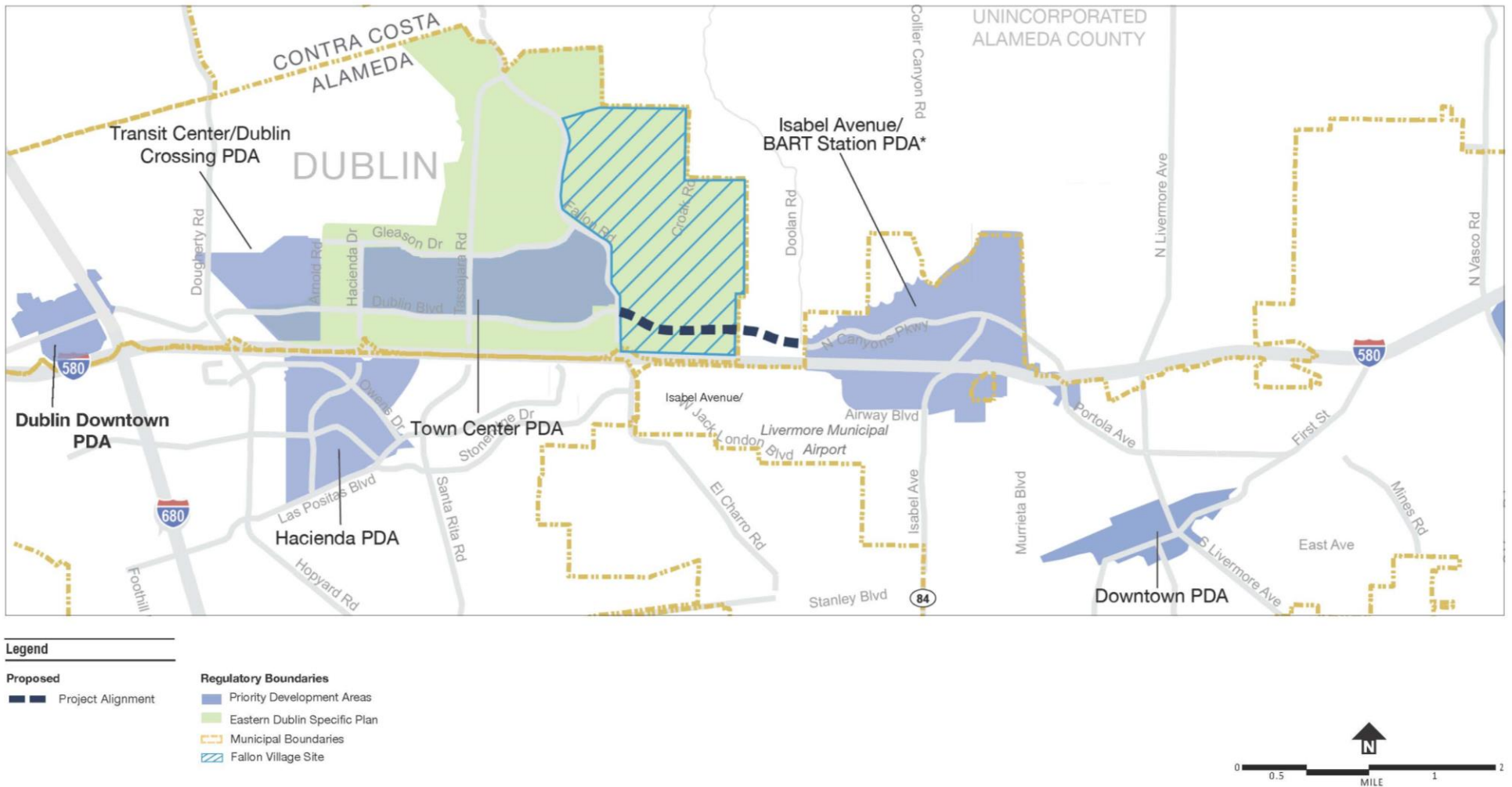


Figure 1 - Map of the Project Location.

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1.3 Purpose and Need

The purpose of the project is to improve east-west local roadway connectivity between the City of Dublin and the City of Livermore, and improve mobility, multimodal access and efficiency for all roadway users. The purpose is also to support an integrated corridor management strategy.

The need for the project is to:

- Eliminate a gap in local roadway network connectivity within the cities of Dublin and Livermore and the County, and improve interconnectivity between Dublin and Livermore PDAs.
- Establish transportation facilities and other public infrastructure to serve planned development in the General Plan, EDSP, and Plan Bay Area.
- Reduce vehicle miles traveled (VMT) on the local highway system by providing local access to existing and planned land uses, including residential, commercial, industrial, and business uses, and local destinations on an alternate local route that is convenient to I-580.
- Reduce local trip lengths in Dublin and between Dublin and Livermore by diverting localized inter-city trips from I-580.
- Provide complete streets and multimodal access between Dublin and Livermore, particularly for key public facilities such as Las Positas College, consistent with the requirements of Senate Bill 375 (SB 375) and regional complete streets policies on multimodal roadways and sustainable transportation.
- Indirectly relieve congestion on I-580 by providing a completed local route on the north side of I-580 between west of I-680 in Dublin to SR-84 in Livermore.

1.4 Baseline and Forecasted Conditions for No-Build and Project Alternative

The proposed alternatives include the No-Build Alternative and the Build Alternative. Under the No Build Alternative, none of the project features described under the project would be constructed. Dublin Boulevard and North Canyons Parkway would continue to operate unconnected in their current configurations. Changes from existing conditions to the No Build in 2025 include:

1. ABAG Plan Bay Area development (2025) along the project corridor in Dublin and the County: 321 new housing units and 419 new jobs
2. General Plan zoning development (2025) in Dublin outside of the project corridor
3. General Plan zoning development (2025) in Livermore
4. BART to Livermore: non-rail alternative
5. Kaiser Dublin Medical Center – medical office building, 220,000 square feet/4,000 jobs

6. Fallon Road Improvements: intersection improvements as described in the Kaiser Dublin Medical Center EIR

For 2040 the following assumptions were added to the baseline:

1. General Plan buildout along the project corridor (includes Eastern Dublin Specific Plan and Fallon Village): 599 new housing units and new 8,544 jobs
2. ABAG Plan Bay Area development (2040) in Dublin outside of the project corridor
3. General Plan zoning development (2040) in Livermore
4. BART to Livermore: non-rail alternative
5. Kaiser Dublin Medical Center – medical office building, 450,000 square feet/9,500 jobs
6. Fallon Road Improvements: intersection improvements as described in the General Plan EIR and Fallon Gateway documents

The Build Alternative would include the extension of Dublin Boulevard approximately 1.5 miles eastward through eastern Dublin and an unincorporated portion of the County. The assumptions listed above were also applied to the Build Alternative analysis. The two project alternatives are each discussed in detail below.

1.4.1 Existing Conditions

The existing roadways and traffic conditions are detailed in the Dublin Boulevard – North Canyons Parkway Extension Traffic Study prepared by Kittelson & Associates, Inc. in August of 2018. Tables 1 and 2 show a summary of the traffic volumes for the existing (2013) and horizon year (2040) No-Build conditions. Detailed information, including vehicle miles traveled and operating speeds and mapping are provided in the Traffic Study.

Table 1 - Summary of Existing (2013) Traffic Conditions

Intersection ID	Location	Annual Average Daily Traffic (AADT)			
		West	East	North	South
1	Hacienda Drive and Dublin Boulevard	16,045	16,875	13,055	18,225
2	Tassajara Road & Dublin Boulevard	17,305	14,590	18,050	26,665
3	Fallon Road & Dublin Boulevard	7,565	10	17,350	19,455
14	Croak Road & Dublin Boulevard Extension	0	0	0	0

4	Fallon Road and I-580 WB Ramps	4,660	11,085	22,150	17,415
5	El Charro Road & I-580 EB Ramps	11,120	2,025	19,430	15,465
6	Airway Boulevard & I-580 EB Ramps	12,275	6,825	12,150	7,270
7	Airway Boulevard and I-580 WB Ramps	5,870	3,940	17,095	12,625
8	Airway Boulevard & N. Canyons Parkway	2,210	14,645	10	16,425
9	Doolan Road & N. Canyons Parkway	25	895	330	580
10	Isabel Avenue & Portola Avenue	11,740	10,530	8,360	15,760
11	Isabel Avenue & I-580 WB Ramps	2,990	18,220	15,860	23,410
12	Isabel Avenue & I-580 EB Ramps	7,405	6,685	23,560	29,740
13	Murrieta Boulevard & Portola Avenue	15,030	18,010	130	7,920

Source Illingworth & Rodkin 2018. Kittelson & Associates, 2018

There are single and multifamily residential units between 550 and 1,500 feet north of the project. Figure 2 shows the location of the closest existing sensitive receptor. There are several potential locations where there may be sensitive receptors, however these projects are still in the preliminary planning and review stage or located on the south side of I-580 well outside 500 feet from the proposed project.

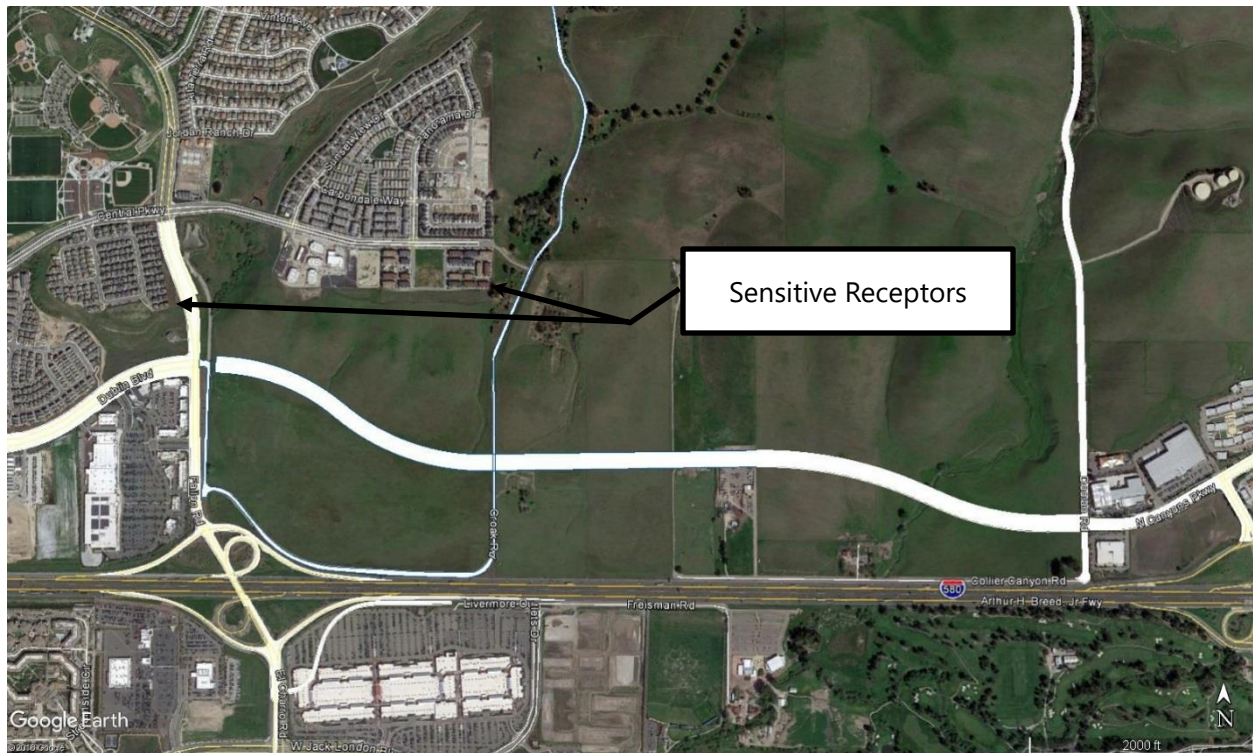


Figure 2 - Map of the Sensitive Receptor Locations.

1.4.2 No-Build Alternative (2025 and 2040)

Under the No Build Alternative, none of the project features described under the project would be constructed. Dublin Boulevard and North Canyons Parkway would continue to operate unconnected in their current configurations. Under the No Build Alternative, there would be no improvement of local connections between Dublin and Livermore or between downtown Dublin and eastern Dublin. This would mean local trips would continue to use the regional transportation network, which adds to congestion and indirectly generates additional air pollutants from traffic congestion. Additionally, use of I-580 for local trips between Dublin and Livermore creates a longer trip length, requiring motorists to go out of their way to reach their destination. This results in greater VMT and associated air pollution.

The No-Build (No Action) Alternative consists of those transportation projects that are already planned for construction by or before 2040. Consequently, the No-Build alternative represents future travel conditions in the Dublin Road/North Canyons Parkway Extension study area without the Dublin Road/North Canyons Parkway Extension project and is the baseline against which the Build Alternative is assessed to meet NEPA requirements. Opening year of the project is represented by traffic volumes for the year 2025. Future transportation projects planned in the area were included in the traffic report and include the following:

1. I-580 Express Lanes (Opened in 2016)
2. Phase 2 interchange improvements at Isabel Avenue interchange (assumed by 2040)
3. Phase 2 interchange improvements at Fallon Road/Charro Road Interchange (assumed by 2040)
4. Widening of Portola Avenue overpass (by 2040).

Table 2 - Summary of Future No-Build Traffic Conditions (2025 & 2040)

Intersection ID	Location	AADT			
		West	East	North	South
Year 2025					
3	Fallon Road & Dublin Boulevard	9,705	3,945	18,310	23,190
14	Croak Road & Dublin Boulevard Extension	0	0	0	0
9	Doolan Road & N. Canyons Parkway	25	985	420	580
Year 2040					
3	Fallon Road & Dublin Boulevard	11,835	16,400	20,735	34,440
14	Croak Road & Dublin Boulevard Extension	0	0	0	0
9	Doolan Road & N. Canyons Parkway	25	895	330	580

Source Illingworth & Rodkin 2018. Kittelson & Associates, 2018

1.4.3 Project Build Alternative

The Build Alternative would include the extension of Dublin Boulevard by 1.5 miles through eastern Dublin and an unincorporated portion of the County. The roadway extension would start from the current terminus of Dublin Boulevard at the Dublin Boulevard/Fallon Road intersection in Dublin and would end at the Doolan Road/North Canyons Parkway intersection along the boundary of the County and Livermore. This roadway extension would provide four to six travel lanes and bicycle and pedestrian facilities (i.e., sidewalks and bike lanes). Beginning at Fallon Road, the roadway extension would have six travel lanes (three in each direction). Continuing eastward, the roadway extension would narrow to four travel lanes (two in each direction) before intersecting with Croak Road. From Croak Road to Doolan Road, the roadway extension would remain in the four lane configuration. The permanent area needed for the project, including the roadway, sidewalks, intersections, and land acquired for right-of-way is estimated at 29 acres.

Project design features and components include (from west to east):

- Intersection improvements at Fallon Road and the elimination of the existing intersection of Croak Road and Fallon Road
- Grading and earthwork northeast of the Dublin Boulevard/Fallon Road intersection, including grading at the base of the Livermore Hills, to allow for the roadway extension, and more minor grading throughout the road alignment to meet engineering and safety requirements
- Abandonment of a north-south (frontage road) portion of Croak Road parallel to Fallon Road
- The addition of a "T" shaped hammerhead turnaround at the new terminus of Croak Road adjacent to Fallon Road
- Removal of overhead utility lines between Fallon Road and Croak Road
- Creation of a new signalized intersection between the Dublin Boulevard extension and Croak Road
- Construction of a new bridge over Cottonwood Creek
- Construction staging and laydown between the extension and Collier Canyon Road, along Doolan Road
- Intersection improvements at Doolan Road
- The extension of underground utility lines into the project site, within the paved areas of the proposed roadway extension
- Construction of the new roadway, which would include a median, inside shoulder, vehicle travel lanes, street bicycle facilities, a parkway strip and separated sidewalk or a separated Class I bike path/MUP, lighting, and cut/fill embankments
- Retaining walls may be use in addition to, or as an alternative to, cut/fill embankments associated with roadway and hillside grading. If used, retaining walls would be placed outside of the sidewalk and path areas on either side of the roadway cross section, within the construction footprint and within the permanent right-of-way. Retaining walls would measure 3 feet to 10 feet in height and would generally require a smaller area of grading or ground disturbance in comparison to cut/fill slopes.

Right-of-way acquisitions would be needed from multiple private property owners. No displacement of any residences or businesses would be required. Ancillary facilities associated with the project include traffic signals, lighting, landscaping, irrigation, drainage, and storm water treatment facilities. Table 3 shows a summary of the Horizon Year traffic conditions.

Table 3 - Summary of Build Alternative Traffic Conditions (2025 & 2040)

Intersection ID	Location	AADT			
		West	East	North	South
Year 2025					
3	Fallon Road & Dublin Boulevard	16,480	13,315	18,485	22,980
14	Croak Road & Dublin Boulevard Extension	11,525	9,850	3,450	165

9	Doolan Road & N. Canyons Parkway	9,830	10,770	420	580
Year 2040					
3	Fallon Road & Dublin Boulevard	18,555	24,890	21,240	32,165
14	Croak Road & Dublin Boulevard Extension	19,145	15,780	4,620	4,005
9	Doolan Road & N. Canyons Parkway	15,590	16,460	330	580

Source Illingworth & Rodkin 2018. Kittelson & Associates, 2018

Transportation System Management and Transportation Demand Management

System management strategies increase the efficiency of existing transportation facilities without increasing the number of through lanes. Examples of transportation system management (TSM) strategies include ramp metering, auxiliary lanes, turning lanes, reversible lanes and traffic signal coordination. TSM also encourages a unified urban transportation system that integrates multiple forms of transportation modes such as pedestrian, bicycle, automobile, rail, ferry, and mass transit. Although TSM measures alone could not satisfy the purpose and need of the project, the following TSM measure has been incorporated into this project:

- Provide a complete streets connection between Dublin and Livermore, including access for bus transit, dedicated bicycle lanes, and pedestrian facilities
- Provide the opportunity for future conversion of dedicated turning lanes into shared turning lanes with queue jumps for buses.
- There are several transportation demand management (TDM) strategies within the San Francisco Bay Area that are used to reduce the number of vehicle trips within the I-580 corridor. Rideshare offers carpoolers reduced bridge tolls as well as access to carpool lanes.

There are also vanpools for larger groups of commuters. TDM may also involve the provision of contract funds to regional agencies that are actively promoting ridesharing, maintaining rideshare databases, and providing limited rideshare services to employers and individuals. Increased vehicle occupancy reduces traffic volumes during peak commuting periods; however, without the construction of the improvements described above, successful implementation of a TDM alternative would not substantially improve the safety and operation of the freeway. TDM alternative by itself would not satisfy the purpose of the project.

1.4.4 Comparison of Existing/Baseline and Build Alternative

Under the baseline condition, no roadway exists between Dublin Boulevard and North Canyons Parkway. The roadway extension would result in a slight decrease in VMT in the project vicinity. Traffic analysis of the local effects of the project applies predominantly to traffic with origins and destinations north of I-580. For example, traffic which under existing conditions is traveling westbound on North Canyons Parkway, then diverting down Airway Boulevard to I-580, and then appearing again on Fallon Road would be considered as diverted by the project. Those trips would be shortened by use of the roadway extension. The select link analysis completed by Kittelson & Associates in July 2018 determined there are 63 vehicles per hour westbound during the AM peak (and approximately the same number eastbound during the PM peak) that would have a trip length reduction of 0.52 mile with the extension. The net VMT reduction associated with those vehicles would be 33 VMT during the AM peak hour and 33 VMT during the PM peak hour. The project would reduce daily VMT by about 328 VMT. The daily VMT results are summarized in Table 4 below.

Table 4 - Summary of Future (2040) Build Traffic Changes over No Build Conditions

Time Period	Distance (mi)	Trips (vph)	VMT
AM 1-Hour	-0.52	63	-33
PM 1 -Hour	-0.52	63	-33
Daily	-0.52	630	-328

Source: Alameda CTC Model and Kittelson & Associates., 2018

1.5 Construction Activities and Schedule

The project would be constructed along the alignment shown in Figure 1, through largely undeveloped areas of Dublin and the County. To construct the project, an area larger than the permanent project footprint would be used for temporary access, construction staging, and equipment laydown. Additionally, grading work would occur beyond the limits of the permanent project footprint. The project construction footprint is estimated to be 84 acres in size.

Construction activities would include but are not limited to demolition, earthwork, paving, pile driving, concrete/rebar/formwork, utility trenching, and roadway striping.

Construction access would be provided primarily from the existing intersections of Dublin Boulevard/Fallon Road and North Canyons Parkway/Doolan Road, along the proposed roadway alignment, and possibly from the adjacent local roadways including Croak Road and Collier Canyon Road. Both Dublin and Livermore have established local truck routes, which would be used whenever feasible for transportation of construction materials and equipment. Depending on the final roadway

alignment, the project could require a temporary road or detour while construction occurs at the Dublin Boulevard/Fallon Road and North Canyons Parkway/Doolan Road intersections.

Construction of the project may require temporary roadway closures and detouring at Fallon Road and Doolan Road, which would be planned for in a Transportation Management Plan (TMP). The plan would include press releases to notify and inform motorists, business community groups, local entities, emergency services, and elected officials of upcoming road closures and detours.

Construction is planned to last 1.5 years, and therefore, 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.

2. Regulatory Setting

Many statutes, regulations, plans, and policies have been adopted at the federal, state, and local levels to address air quality issues related to transportation and other sources. The proposed project is subject to air quality regulations at each of these levels. This section introduces the pollutants governed by these regulations and describes the regulation and policies that are relevant to the proposed project.

The U.S. Environmental Protection Agency (U.S. EPA) is responsible for enforcing the federal Clean Air Act and the 1990 amendments to it, as well as the national ambient air quality standards (federal standards) that the U.S. EPA establishes. These standards identify levels of air quality for six criteria pollutants, which are considered the maximum levels of ambient air pollutants considered safe, with an adequate margin of safety, to protect public health and welfare. The six criteria pollutants are ozone (O₃), carbon dioxide (CO₂), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), respirable particulate matter with an aerodynamic diameter of 10 micrometers (PM₁₀), fine particulate matter with an aerodynamic diameter of 2.5 micrometers (PM_{2.5}), and lead (Pb). The U.S. EPA also has regulatory and enforcement jurisdiction over emission sources beyond State waters (outer continental shelf) and sources that are under the exclusive authority of the federal government, such as aircraft, train locomotives, and interstate trucking. As part of its enforcement responsibilities, the U.S. EPA requires each State with nonattainment areas (i.e., areas that do not meet national ambient air quality standards) to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, State, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs.

The California Air Resource Board (CARB), a department of the California EPA, oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the 1989 amendments to the California Clean Air Act (CCAA), responding to the federal Clean Air Act Amendment requirements, and regulating emissions from motor vehicles and consumer products within the state. CARB has established emission standards for vehicles sold in California and for various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions and develops airborne toxic control measures to reduce TACs identified under CARB regulations.

Both the U.S. EPA and CARB established ambient air quality standards for common air pollutants. These ambient air quality standards are prescribed levels of pollutants that represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called “criteria” pollutants because the health and other effects of each pollutant are described in criteria documents. The federal and State ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid

health-related effects. As a result, federal and State standards differ in some cases. In general, California standards are more stringent. This is particularly true for O₃ and PM₁₀. The BAAQMD is the regional agency tasked with managing air quality in the region. At the State level, the CARB oversees regional air district activities and regulates air quality at the State level. The BAAQMD has published the California Environmental Quality Act (CEQA) Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.¹

2.1 Air Quality Attainment Status

Air quality conditions in the Bay Area are compared against ambient air quality standards set at the Federal level (i.e., National Ambient Air Quality Standards, or NAAQS) and at the State level (CAAQS). The attainment status is classified for each pollutant.

Under the NAAQS, the Bay Area is classified as nonattainment for O₃ and PM_{2.5}. Note that in 2013, EPA issued a final rule to determine that the Bay Area attains the 24-hour PM_{2.5} national standard. Despite this EPA action, the Bay Area continues to be designated as “nonattainment” for the 24-hour PM_{2.5} NAAQS standard until BAAQMD submits a “redesignation request” and a “maintenance plan” to EPA, and EPA approves the proposed redesignation. For the pollutants NO₂, CO and SO₂, the area is designated as attainment. Note that the region is considered a “maintenance” area for CO since at one time the region was considered “nonattainment.” While monitoring data shows the region meets the PM₁₀ NAAQS, the area is technically designated “unclassified.” At the State level, the area is considered nonattainment for O₃, PM_{2.5} and PM₁₀ and considered “attainment” for all other criteria air pollutants.

2.2 SIP Conformity

Transportation projects are typically evaluated for their effects on regional air quality as a whole, in response to Federal requirements. The Dublin Boulevard – North Canyons Parkway Extension project is listed in the 2019 TIP, as Project TIP ID ALA 150003. The 2019 TIP was evaluated to demonstrate air quality conformity with the SIP.²

The Federal Clean Air Act, as amended in 1990 outlines the requirements for ensuring that federal transportation plans, programs and projects are consistent with or conform to the purpose of the SIP in reducing transportation-related emissions for non-attainment or maintenance air pollutants. Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant national ambient air quality standards. A conformity finding demonstrates that the total emissions projected for the TIP are

¹ Bay Area Air Quality Management District. 2017. BAAQMD CEQA Air Quality Guidelines. May.

² MTC. 2018. *Final Transportation-Air Quality Conformity Analysis for the Amended Plan Bay Area and the 2019 Transportation Improvement Program*. Final: September 2018, approved December 17, 2018..

within the emissions budgets established by the SIP, and that transportation control measures (TCMs) are implemented in a timely fashion. The conformity analysis for the 2019 TIP addresses the pollutants O₃ (through ROG and NO_x modeling), carbon monoxide or CO (through modeling of CO emissions) and PM_{2.5} (through directly emitted PM_{2.5} and emissions of NO_x). The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) approved the 2019 TIP (and air quality conformity analysis) in December 2018.

2.3 Pollutant-Specific Overview

Air pollutants are governed by multiple federal and state standards to regulate and mitigate health impacts. At the federal level, there are six criteria pollutants for which National Ambient Air Quality Standards (NAAQS) have been established: CO, Pb, NO₂, O₃, PM (PM_{2.5} and PM₁₀), and SO₂. The U.S. EPA has also identified nine priority mobile source air toxics: 1,3-butadiene³, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. In California, sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride are also regulated.

(https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/).

2.3.1 Criteria Pollutants

The Clean Air Act requires the U.S. EPA to set National Ambient Air Quality Standards 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 5 documents the current air quality standards while Table 6 summarizes the sources and health effects of the six criteria pollutants and pollutants regulated in the state of California.

³ 1-3-butadiene is an organic compound that is found in the emissions from motor vehicles.

Table 5 - 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 Fluorescence; 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 ...

See footnotes on next page ...

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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 $150 \mu\text{g}/\text{m}^3$ 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 $15 \mu\text{g}/\text{m}^3$ to $12.0 \mu\text{g}/\text{m}^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at $35 \mu\text{g}/\text{m}^3$, as was the annual secondary standard of $15 \mu\text{g}/\text{m}^3$. The existing 24-hour PM10 standards (primary and secondary) of $150 \mu\text{g}/\text{m}^3$ 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 ($1.5 \mu\text{g}/\text{m}^3$ 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.

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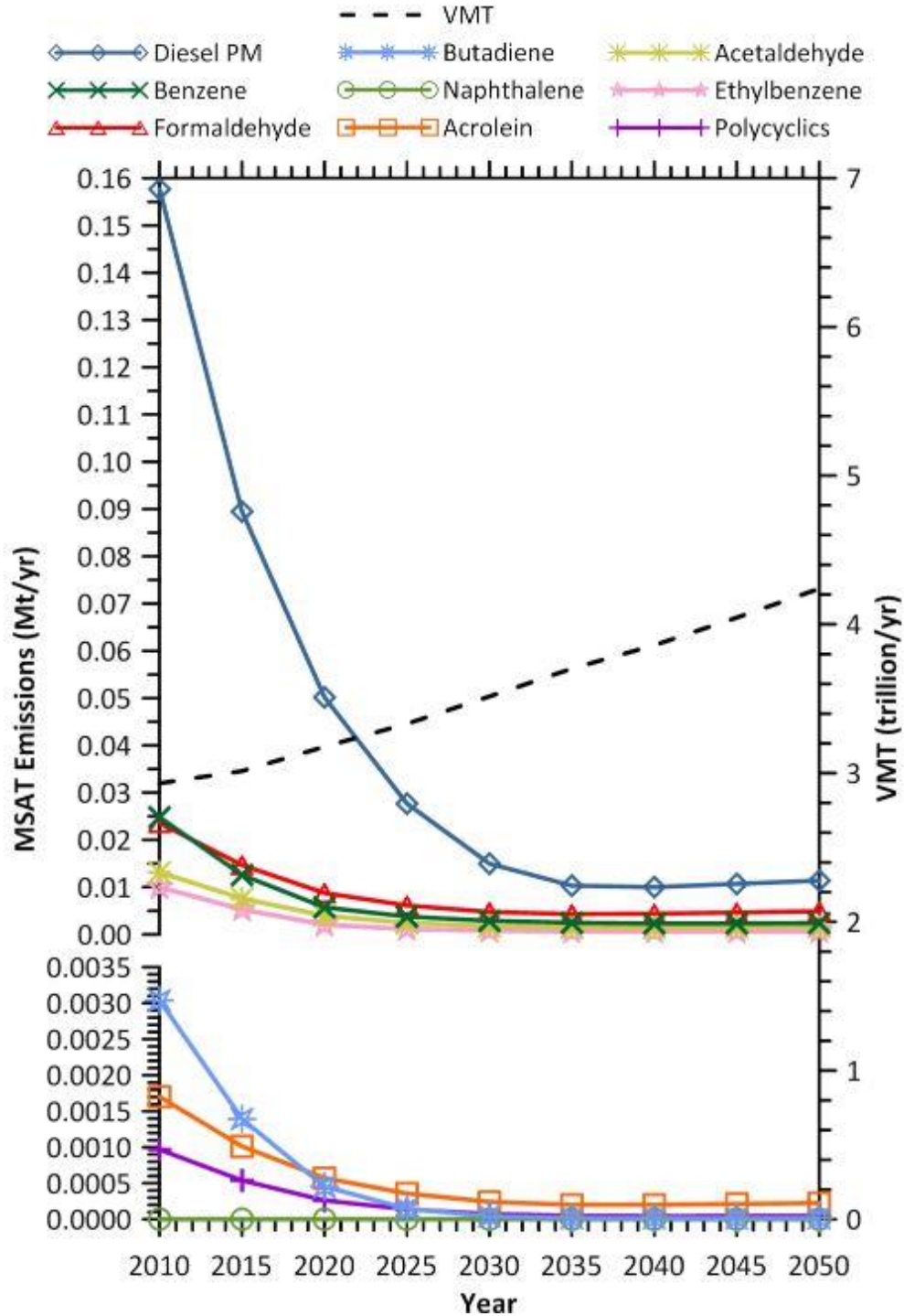
Table 6 - State and Federal Criteria Air Pollutant Effects and Sources

Pollutant	Principal Health Effects	Typical Sources
Ozone (O ₃)	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known toxic air contaminants. Biogenic VOC may also contribute.	Low-altitude ozone is almost entirely formed from reactive organic gases/volatile organic compounds (ROG or VOC) and nitrogen oxides (NOx) in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.
Respirable Particulate Matter (PM ₁₀)	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many toxic and other aerosol and solid compounds are part of PM ₁₀ .	Dust- and fume-producing industrial and agricultural operations; combustion smoke & vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.
Fine Particulate Matter (PM _{2.5})	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – a toxic air contaminant – is in the PM _{2.5} size range. Many toxic and other aerosol and solid compounds are part of PM _{2.5} .	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical and photochemical reactions involving other pollutants including NOx, sulfur oxides (SOx), ammonia, and ROG.
Carbon Monoxide (CO)	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical ozone. Colorless, odorless.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.
Nitrogen Dioxide (NO ₂)	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain & nitrate contamination of storm water. Part of the "NOx" group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.
Sulfur Dioxide (SO ₂)	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.
Lead (Pb)	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also, a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from older gasoline use may exist in soils along major roads.
Visibility-Reducing Particles (VRP)	Reduces visibility. Produces haze. NOTE: not directly related to the Regional Haze program under the Federal Clean Air Act, which is oriented primarily toward visibility issues in National Parks and other "Class I" areas. However, some issues and measurement methods are similar.	See particulate matter above. May be related more to aerosols than to solid particles.
Sulfate	Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.
Hydrogen Sulfide (H ₂ S)	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea. Strong odor.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Natural sources like volcanic hot springs.
Vinyl Chloride	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes.

2.3.2 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*, *ethylbenzene*, *formaldehyde*, *naphthalene*, and *polycyclic organic matter*. While the 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 3.



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: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/

Figure 3 - Projected National MSAT Trends, 2010-2050

2.3.3 Greenhouse Gases

This section provides a general discussion of global climate change and focuses on emissions from human activities that alter the chemical composition of the atmosphere. The discussion on global climate change and greenhouse gas (GHG) emissions is based in part upon the California Global Warming Solutions Act of 2006 (Assembly Bill 32 or AB 32) and research, information and analysis completed by the International Panel on Climate Change (IPCC), the U.S. EPA, and CARB.

Global climate change refers to changes in weather including temperatures, precipitation, and wind patterns. Global temperatures are modulated by naturally occurring and anthropogenic (generated by mankind) atmospheric gases such as CO₂, methane (CH₄), and NO_x.⁴ These gases allow sunlight into the earth's atmosphere but prevent heat from radiating back out into outer space and escaping from the earth's atmosphere, thus altering the earth's energy balance. This phenomenon is known as the greenhouse effect.

Naturally occurring GHGs include water vapor,⁵ CO₂, CH₄, NO_x, and O₃. Several classes of halogenated substances that contain fluorine, chlorine, or bromine are also GHGs, but are for the most part solely a product of industrial activities.

Unlike emissions of criteria and toxic air pollutants, which have local or regional impacts, emissions of GHGs have a broader, global impact. Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial, and agricultural sectors.

Impacts to California from climate change include shifting precipitation patterns, increasing temperatures, increasing severity and duration of wildfires, earlier melting of snow pack and effects on habitats and biodiversity. Sea levels along the California coast have risen up to seven inches over the last century, and average annual temperatures have been increasing. These and other effects will likely intensify in the coming decades and significantly impact the State's public health, natural and manmade infrastructure, and ecosystems.⁶

Agencies at the international, national, state, and local levels are considering strategies to control emissions of gases that contribute to global warming. There is no comprehensive strategy that is being implemented on a global scale that addresses climate change; however, in California a multi-agency "Climate Action Team," has identified a range of strategies and the Air Resources Board, under AB 32,

⁴ 19 IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Bases. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Available at: <<http://ipcc.ch/>>. Accessed March 25, 2013

⁵ Concentrations of water are highly variable in the atmosphere over time, with water occurring as vapor, cloud droplets and ice crystals. Changes in its concentration are also considered to be a result of climate feedbacks rather than a direct result of industrialization or other human activities. For this reason, water vapor is not discussed further as a greenhouse gas

⁶ State of California Energy Commission. 2009 California Climate Adaptation Strategy Discussion Draft. Frequently Asked Questions. August 3, 2009. <www.climatechange.ca.gov/adaptation/documents/2009-07-31_Discussion_Draft-Adaptation_FAQs.pdf>. Accessed March 25, 2013.

has approved the *Climate Change Scoping Plan* (Scoping Plan). AB 32 requires achievement by 2020 of a statewide greenhouse gas emissions limit equivalent to 1990 emission levels, and the adoption of rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions. The CARB and other State agencies are currently working on regulations and other initiatives to implement the Scoping Plan. By 2050, the State plans to reduce emissions to 80 percent below 1990 levels.

In April 2015, Governor Brown signed Executive Order B-30-15 which extended the goals of AB 32, setting a greenhouse gas emissions target at 40 percent of 1990 levels by 2030. On September 8, 2016, Governor Brown signed SB 32, which legislatively established the GHG reduction target of 40 percent of 1990 levels by 2030. In November 2017, CARB issued *California's 2017 Climate Change Scoping Plan*. While the State is on track to exceed the AB 32 scoping plan 2020 targets, this plan is an update to reflect the enacted SB 32 reduction target.

The new Scoping Plan establishes a strategy that will reduce GHG emissions in California to meet the 2030 target (note that the AB 32 Scoping Plan only addressed 2020 targets and a long-term goal). Key features of this plan are:

- Cap and Trade program places a firm limit on 80 percent of the State's emissions;
- Achieving a 50-percent Renewable Portfolio Standard by 2030 (currently at about 29 percent statewide);
- Increase energy efficiency in existing buildings;
- Develop fuels with an 18-percent reduction in carbon intensity;
- Develop more high-density, transit-oriented housing;
- Develop walkable and bikeable communities
- Greatly increase the number of electric vehicles on the road and reduce oil demand in half;
- Increase zero-emissions transit so that 100 percent of new buses are zero emissions;
- Reduce freight-related emissions by transitioning to zero emissions where feasible and near-zero emissions with renewable fuels everywhere else; and
- Reduce "super pollutants" by reducing methane and hydrofluorocarbons or HFCs by 40 percent.

In the updated Scoping Plan, CARB recommends statewide targets of no more than 6 metric tons CO₂e per capita (statewide) by 2030 and no more than 2 metric tons CO₂e per capita by 2050. The statewide per capita targets account for all emissions sectors in the State, statewide population forecasts, and the statewide reductions necessary to achieve the 2030 statewide target under SB 32 and the longer-term State emissions reduction goal of 80 percent below 1990 levels by 2050

The term 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 CO₂, CH₄, nitrous oxide (N₂O), 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 CO₂, CH₄, N₂O, and fluorinated gases.

GHGs differ by the amount of heat each GHG traps in the atmosphere (global warming potential, or GWP). CO₂ is the most important GHG, so amounts of other gases are expressed relative to CO₂, using a metric called “carbon dioxide equivalent” (CO₂e). The global warming potential of CO₂ 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 CH₄ as 25 and the GWP of N₂O as 298, over a 100-year time horizon.⁷ Generally, estimates of all GHGs are summed to obtain total emissions for a project or given time period, usually expressed in metric tons (MTCO₂e), or million metric tons (MMTCO₂e).⁸

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 deciding 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 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.

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

⁷ See Table 2.14 in IPCC Fourth Assessment Report: Climate Change 2007 (AR4): The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA. <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf>.

⁸ See <http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/CEQA-Guidance-Tools>.

transportation plan an SCS proposing actions toward achieving the regional emissions reduction targets.⁹

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.

2.3.4 Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by state, federal, and international agencies and was identified as a toxic air contaminant by the ARB in 1986. All types of asbestos are hazardous and may cause lung disease and cancer.

Asbestos can be released from serpentine and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos-bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed.

Serpentine may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, though much less frequently than serpentinite and/or ultramafic rock. Serpentinite and/or ultramafic rock are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in counties of the Sierra Nevada foothills, the Klamath Mountains, and Coast Ranges. The California Department of Conservation, Division of Mines and Geology has developed a map showing the general location of ultramafic rock in the state.

(www.conservation.ca.gov/cgs/minerals/hazardous_minerals/asbestos/Pages/index.aspx).

2.4 Regulations

2.4.1 Federal and California Clean Air Act

The Federal Clean Air Act (FCAA), as amended, is the primary federal law that governs air quality while the CCAA is its companion state law. These laws and related regulations by the U.S. EPA and the (ARB)

⁹ <https://www.arb.ca.gov/cc/sb375/sb375.htm>

set standards for the concentration of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS and state ambient air quality standards have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide, nitrogen dioxide, ozone, PM, which is broken down for regulatory purposes into particles of 10 micrometers or smaller (PM₁₀) and particles of 2.5 micrometers and smaller (PM_{2.5}), and SO₂. In addition, national and state standards exist for Pb, and state standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H₂S), and vinyl chloride. The NAAQS and state standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Both state and federal regulatory schemes also cover toxic air contaminants (air toxics); some criteria pollutants are also air toxics or may include certain air toxics in their general definition.

2.4.2 Transportation Conformity

The conformity requirement is based on Federal Clean Air Act Section 176(c), which prohibits the U.S. Department of Transportation (USDOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to the SIP for attaining the NAAQS. “Transportation Conformity” applies to highway and transit projects and takes place on two levels: the regional—or, planning and programming level—and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and “maintenance” (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. The U.S. EPA regulations at 40 CFR 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for state standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, NO₂, O₃, PM₁₀, PM_{2.5}, and in some areas (although not in California), SO₂. California has attainment or maintenance areas for all of these transportation-related “criteria pollutants” except SO₂, and also has a nonattainment area for lead; however, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all transportation projects planned for a region over a period of at least 20 years (for the RTP), and 4 years (for the FTIP). RTP and FTIP conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the Clean Air Act and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), FHWA, and FTA, make the determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept, scope, and “open-to-traffic”

schedule of a proposed transportation project are the same as described in the RTP and the TIP, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that the project comes from a conforming RTP and TIP and the project has a design concept and scope¹⁰ that has not changed significantly from those in the RTP and TIP. If the design concept and scope have changed substantially from that used in the RTP Conformity analysis, RTP and TIP amendments may be needed. Project-level conformity also needs to demonstrate that project analyses have used the latest planning assumptions and U.S. EPA-approved emissions models; the project complies with any control measures in the SIP in PM areas. Furthermore, additional analyses (known as hot-spot analyses) may be required for projects located in CO and PM nonattainment or maintenance areas to examine localized air quality impacts.

2.4.3 National Environmental Policy Act

NEPA requires that policies and regulations administered by the federal government are consistent with its environmental protection goals. NEPA also requires that federal agencies use an interdisciplinary approach to planning and decision-making for any actions that could impact the environment. It requires environmental review of federal actions including the creation of Environmental Documents (EDs) that describe the environmental effects of a proposed project and its Alternative (including a section on air quality impacts).

2.4.4 California Environmental Quality Act

CEQA¹¹ is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA documents address CCAA requirements for transportation projects. While state standards are often more strict than federal standards, the state has no conformity process.

2.4.5 Local

Plan Bay Area

SB 375 requires the Bay Area regional planning agencies to include a SCS in their regional transportation plan updates to describe how the GHG emissions reductions set by CARB would be met through land-use and transportation planning. In 2010, the MTC approved a set of "*Bay Area Principles for Establishing Regional Greenhouse Gas Reduction Targets*" (Resolution 3970) that proposed per-

¹⁰ "Design concept" means the type of facility that is proposed, such as a freeway or arterial highway. "Design scope" refers to those aspects of the project that would clearly affect capacity and thus any regional emissions analysis, such as the number of lanes and the length of the project.

¹¹ For general information about CEQA, see: <http://resources.ca.gov/ceqa/more/faq.html>.

capita GHG emission reductions of 7 percent from 1990 by 2020 and 15 percent by 2035. Subsequently, MTC, along with the Association of Bay Area Governments (ABAG), developed the SCS plans to meet state targets for reducing greenhouse gas emissions from light-duty vehicles. Plan Bay Area 2040 is the update to this plan, which includes implementation of transportation projects and Climate Initiatives Program that, together, would result in emissions from light-duty vehicles that meet the region's GHG reduction targets, per SB 375.¹² The proposed project, being part of the 2019 TIP is part of the Plan Bay Area 2040 transportation network.

The U.S. EPA has delegated responsibility to air districts to establish local rules to protect air quality. Caltrans' Standard Specification 14-9.02 (Caltrans, 2015) requires compliance with all applicable air quality laws and regulations including local and air district ordinances and rules.

SB 375 requires the Bay Area regional planning agencies to include a SCS in their regional transportation plan updates to describe how the GHG emissions reductions set by CARB would be met through land-use and transportation planning. In 2010, the MTC approved a set of "*Bay Area Principles for Establishing Regional Greenhouse Gas Reduction Targets*" (Resolution 3970) that proposed per-capita GHG emission reductions of 7 percent from 1990 by 2020 and 15 percent by 2035. Subsequently, MTC, along with the ABAG, developed the SCS plans to meet state targets for reducing greenhouse gas emissions from light-duty vehicles. Plan Bay Area 2040 is the update to this plan, which includes implementation of transportation projects and Climate Initiatives Program that, together, would result in emissions from light-duty vehicles that meet the region's GHG reduction targets, per SB 375¹³. The proposed project, being part of the 2019 TIP is part of the Plan Bay Area 2040 transportation network.

Bay Area 2017 Clean Air Plan

The Bay Area 2017 Clean Air Plan (CAP) is a multi-pollutant plan prepared by the BAAQMD that addresses GHG emissions along with other air emissions in the San Francisco Bay Area Air Basin. One of the key objectives in the CAP is climate protection. The 2017 CAP includes emission control measures in five categories: Stationary Source Measures, Mobile Source Measures, Transportation Control Measures, Land Use and Local Impact Measures, and Energy and Climate Measures. Consistency of a project with current control measures is one measure of its consistency with the CAP. The current CAP also includes performance objectives, consistent with the State's climate protection goals under SB 32, designed to reduce emissions of GHGs to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were posted on BAAQMD's

¹² MTC and ABAG. 2017. *Plan Bay Area 2040 Draft EIR SCH# 2016052041*. April.

¹³ MTC and ABAG. 2017. *Plan Bay Area 2040 Draft EIR SCH# 2016052041*. April.

website and included in the updated CEQA Guidelines (updated 2011 and recently in May 2017). The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 7.

Table 7 - Air Quality Significance Thresholds

Criteria Air Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
ROG	54	54	10
NO _x	54	54	10
PM ₁₀	82 (Exhaust)	82	15
PM _{2.5}	54 (Exhaust)	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards	Single Sources Within 1,000-foot Zone of Influence	Combined Sources (Cumulative from all sources within 1,000-foot zone of influence)	
Excess Cancer Risk	> 10.0 per one million	> 100.0 per one million	
Hazard Index	> 1.0	> 10.0	
Incremental annual PM _{2.5}	>0.3 µg/m ³	>0.8 µg/m ³	
Greenhouse Gas Emissions			
GHG Annual Emissions	Compliance with a Qualified GHG Reduction Strategy OR 1,100 metric tons or 4.6 metric tons per capita		
Note: ROG = reactive organic gases, NO _x = nitrogen oxides, PM ₁₀ = coarse particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, PM _{2.5} = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less, and GHG = greenhouse gases.			

Source: Bay Area Air Quality Management District, 2017

3. Affected Environment

The topography of a region can substantially impact air flow and resulting pollutant concentrations. California is divided into 15 air basins with similar topography and meteorology to better manage air quality throughout the state. Each air basin has a local air district that is responsible for identifying and implementing air quality strategies to comply with ambient air quality standards.

The Dublin Boulevard – North Canyons Parkway Extension project site is located in proximity to the cities of Dublin and Livermore in Alameda County, an area within the San Francisco Bay Air Basin, which includes Marin, Napa, San Mateo, Contra Costa, Alameda, Santa Clara, and parts of Sonoma and Solano counties. Air quality regulation in the San Francisco Air Basin is administered by BAAQMD. Current and forecasted population for Alameda County reached 1.44 million in 2000 and is projected to increase to 1.71 million by 2025 and the county's economy is largely driven by a diverse cross section of employment such as Government, Education and Health, Retail Trade, Management/Professional, Manufacturing, and Construction.

3.1 Climate, Meteorology, and Topography

Meteorology (weather) and terrain can influence air quality. Certain weather parameters are highly correlated to air quality, including temperature, the amount of sunlight, and the type of winds at the surface and above the surface. Winds can transport O₃ and O₃ precursors from one region to another, contributing to air quality problems downwind of source regions. Furthermore, mountains can act as a barrier that prevents O₃ from dispersing.

The project is in the San Francisco Bay Area Air Basin and is under the jurisdiction of the BAAQMD. The project is situated in the Livermore Valley which is a valley in eastern Alameda County in the San Francisco Bay Area Air Basin. The valley is located about 30 miles (48 km) east of the first coastal range of foothills that surround the San Francisco Bay Area. The Livermore Valley has an east-west orientation with mountain passes on the west and east connecting the Bay Area and the Central Valley. The passes are used by railroads and highways to connect the two regions. Livermore Valley is about 15 miles (24 km) long (east to west), 10 miles (16 km) wide (north to south) and surrounded by California coastal range mountains and foothills.

Livermore Valley has a Mediterranean climate, although it is close to a semi-arid climate because of its relatively low annual precipitation. It features warm to hot, dry summers and mild to cool, wet winters. Summer (June–October) daytime temperatures average in the 75 to 85°F (24 to 29°C) range, but sometimes reach 100°F (38°C) and can occasionally approach 110°F (43°C). Summer nights, however, are normally much cooler, with lows in the 50 to 60°F (10 to 16°C) range. The valley's passes direct the normal west to east flow of air through the valley. Usually there is a strong evening wind in the summer that brings cool air off the Pacific Ocean into the Livermore valley as it heads towards the much hotter

Central Valley. This wind is strong enough with an average summer wind speed of about 9 miles per hour (14 km/h) and predictable enough to make the Livermore hills covered with wind turbines mounted in Altamont Pass. The period from June to September is extremely dry and is characterized by clear skies, but in late summer, subtropical moisture occasionally surges into the Livermore Valley, bringing high humidity, monsoon clouds, and, much less commonly, thunderstorms.

Nearly all the 14.6 inches (370 mm) of annual Livermore rainfall comes between September and May, but about 50% of the days are sunny during this period with no appreciable cloud cover. The peak rainy months are December to March. Most rainstorms are classified as 50% light rain, 32% moderate rain, 11% heavy rain and less than 6% thunder showers. The coldest months are December and January, with a mean high of about 56°F (13°C) and a low of about 38°F (3°C) with some occasional frost possible on clear mornings. The temperature can drop to as low as the 20 to 25°F (−7 to −4°C) range on an exceptionally cold night. Snow is very rare, but light dustings do occur on the surrounding hills and occasionally in the valley.

The record high temperature is 115°F (46 °C), recorded on September 3, 1950, and the record low temperature is 18°F (−8°C), recorded on January 5, 1961, and December 9, 1972.

The Lawrence Livermore National Laboratory climatological station, maintained by Lawrence Livermore National Laboratory, is located near the project site and is representative of meteorological conditions near the project. Figure 4 shows a wind rose, illustrating the predominant wind patterns near the project area.

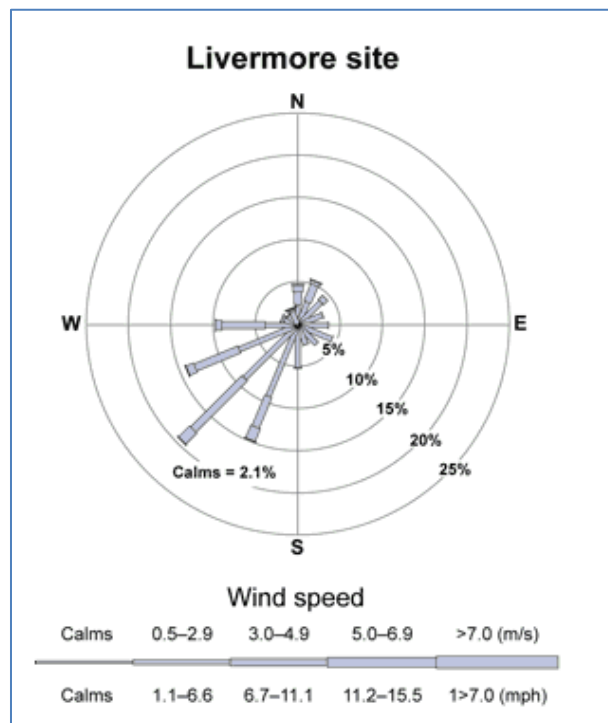


Figure 4 - Predominant Wind Patterns Near the Project.

3.2 Existing Air Quality

This section summarizes existing air quality conditions near the proposed project area. Figure 5 shows the location of the monitoring site compared to the project location. Data from the monitoring sites include attainment statuses for criteria pollutants, describes local ambient concentrations of criteria pollutants for the past 5 years, and discusses MSAT and GHG emissions.

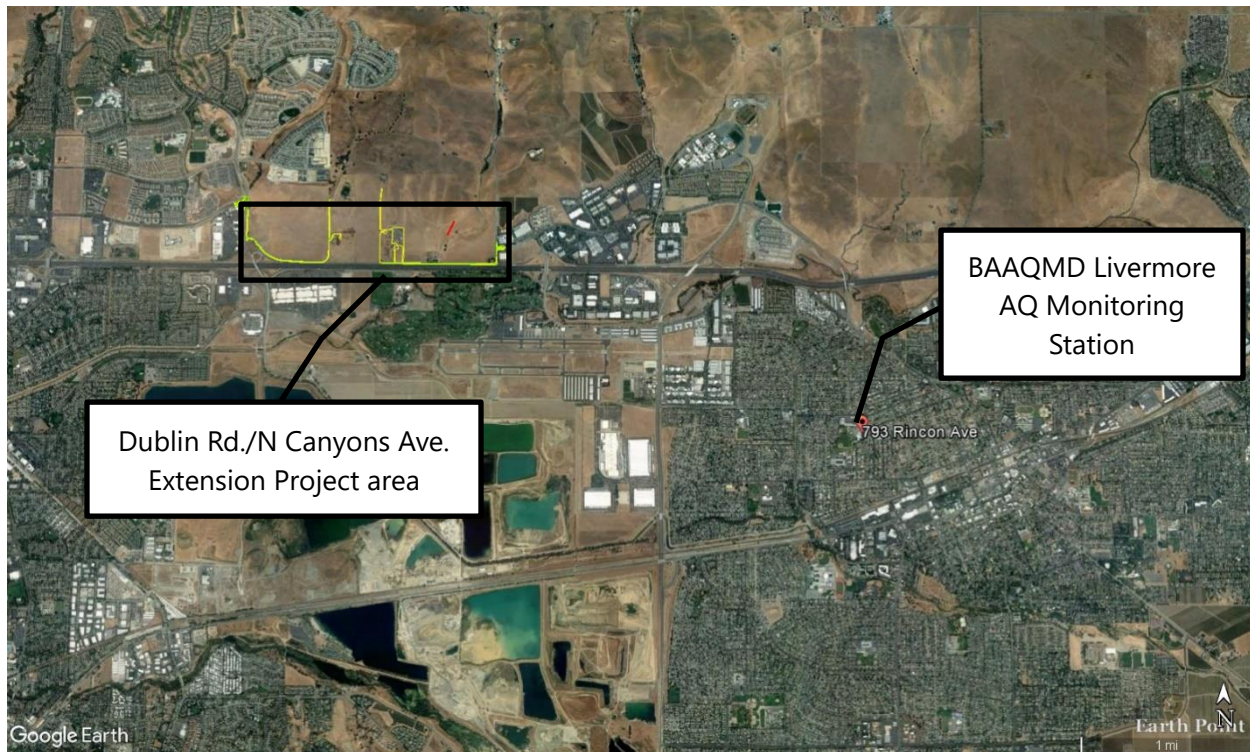


Figure 5 - Map of Air Quality Monitoring Stations Located Near the Project.

3.2.1 Criteria Pollutants and Attainment Status

Table 8 lists the state and federal attainment status for all regulated pollutants. The current designation of the Basin shows that the area is nonattainment for the state O_3 , PM_{10} , and $PM_{2.5}$ standards, nonattainment for the federal O_3 and $PM_{2.5}$ standards, and unclassified for the national PM_{10} . The closest air monitoring station to the project site is in the City of Livermore approximately 4 miles to the east of the project site; however, it does not collect data for CO or PM_{10} . The nearest PM_{10} monitoring station is in Concord approximately 19 miles northwest of the project and the closest carbon monoxide monitoring site is in Oakland East, approximately 18 miles west of the project site. The data show that during the past few years, the project area has exceeded the state and/or federal O_3 , PM_{10} , and $PM_{2.5}$ ambient air quality standards. Table 9 lists air quality trends in data collected at the Livermore station and the Oakland Station for the past 5 years, 2013 through 2018 air monitoring data published by the BAAQMD, which is the most recent time-period available.

Table 8 - State and Federal Attainment Status

Pollutant	State Attainment Status	Federal Attainment Status
Ozone (O ₃)	Nonattainment	Nonattainment (Marginal)
Respirable Particulate Matter (PM ₁₀)	Nonattainment	Attainment
Fine Particulate Matter (PM _{2.5})	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment Maintenance (Moderate)
Nitrogen Dioxide (NO ₂)	Attainment	Unclassified (EPA Attainment designation expected) ¹
Sulfur Dioxide (SO ₂)	Attainment	Unclassified (EPA Attainment designation expected) ¹
Lead (Pb)	Attainment	Attainment
Visibility-Reducing Particles	Unclassified	N/A
Sulfates	Attainment	N/A
Hydrogen Sulfide	Unclassified	N/A
Vinyl Chloride	No Information Available	N/A

Source: Bay Area Air Quality Management District, 2018; WWW.ARB.ca.gov/desig/adm/adm.htm

US EPA Greenbook <https://www3.epa.gov/airquality/greenbook/cbtc.html>

- 1 U.S. EPA was expected to make an attainment designation by the end of 2017; however, these designations have not yet been made. Monitoring data indicate the region meets the standard (attainment)

Table 9 - Air Quality Concentrations for the Past 5 Years

Pollutant		Standard	2013	2014	2015	2016	2017
Ozone – From the Livermore Station							
Max 1-hr concentration			0.096 ppm	0.093 ppm	0.105 ppm	0.102 ppm	0.109 ppm
No. days exceeded: State	0.09 ppm		3	0	1	2	5
Max 8-hr concentration			0.077 ppm	0.080 ppm	0.081 ppm	0.085 ppm	0.086 ppm
No. days exceeded: State	0.070 ppm		2	4	7	4	6
Federal	0.070 ppm		1	7	7	6	6
Carbon Monoxide – From the Oakland Station							
Max 1-hr concentration			3.6 ppm	2.8 ppm	2.4 ppm	2.6 ppm	3.2 ppm
No. days exceeded: State	20 ppm		0	0	0	0	0
Federal	35 ppm		0	0	0	0	0
Max 8-hr concentration			2.0 ppm	1.7 ppm	1.4 ppm	1.0 ppm	2.2 ppm
No. days exceeded: State	9.0 ppm		0	0	0	0	0
Federal	9 ppm		0	0	0	0	0
PM₁₀ – Concord Monitoring Data							
Max 24-hr concentration			51 µg/m ³	43 µg/m ³	24 µg/m ³	19 µg/m ³	41 µg/m ³
No. days exceeded: State	50 µg/m ³		1	0	0	0	0
Federal	150 µg/m ³		0	0	0	0	0
Max annual concentration			16.0 µg/m ³	14.2 µg/m ³	13.1 µg/m ³	11.5 µg/m ³	13.3 µg/m ³
No. days exceeded: State	20 µg/m ³						
PM_{2.5} – From the Livermore Station							
Max 24-hr concentration			40.1 µg/m ³	42.9 µg/m ³	31.1 µg/m ³	22.3 µg/m ³	41.5 µg/m ³
No. days exceeded: Federal	35 µg/m ³		4	1	0	0	2
Max annual concentration			8.4 µg/m ³	7.6 µg/m ³	8.8 µg/m ³	7.5 µg/m ³	8.5 µg/m ³
No. days exceeded: State	12 µg/m ³		0	0	0	0	0
Federal	12.0 µg/m ³		0	0	0	0	0
Nitrogen Dioxide – From the Livermore Station							
Max 1-hr concentration			51 ppb	49 ppb	50 ppb	41 ppb	45 ppb
No. days exceeded: State	0.18 ppm		0	0	0	0	0
Federal	100 ppb		0	0	0	0	0
Max annual concentration			12 ppb	10 ppb	10ppb	9ppb	9 ppb
No. days exceeded: State	0.030 ppm		0	0	0	0	0
Federal	53 ppb		0	0	0	0	0

Source: Bay Area Air Quality Management District, 2018

3.2.2 Mobile Source Air Toxics

There are no include rail yards, transit terminals, or other nearby facilities serving on- or off-road motor vehicles that may be considered priority MSAT pollutant sources in the project area. Ambient MSAT data are available from ARB's website. (<http://www.arb.ca.gov/adam/toxics/toxics.html>).

3.2.3 Greenhouse Gas and Climate Change

The project is located within three different Climate Action Plan Areas; the City of Dublin Climate Action Plan dated October 2010; the City of Livermore Climate Action Plan, dated November 2012; and the County of Alameda Climate Action Plan, dated February 2014.

CO₂, as part of the carbon cycle, is an important compound for plant and animal life, but also accounted for 84 percent of California's total GHG emissions in 2015. Transportation, primarily on-road travel, is the single largest source of CO₂ emissions in the state.

The proposed project is in the Cities of Dublin and Livermore, and in Alameda County, and is included in the Plan Bay Area Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). The base year used for the existing conditions in the RTP/SCS was 2010, with the exception that for greenhouse gas emissions, where 2005 was the base year for one criterion to demonstrate compliance with SB 375. The horizon year (future conditions) for the RTP/SCS is 2040, when it is assumed that Plan Bay Area will be fully implemented; Plan Bay Area covers an approximately 25-year planning period, and the year 2040 represents the last year of the plan when projects/programs are anticipated to be fully implemented.

3.3 Sensitive Receptors

The BAAQMD defines sensitive receptors to include residential dwellings, including apartments, houses, and condominiums; schools, colleges, and universities; daycare centers and hospitals, and senior-care facilities. Based on research showing that the zone of greatest concern near roadways is within 500 feet (or 150 meters), sensitive receptors within 500 feet (or 150 meters) of the project footprint have been identified (CARB 2005). The results of the analysis below confirm that no impacts would occur within 500 feet, and therefore an expanded buffer distance of 2,000 is not needed; impacts to sensitive receptors would continue to dissipate further away from the project footprint.

Most of the surrounding area is undeveloped or developed with commercial uses. The majority of residential or potentially sensitive receptors are located further than 500 feet from the project. Receptors greater than 500 feet from the project would not be affected by localized air pollution from the project. There are no potential sensitive receptor is within 500 feet of the proposed roadway. Figure 5 shows the locations of sensitive receptor relative to the project site..

3.4 Conformity Status

The federal conformity requirement is based on FCAA Section 176(c), which prohibits the USDOT and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to the SIP for attaining the NAAQS.

Conformity requirements apply only in nonattainment and “maintenance” (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. U.S. EPA regulations at 40 Code of Federal Regulations (CFR) 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for state standards regardless of the status of the area.

“Transportation Conformity” applies to highway and transit projects and takes place on two levels: the regional (or planning and programming) level and the project level. The proposed project must conform at both levels to be approved.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, NO₂, O₃, PM₁₀ and PM_{2.5}, and in some areas (although not in California), SO₂. California has nonattainment status or maintenance area status for all transportation-related “criteria pollutants” except SO₂, and has a nonattainment status for lead; however, lead is not currently required by the FCAA to be covered in transportation conformity analysis.

Regional conformity is based on emission analysis of Regional Transportation Plans (RTPs) and FTIPs that include all transportation projects planned for a region over a period of at least 20 years (for the RTP) and 4 years (for the FTIP). RTP and FTIP conformity uses travel demand and emission models to determine whether the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the FCAA and the SIP are met. If the conformity analysis is successful, the MPO, FHWA, and FTA make the determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the FCAA. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept and scope and the “open-to-traffic” schedule of a proposed transportation project are the same as described in the RTP and FTIP, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that the project comes from a conforming RTP and TIP; the project has a design concept and scope¹⁴ that has not changed significantly from those in the RTP and TIP; project analyses have used the latest planning assumptions and EPA approved emissions models; and in PM areas, the project complies with any control measures in the SIP.

¹⁴ “Design concept” means the type of facility that is proposed, such as a freeway or arterial highway. “Design scope” refers to those aspects of the project that would clearly affect capacity and thus any regional emissions analysis, such as the number of lanes and the length of the project.

Furthermore, additional analyses (known as hot-spot analyses) may be required for projects located in CO and PM nonattainment or maintenance areas to examine localized air quality impacts

3.4.1 Regional Conformity

The project is included in the regional emissions analysis conducted by MTC for the current RTP, Plan Bay Area 2040 (ABAG and MTC 2017a, RTP ID 240386). The regional emissions analysis found that significant projects in the San Francisco Bay Area will conform to the SIP for attaining and/or maintaining the NAAQS as provided in Section 176(c) of the Clean Air Act. FHWA and FTA determined that the RTP conforms to the SIP on August 23, 2017. The project is also included in the MTC's financially constrained 2019 TIP (MTC 2018, TIP ID ALA150003). The TIP gives priority to eligible Transportation Control Measures (TCMs) identified in the SIP and provides sufficient funds to provide for their implementation. FHWA and FTA determined that the TIP conforms to the SIP on December 16, 2016. The project's design concept, scope, and open-to-traffic date assumptions are generally consistent with the regional emissions analysis performed for the current RTP and TIP. Currently the RTP assumes a 4-lane roadway project, if during the environmental and design process it is determined that a 6-lane roadway facility would better serve the needs of the area an amendment to the RTP will be required. Therefore, the project will not interfere with the timely implementation of any TCMs identified in the SIP. Photocopies of relevant pages from the RTP and TIP are included in Appendix A.

3.4.2 Project-Level Conformity

At the time of this report preparation, the San Francisco Bay Area Air Basin (SFBAAB) was designated as a federal maintenance area for CO, and the project is in a federal nonattainment area for O₃ and PM_{2.5}¹⁵. For nonattainment or maintenance area, a project-level hot-spot analysis for CO is required under 40 CFR 93.109 and project-level conformity to the SIP was performed. In accordance with guidance from the UC Davis Transportation Project-Level Carbon Monoxide Protocol, a CO hot-spot analysis was performed for the Build Alternative to evaluate the potential transportation-related impacts on local CO levels at the most congested intersections and/or interchanges. This project is not listed in the SIP as a TCM.

The SFBAAB is currently designated as a federal nonattainment area for O₃. Because O₃ impacts are regional in nature, projects that are included in a RTP and TIP have already undergone regional conformity analysis and do not require further analysis for a project-level conformity determination. This project is included in a conforming RTP and TIP, and therefore emissions of O₃ precursors from project-related traffic are not anticipated to cause or contribute to, or worsen, any O₃ violations.

¹⁵ On March 21, 2018, U.S. EPA informed the California Air Resources Board that the transportation conformity requirements for CO ended on June 1, 2018, as the region has been designated maintenance for 20 years. The region is now designated "Attainment."

In addition, the BAAQMD adopted the 2017 Clean Air Plan (CAP) to plan for and achieve compliance with the federal and State O₃ standards (BAAQMD 2017). The Build Alternative will not interfere with the control measures described in the 2017 CAP. Furthermore, the Build Alternative will provide transportation benefits that reduce pollutant emissions, including O₃ precursors, by improving traffic operations and efficiency.

40 CFR 93.123(c)(5) states that: “CO, PM₁₀, and PM_{2.5} hot-spot analyses are not required to consider construction-related activities which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established ‘Guideline’ methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site.” Because construction of the project is expected to last less than five years, an evaluation of CO, PM₁₀, and PM_{2.5} emissions during project construction is not required for a project-level conformity determination.

3.4.3 Interagency Consultation

The City of Dublin, as the project sponsor, initiated consultation with the Air Quality Conformity Task Force by submitting a Project Assessment Form for PM_{2.5} Interagency Consultation. The Task Force considered projected future traffic conditions, with and without the project, and whether the project meets the specific regulatory definition of a POAQC set forth in 40 CFR Part 93. On October 25, 2018, the Task Force determined that the project is not a POAQC (See Appendix D).

3.5 NEPA Analysis/Requirement

Caltrans, as assigned by the FHWA, is the lead agency under NEPA. The analysis addresses federal criteria pollutants (O₃, PM₁₀, PM_{2.5}, CO, NO₂, SO₂, and lead), MSATs and asbestos. The project is in the MTC non-attainment/maintenance area for air quality and is listed in MTC’s 2019 TIP (TIP identification number ALA150003) and the RTP (RTP number 17-01-0048). The future No Build scenario emissions were compared to the future Build scenario emissions. Nonattainment pollutants include O₃ and PM_{2.5}, the region is “Attainment/Maintenance” for CO¹⁶.

3.6 CEQA Analysis/Requirement

Dublin is the lead agency under CEQA. CEQA analysis is provided under a separate cover.

¹⁶ Adams, Elizabeth J., United States Environmental Protection Agency, Received by Aljabiry, Muhaned, Chief Office of Federal Transportation Management Program California Department of Transportation, March 21, 2018.

4. Environmental Consequences

This section describes the methods, impact criteria, and results of air quality analyses of the proposed project. Analyses in this report were conducted using methodology and assumptions that are consistent with the requirements of NEPA, CEQA, the CAAAs of 1990, and the CCAA of 1988. The analyses also use guidelines and procedures provided in applicable air quality analysis protocols, such as the Transportation Project-Level Carbon Monoxide Protocol (CO Protocol) (Garza et al., 1997), Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM₁₀ and PM_{2.5} Nonattainment and Maintenance Areas (U.S. EPA, 2015), and the FHWA Updated Interim Guidance on Air Toxics Analysis in NEPA Documents (FHWA, 2016).

4.1 Impact Criteria

Project-related emissions would have an adverse environmental impact if they result in pollutant emissions levels that either create or worsen a violation of an ambient air quality standard (identified in Table 4) or contribute to an existing air quality violation.

The NAAQS were used to evaluate air quality impacts from a Caltrans (NEPA) perspective. The CT-EMFAC, Caltrans's Ethylbenzene tool, and the Sacramento Metropolitan Air Quality Management District's Roadway Construction Emissions Model were used to calculate the emissions from the project.

4.2 Short-Term Effects (Construction Emissions)

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, and paving roadway surfaces. During construction, short-term degradation of air quality is expected from the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment powered by gasoline and diesel engines are also anticipated and would include CO, NO_x, VOCs, directly emitted PM₁₀ and PM_{2.5}, and toxic air contaminants (TACs) such as diesel exhaust particulate matter. Construction activities are expected to increase traffic congestion in the area, resulting in increases in emissions from traffic during the delays. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Under the transportation conformity regulations (40 CFR 93.123(c)(5)), construction-related activities that cause temporary increases in emissions are not required in a hot-spot analysis. These temporary

increases in emissions are those that occur only during the construction phase and last five years or less at any individual site. They typically fall into two main categories:

- *Fugitive Dust*: A major emission from construction due to ground disturbance. All air districts and the California Health and Safety Code (Sections 41700-41701) prohibit “visible emissions” exceeding three minutes in one hour – this applies not only to dust but also to engine exhaust. In general, this is interpreted as visible emissions crossing the right-of-way line.

Sources of fugitive dust include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site may deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM₁₀ emissions may vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM₁₀ emissions depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

- *Construction equipment emissions*: Diesel exhaust particulate matter is a California-identified toxic air contaminant, and localized issues may exist if diesel-powered construction equipment is operated near sensitive receptors.

Construction emissions were estimated for the project (Build Alternative) using detailed equipment inventories and project construction scheduling combined with emissions factors from the Sacramento Metropolitan Air Quality Management District Road Construction Emissions Model, Version 8.1.0. Construction-related emissions for the Build Alternative are presented in Table 10. The results of the construction emission calculations are included in Appendix B. The emissions presented are based on the best information available at the time of calculations. The emissions represent the peak daily construction emissions that would be generated by each alternative.

Table 10 – Maximum Construction Emissions for the Build Alternative

Activity/Phase	ROG (lbs./day)	PM₁₀ Exhaust (lbs./day)	PM_{2.5} Exhaust (lbs./day)	NO_x (lbs./day)	CO_{2e} (lbs./day)
Land Clearing/ Grubbing	10.91	5.56	5.1	107.75	13,399.38
Grading/Excavation	15.11	4.64	4.07	101.72	17,253.60
Drainage/Utilities/Sub- Grade	10.9	3.54	3.22	65.44	11,749.74
Paving	4.3	2.5	2.2	45.25	8,700.93
Average Daily	4.44	2.33	2.06	47.10	7,977.51

Activity/Phase	ROG	PM₁₀ Exhaust	PM_{2.5} Exhaust	NO_x	CO_{2e} (metric tons)
Project Total (Tons/construction Period)	0.82	0.43	0.38	8.69	1335

Source: Illingworth & Rodkin, 2018

Implementation of the following measures, some of which may also be required for other purposes such as storm water pollution control, will reduce air quality effects resulting from construction activities. Please note that although these measures are anticipated to reduce construction-related emissions, these reductions cannot be quantified at this time.

- The construction contractor must comply with the Caltrans' Standard Specifications in Section 14-9 (2015).
 - Section 14-9-02 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.
- Water or a dust palliative will be applied to the site and equipment as often as necessary to control fugitive dust emissions.
- Soil binder will be spread on any unpaved roads used for construction purposes, and on all project construction parking areas.
- Trucks will be washed as they leave the right-of-way as necessary to control fugitive dust emissions.
- Construction equipment and vehicles will be properly tuned and maintained. All construction equipment will use low sulfur fuel as required by CA Code of Regulations Title 17, Section 93114.
- A dust control plan will be developed documenting sprinkling, temporary paving, speed limits, and timely re-vegetation of disturbed slopes as needed to minimize construction impacts to existing communities.
- Equipment and materials storage sites will be located as far away from residential and park uses as practicable. Construction areas will be kept clean and orderly.
- Environmentally sensitive areas will be established near sensitive air receptors. Within these areas, construction activities involving the extended idling of diesel equipment or vehicles will be prohibited, to the extent feasible.
- Track-out reduction measures, such as gravel pads at project access points to minimize dust and mud deposits on roads affected by construction traffic, will be used.
- All transported loads of soils and wet materials will be covered before transport, or adequate freeboard (space from the top of the material to the top of the truck) will be provided to minimize emission of dust during transportation.

- Dust and mud that are deposited on paved, public roads due to construction activity and traffic will be promptly and regularly removed to reduce PM emissions.
- To the extent feasible, construction traffic will be scheduled and routed to reduce congestion and related air quality impacts caused by idling vehicles along local roads during peak travel times.
- Mulch will be installed, or vegetation planted as soon as practical after grading to reduce windblown PM in the area.

Disturbance to naturally occurring asbestos during construction is a concern in parts of California. According to information presented in the Department of Conservation Division of Mines and Geology map, naturally occurring asbestos is not indicated in the project footprint or in the vicinity of the project (California Department of Conservation 2011).

4.3 Long-Term Effects (Operational Emissions)

Operational emissions take into account long-term changes in emissions due to project operation (excluding the construction phase). The operational emissions analysis compares forecasted emissions for existing/baseline, No-Build, and the Build Alternative. The CT-EMFAC model, Version 4.0) was used with project traffic data to analyze air pollutant emissions associated with the project. Table 11 shows the effect of the project in the project vicinity as shown in Figure 2 while Table 12 shows the project emissions in the local roadway network and from the proposed new roadway only.

In the project vicinity overall emissions of all pollutants would be reduced from existing conditions by implementation of the project due to improvement in traffic flow on the roadway network and through cleaner vehicles which are assumed in the model defaults.

In the immediate project area PM₁₀ and PM_{2.5} emissions would increase slightly due to the presence of a new roadway; however, the emissions are below the significance thresholds for all pollutants. Emissions of CO and NO_x would decrease.

Table 11 - Summary of Comparative Emissions Analysis in the Project Vicinity

Scenario/ Analysis Year	CO (tons/day)	PM₁₀ (tons/day)	PM_{2.5} (tons/day)	NO_x (tons/day)
Baseline 2013	1,754.98	8.10	7.67	708.80
No-Build 2025	962.58	3.19	2.99	252.86
Build Alternative 2025	962.53	3.19	2.99	252.85
No-Build 2040	655.02	1.74	1.63	148.69
Build Alternative 2040	655.21	1.74	1.63	148.73

Source: Illingworth & Rodkin, 2018

Table 12 - Summary of Comparative Emissions Analysis for the Project

Scenario/ Analysis Year	CO (pounds/day)	PM₁₀ (pounds/day)	PM_{2.5} (pounds/day)	NOx (pounds/day)
Analysis for the Project Area (Local Roadway Network)				
Baseline (Existing Conditions) 2013	48.8	1.6	0.9	20.8
No-Build 2025	26.3	1.9	0.8	8.0
Build Alternative 2025	57.5	4.1	1.7	17.4
No-Build 2040	35.3	4.0	1.6	11.3
Build Alternative 2040	48.6	5.5	2.3	15.6
Analysis for the New Roadway Only				
Baseline (Existing Conditions) 2013	0	0	0	0
No-Build 2025	0	0	0	0
Build Alternative 2025	31.2	2.2	0.9	9.4
No-Build 2040	0	0	0	0
Build Alternative 2040	13.3	1.5	0.7	4.3

Source: Illingworth & Rodkin, 2018

4.3.1 CO Analysis

The CO Protocol was developed for project-level conformity (hot-spot) analysis and was approved for use by the U.S. EPA in 1997. It provides qualitative and quantitative screening procedures, as well as quantitative (modeling) analysis methods to assess project-level CO impacts. The qualitative screening step is designed to avoid the use of detailed modeling for projects that clearly cannot cause a violation, or worsen an existing violation, of the CO standards. Although the protocol was designed to address federal standards, it has been recommended for use by several air pollution control districts in their CEQA analysis guidance documents and should also be valid for California standards because the key criterion (8-hour concentration) is similar: 9 ppm for the federal standard and 9.0 ppm for the state standard.

The CO impacts analysis followed the procedures in the CO Protocol; the protocol applies screening procedures, based on the attainment status of the area in which the project is planned, to evaluate potential CO impacts of the project and assess the need for any further detailed analysis. The project is within a CO maintenance area where continued attainment of the federal CO standard has been verified. The area is also in attainment for the state CO standard. The project is included in a conforming RTP and TIP. Based on the CO Protocol, the screening procedure in "Level 7" was followed to make a comparison of the Build Alternative and one of the worst intersections in the region. For this analysis, the State Route 24 between Broadway and State Route 13 was used. Projects that meet the requirement in Section 4.7.2 of the Caltrans CO Protocol are deemed to be satisfactory and no further

analysis is necessary. A discussion of the protocol list items is provided below with a project-specific discussion for each item.

The Dublin Boulevard – North Canyons Parkway extension would carry less traffic than the comparison location. In addition, the background level at the project site would be lower than that of the comparison location.

Table 13 - Comparison of Project to an Existing Roadway per CO Protocol Criteria

Parameter	Dublin Boulevard – North Canyons Parkway Extension (Build/Project)	State Route 24 Between Broadway and Caldecott Lane
Receptor Distance	550 feet	150 feet
Roadway Geometry	4-6 Lanes	8 Lanes
Worst-Case Meteorology	Coastal Valley	Coastal Valley
AADT Mainline Volumes¹⁷	Dublin Boulevard – North Canyons Parkway Extension ¹⁸ 17,000 (2025) 19,000 (2040)	SR 24 Broadway – 179,000 (2016) ¹
Hot/Cold Starts	50/10	50/10
Percent Heavy Duty Gasoline Trucks¹⁹ 20Truck AADT	4.3% - Average of Existing Dublin Boulevard and North Canyons parkway Truck AADT 40	2.26 % AADT 3,909
8-Hour Background (CO)²¹ (Highest reported in last 3 years)	Oakland – International Blvd. 2015 – 1.4 ppm 2016 – 1.0 ppm 2017 – 2.2 ppm	Oakland West – 21 st St. 2015 – 2.6 ppm 2016 – 2.2 ppm 2017 – 2.1 ppm

Source: Illingworth & Rodkin, 2018; Kittelson & Associates, 2018;

¹ Caltrans Website: http://www.dot.ca.gov/trafficops/census/docs/2016_aadt_truck.pdf; 2017 data not available

The following discusses each of the requirements in Section 4.7.2 of the Caltrans CO Protocol:

1. The receptors at the location under study are at the same distance or farther from the traveled roadway than the receptors at the location where attainment has been demonstrated.

Response - The receptors at the project location are either at the same distance or farther from the traveled way than the State Route 24 roadway.

¹⁷ Source: 2016 Caltrans Traffic and Vehicle Data Systems Unit

(<http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2015all/index.htm>) and Personnel Comm. David Kobayashi, VTA.

¹⁸ Source Traffic Report Dublin Boulevard – North Canyons Parkway Extension, Prepared by Kittelson & Associates, Inc. March 2018

¹⁹ Truck AADT is from 2015 Annual Average Daily Truck Traffic on the California State Highway System. The component of heavy duty gasoline trucks as part of the truck count is not available; the value listed represents all trucks, of which a portion would be heavy duty gasoline trucks. The same data source was used for both facilities compared in this table. (<http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/truck2015final.pdf>)

²⁰ Source Traffic Report Dublin Boulevard – North Canyons Parkway Extension, Prepared by Kittelson & Associates, Inc. March 2018

²¹ BAAQMD Annual Bay Area Air Quality Summaries. <http://www.baaqmd.gov/about-air-quality/air-quality-summaries> Accessed December 18, 2018.

2. The roadway geometry of the roadway locations is not significantly different.

Response – SR 24 roadway has 8 travel lanes and the Dublin Boulevard – North Canyons Parkway Extension will have 4 to 6 travel lanes.

3. Expected worst-case meteorology at the location under study is the same or better than the worst-case meteorology at the location where attainment has been demonstrated.

Response - The meteorology, wind speed, wind direction, temperature, and stability class are the same at both locations.

4. Traffic lane volumes at the location under study are the same or lower than those at the location where attainment has been demonstrated.

Response – State Route 24 between Broadway and Caldecott Lane is in close proximity to the proposed project. The roadway has higher traffic volumes than the project and is in an area that is in attainment for CO (see Table 3).

5. Percentages of vehicles operating in cold start mode at the location under study are the same or lower than those at the location where attainment has been demonstrated.

Response - Based on the truck traffic counts from Caltrans²², the traffic composition is the same at both locations.

6. Percentages of Heavy Duty Gas Trucks at the locations under study are the same or lower than the percentage at the location where attainment has been demonstrated.

Response - The percentage of Heavy Duty Gas Trucks along State Route 24 is lower however the volume is higher than on Dublin Boulevard and North Canyons Parkway, and the total number of trucks along Dublin Boulevard and North Canyons Parkway is significantly lower than State Route 24.

7. Background concentrations at the locations under study are the same or lower than the background concentration at the location where attainment has been demonstrated.

Response – Background concentration at all locations are similar. The closest monitoring station to the project is located in Oakland on Industrial Boulevard and is maintained by the BAAQMD and the closet monitoring station to State Route 24 between Broadway and Caldecott Lane is located in Oakland West on 21st Street. The following table shows the Maximum levels over the last three years.

²²<http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm>

Table 14 - Measured CO 8-hour Average Concentrations in ppm at Bay Area Monitoring Sites

Year	Maximum Entire Bay Area	Maximum in Oakland	Maximum in Oakland West
2017	4.7* / 2.2	2.2	2.1
2016	2.2	1.0	2.2
2015	2.6	1.4	2.6
*Likely an episodic event			

Source: Bay Area Air Quality Management District, Air Pollution Summaries (2018)

All of the above conditions are satisfied and there is no reason to expect higher CO concentrations at the Dublin Boulevard – North Canyons Parkway Extension.

The project location in Alameda County has recorded CO levels well below both the CO standard and the comparison location's level. The proposed project is in an area that continues to meet air quality standards (within a CO maintenance area), and the documentation satisfies the conditions in the CO Protocol supporting a conclusion that there is no reason to expect higher concentrations at the project location than the comparative facility/location. Therefore, the project is not expected to cause exceedances of state or federal CO standards.

The comparative analysis results shown above indicate that total CO concentrations would not cause or contribute to any new localized violations of the federal 1-hour or 8-hour CO ambient standards.

The approved RTP and TIP for the project area has no CO mitigation or control measures that relate to the project's construction or operation. Therefore, a written commitment consistent with CFR 93.125 to implement CO control measures is not required.

4.3.2 PM Analysis

Emissions Analysis

PM emissions were estimated for Baseline, No-Build, and the Build Alternative for the opening year 2025 and horizon year 2040. The PM emissions were lower in the opening year and the horizon year with the project. Tables 11 and 12 shows the modeling results for the project.

Hot-Spot Analysis

In November 2015, the U.S. EPA released an updated version of Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} 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 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;
- (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;
- (iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- (iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
- (v) Projects in or affecting locations, areas, or categories of sites which are identified in the PM_{2.5} and PM₁₀ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Since the project is not a POAQC, a PM_{2.5} and PM₁₀ hot spot analysis is not required. In addition, the area is not a Nonattainment or Maintenance for PM₁₀.

4.3.3 Mobile Source Air Toxics Analysis

FHWA released updated guidance in October 2016 (FHWA, 2016) 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 Alternative 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. Most projects fall into this category, including this project. Examples of these types of projects are minor widening projects; new interchanges; replacing a signalized intersection on a surface street; and projects where design year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT).

For these projects, a qualitative assessment of emissions projections should be conducted. This qualitative assessment should compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic and the associated changes in MSAT for the project alternatives, including no-build, based on VMT, vehicle mix, and speed. It should also discuss national trend data projecting substantial overall reductions in emissions due to stricter engine and fuel regulations issued by EPA. Because the emission effects of these projects typically are low, we expect there would be no appreciable difference in overall MSAT emissions among the various alternatives.

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).

MSAT emissions were estimated for Baseline, No-Build, and the Build Alternative for the opening year 2025 and horizon year 2040. The modeling results for the Baseline, No-Build, and Build Alternative are presented in Table 16 for the entire network (in the vicinity) and in Table 17 for the localized increase along the roadway. Appendix C summarizes the results of the MSAT analysis.

The latest version of CT-EMFAC, CT-EMFAC2014 released in November 30, 2015, was used to estimate emissions of benzene, 1,3-butadiene, formaldehyde, acrolein, naphthalene, DPM, and POM. The emissions for ethylbenzene were calculated using the Caltrans Ethylbenzene Emissions Calculator dated April 26, 2016. Figure 6 illustrates the extent of the area considered in the vicinity MSAT analysis, while the localized analysis was based upon new traffic along the roadway. Traffic activity data were estimated for each of different periods of a representative day in the baseline, opening 2025, and horizon 2040 years. Emissions were estimated for all MSATs using CT-EMFAC, based on EMFAC and speciation factors provided by ARB and U.S. EPA.

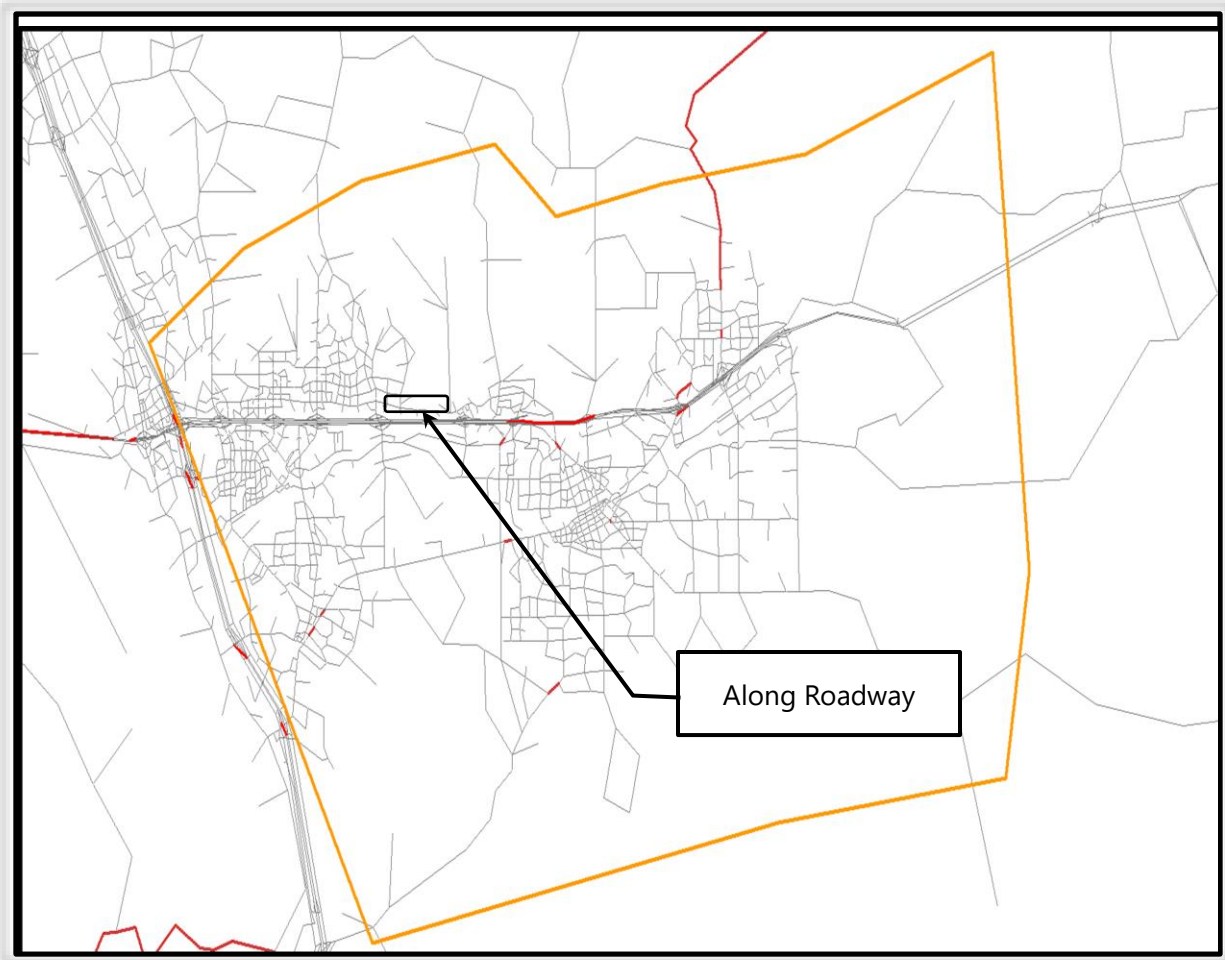


Figure 6 - Extent of Area Considered in the MSAT Analysis.

Table 15 - Summary of Daily VMT used in MSAT Emissions Analysis

Traffic, VMT	Baseline (Existing Conditions) 2013	No-Build 2025	Build Alternative 2025	No-Build 2040	Build Alternative 2040
Region	4,589,047	5,168,804	5,168,581	5,585,023	5,859,720
New Roadway	0	0	38,735	0	46,592

Table 16 - Summary of Comparative MSAT Emissions Analysis – in Project Vicinity

Scenario/ Analysis Year	1,3- butadiene (lbs/day)	Acetal- dehyde (lbs/day)	Acrolein (lbs/day)	Benzene (lbs/day)	Diesel PM (lbs/day)	Ethyl- benzene (lbs/day)	Formal- dehyde (lbs/day)	Naph- thalene (lbs/day)	Polycyclic Organic Matter (lbs/day)
Baseline (Existing Conditions) 2013	3.39	15.53	0.72	16.82	46.41	3.68E-06	36.07	0.51	0.79
No-Build 2025	1.70	7.05	0.35	8.34	10.40	2.47E-06	16.63	0.25	0.35
Build Alternative 2025	1.70	7.05	0.35	8.34	10.40	2.80E-06	16.62	0.25	0.35
No-Build 2040	1.39	7.35	0.28	7.03	6.44	1.47E-06	16.63	0.23	0.27
Build Alternative 2040	1.40	7.35	0.28	7.03	6.45	1.67E-06	16.64	0.23	0.27

Source: Illingworth & Rodkin, 2018

Table 17 - Summary of MSAT Emissions Analysis – along Proposed Roadway

Scenario/ Analysis Year	1,3- butadiene (lbs/day)	Acetal- dehyde (lbs/day)	Acrolein (lbs/day)	Benzene (lbs/day)	Diesel PM (lbs/day)	Ethyl- benzene (lbs/day)	Formal- dehyde (lbs/day)	Naph- thalene (lbs/day)	Polycyclic Organic Matter (lbs/day)
Baseline (Existing Conditions) 2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
No-Build 2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Build Alternative 2025	0.01	0.05	<0.01	0.06	0.08	<0.01	0.12	<0.01	<0.01
No-Build 2040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Build Alternative 2040	0.01	0.06	<0.01	0.06	0.05	<0.01	0.13	<0.01	<0.01

4.3.4 Local Community Risk from Project Operation

The project would be constructed near existing sensitive receptors including residences. Substantial sources of air pollution such as roadways can adversely affect nearby sensitive receptors as part of implementing new projects.

Screening Local Roadway Community Risk

For local roadways, BAAQMD has provided the *Roadway Screening Analysis Calculator* to assess whether roadways with traffic volumes of over 10,000 vehicles per day may have a potentially significant effect on sensitive receptors. Two adjustments were made to the cancer risk predictions made by this calculator: (1) adjustment for latest vehicle emissions rates and (2) adjustment of cancer risk to reflect new OEHHA guidance described above.

The calculator uses EMFAC2011 emission rates for the year 2014. Overall, emission rates will decrease by the time the project is constructed and occupied. The project is not likely to be occupied prior to 2020. In addition, a new version of the emissions factor model, EMFAC2014 is available. This version predicts much lower emission rates than EMFAC2011 and the rates for later years are lower than the rates for 2014. Using a fleet mix typical of local roadways operating at 30 mph, EMFAC2014 predicts diesel (DSL) PM_{2.5} aggregate emission rates in 2018 that are 46 percent of EMFAC2011 rates for 2014.²³ TOG for gasoline-powered vehicle rates are 56 percent of EMFAC2011 year 2014 rates. An adjustment factor of 0.5 was applied to the *Roadway Screening Analysis Calculator* results.

The adjusted predicted cancer risk was then adjusted again using a factor of 1.3744 to account for new guidance to compute cancer risk (OEHHA 2015). This factor was provided by BAAQMD for use with their CEQA screening tools that are used to predict cancer risk.²⁴

Traffic for Dublin Boulevard/North Canyons Parkway extension was based on the traffic data prepared for this project by Kittelson & Associates in July and August 2018. The study segment of Fallon Road and Dolan Road was used to describe traffic conditions, where the increase in ADT ranges from 11,525 vehicles for "2025 Project" and 19,145 vehicles for 2040 Project." This assessment conservatively used the highest "2040 Project" condition. The edge of the travel way for this east-west roadway was entered as 50 feet from the nearest receptor. The roadway orientation, distance and direction, and traffic volume were input to the BAAQMD *Roadway Screening Analysis Calculator* for Alameda County. Based on the BAAQMD screening calculator, potential excess cancer risk would be 3.56 in one million, which is below the BAAQMD significance threshold of 10.0 in one million. Annual PM_{2.5} concentration would be 0.12µg/m³, which would not exceed the BAAQMD significance threshold of greater than 0.3µg/m³.

²³ Comprised mostly of light- and medium-duty vehicles.

²⁴ Email from Virginia Lau, BAAQMD to Bill Popenuck of Illingworth & Rodkin, Inc, dated November 15, 2015.

Note that these results are based on a screening calculation that assumes current emission rates and poor dispersion characteristics. A refined modeling the scenario would likely predicted lower impacts.

Project Construction Activity

Construction equipment and associated heavy-duty truck traffic for the proposed road construction would generate diesel exhaust, which is a known TAC.²⁵ Construction exhaust emissions may pose community risks for sensitive receptors in the vicinity of the construction activities. The primary community risk impact issues associated with construction emissions are cancer risk and exposure to PM_{2.5}. Diesel exhaust poses both a potential health and nuisance impact to nearby receptors.

Construction period emissions were computed using the Roadway Construction Emissions Model Version 8.1.0 emissions model along with projected construction activity, as described above. The Roadway Construction Emissions Model provided total annual PM₁₀ exhaust emissions (assumed to be DPM) from the off-road construction equipment and worker, vendor and hauling trucks used for the proposed road construction of 0.43 tons (860 pounds) over the construction period for the entire project (including off-site truck travel). Fugitive exhaust PM_{2.5} emissions were also computed and included in this analysis. The model predicts emissions of 0.38 tons (760 pounds) of fugitive PM_{2.5} over the construction period. Construction activities would move along the roadway and not be intensive for extended periods at any one location near sensitive receptors.

Predicted Cancer Risk and Hazards

The maximum modeled residential concentrations, or maximally exposed individual (MEI) are shown on Figure 7, and the residential maximum annual PM_{2.5} concentrations are shown in Table 16. The cancer risk calculations were based on using the maximum modeled DPM concentrations for each type of sensitive receptor and applying the methods described in *Attachment 3*.

As shown in Table 16, the maximum increased residential risk, of 4 chances per million or less, would be below the BAAQMD significance threshold of a cancer risk of 10 in one million or greater.

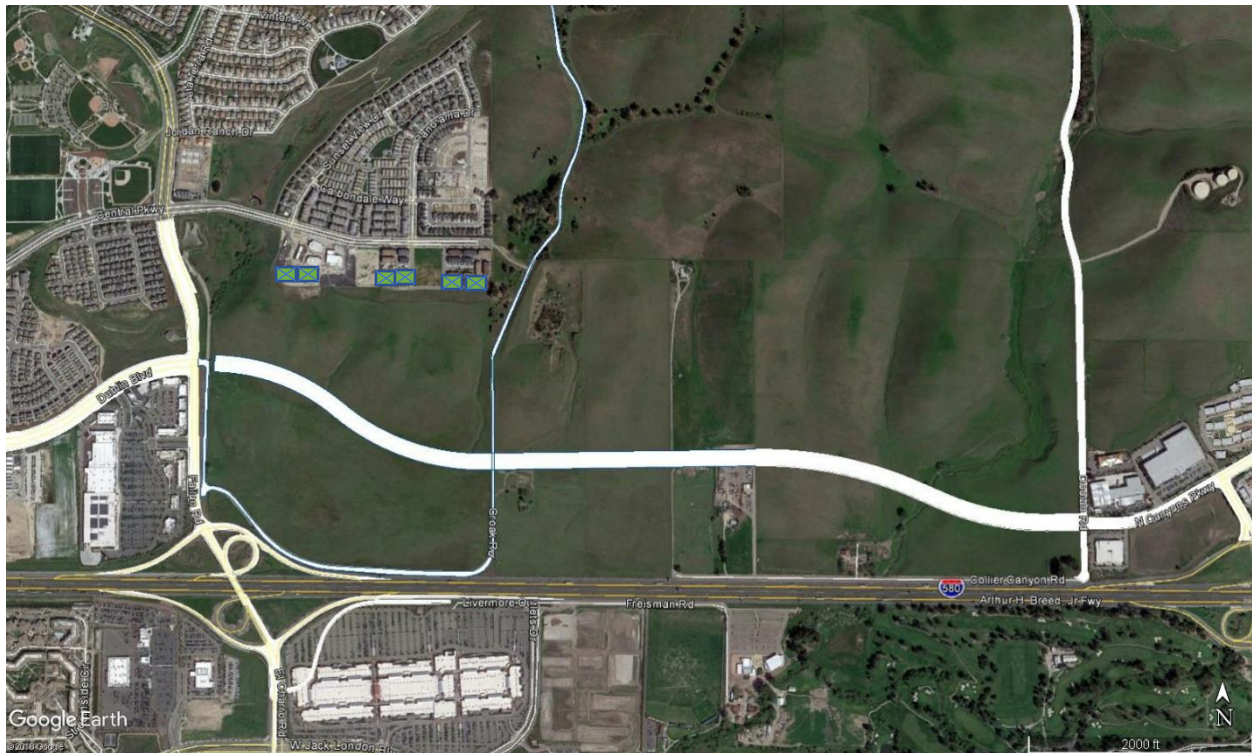
The maximum modeled annual PM_{2.5} concentration was 0.12 µg/m³, occurring at 150 feet or further from the roadway. This PM_{2.5} concentration would not exceed the threshold of 0.3 µg/m³ used to judge the significance of health impacts from PM_{2.5}.

²⁵ DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.

Table 18 - Maximum Community Risks from Project Operations

Scenario	ADT west	ADT east	ADT north	ADT south
No Build 2025	9,705	0	0	985
Build 2025	16,480	11,525	9,850	10,770
2025 ADT Increase	6,775	11,525	9,850	9,785
No Build 2040	11,835	0	0	895
Build 2040	18,555	19,145	15,780	16,460
2040 ADT Increase	6,720	19,145	15,780	15,565
	Cancer Risk and Annual PM_{2.5} Concentrations			
Closest Sensitive Receptor	40ft North	>700ft North	>700ft South	>150ft North
Cancer Risk at 50 feet	3.56	1.49	0.66	4.15
PM _{2.5} at 50 feet	0.10	0.04	0.02	0.12
<i>BAAQMD Significance Threshold</i>	Cancer Risk (per million)		Annual PM _{2.5} (µg/m ³) ¹	
	Less than 10.0 ppm		less than 0.3 ppm	
<i>Exceed Threshold</i>	No		No	

Source: Illingworth & Rodkin, 2018

Note: ¹The annual PM_{2.5} concentration is the sum of the DPM and fugitive PM_{2.5} concentrations.**Figure 7 - Locations of Nearby Sensitive Receptors Modeled for TAC Impacts**

4.3.5 Greenhouse Gas Emissions Analysis

GHG emissions associated with development of the proposed project would occur over the short-term from construction activities, consisting primarily of emissions from equipment exhaust and worker and vendor trips. There would also be long-term operational emissions associated with vehicular traffic on the new roadway. GHG emission impacts for the proposed project are discussed below and were analyzed using the methodology recommended in the BAAQMD CEQA Air Quality Guidelines.²⁶

Existing Conditions

Under existing conditions, in the project area, there is no extended roadway and the potential for a direct change in GHG emissions is nonexistent. Indirect emissions are generated from the burning of fuel required for site maintenance (e.g., infrequent disking and/or mowing to control fire hazards, etc.). Regionally the GHG emissions under existing conditions from traffic on the roadway network were calculated to be 505,694 metric tons per year.

Table 19 - Modeled Annual CO₂ Emissions and VMT by Alternative

Alternative	CO ₂ Emissions (Metric Tons/Year)	Percent Reduction From Baseline	Annual Vehicle Miles Traveled ¹
Existing/Baseline [2013]	505,678	--	1,197,741,358
Open to Traffic [2025]			
No Build	438,115	-15.42%	1,349,057,818
Build Alternative	438,096	-15.43%	1,348,999,732
20-Year Horizon [2040]			
No Build	424,796	-19.04%	1,528,944,016
Build Alternative	424,919	-19.01%	1,529,387,024

CO₂ = Carbon Monoxide

Source: EMFAC2014,

¹ Annual VMT values from Kittelson & Associates, 2018

Construction Greenhouse Gas Emissions (Temporary Emissions)

GHG emissions for transportation projects can be divided into those produced during construction and those produced during operations. Currently, neither the Cities of Dublin or Livermore, nor BAAQMD, have adopted GHG significance thresholds that apply to construction projects. For informational purposes, GHG emissions from project construction are estimated to be 1,335 metric tons of CO₂e over the course of the entire construction project based on Road Construction Emissions Model version 8.1.0 modeling described above.

²⁶ BAAQMD, 2017. *Op cit.*

Operational Greenhouse Gas Emissions (Ongoing Emissions)

GHG (e.g., carbon dioxide, methane, and nitrogen dioxide) from operation of the project will include fuel burned while traveling on the new roadway. There would be a shift in traffic from other congested routes which would increase the overall effectiveness of the transportation system. There are no thresholds identified for evaluating the effect of roadway projects on GHG emissions since these types of projects do not generate emissions on their own.

As previously discussed, there is a process that air quality for transportation projects is considered by looking at the entire transportation sector of emissions. This is done through the SIP conformity process, where transportation projects are evaluated at the regional level. Most public transportation projects are included in the TIP. The project is included in the TIP. Projects included in the TIP are also part of the Bay Area Plan 2040 plan that includes the region's SCS. MTC and ABAG identified GHG reduction targets that are included in the SCS. The proposed project, being part of the 2019 TIP is part of the Plan Bay Area 2040 transportation network, and therefore, is consistent with the SCS.

While regionally there will be a slight increase in VMT with the project, in the local area the VMT is expected to decrease slightly with the project. The net effect on the greenhouse gas emissions regionally is 123 metric tons a year increase compared to the No Build scenario, or approximately 0.03% increase. The project would result in a 32 metric tons per year decrease in the local area. As shown in Table 19, the project would result in a 19 percent reduction of GHG emissions regionally compared to existing conditions.

4.4 Cumulative/Regional/Indirect Effects

Effects of the project that would occur at a later date or are fairly distant from the project are referred to as indirect effects. Cumulative impacts are those effects that result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. Cumulative impacts are inclusive of the indirect effects. As summarized below, the potential for indirect effects or cumulative impacts to air quality that may be attributable to this project is not expected to be significant.

The analysis of project impacts to regional air quality, as performed by MTC as part of the RTP and RTIP conformity process, is a cumulative analysis. The proposed project would conform to the assumptions in the conformity analyses for the 2040 RTP and 2017 RTIP, which are long-range planning documents that include roadway projects throughout the region. Therefore, the project would not result in a cumulative impact to air quality.

The CO and MSAT quantitative assessments can be considered indirect effects analyses because they look at air quality impacts attributable to the project that occur at a later time in the future. Those

assessments indicate the potential for indirect effects associated with the project is not expected to be significant. They demonstrate that in the future: 1) air quality impacts from CO will not cause or contribute to violations of the CO NAAQS; and 2) MSAT emissions from the affected network will be slightly increased over the No-Build Alternative but significantly lower than they are today.

Overall, the potential for indirect effects and cumulative impacts associated with the project is not expected to be significant.

5. Minimization Measures

5.1 Short-Term (Construction)

During any construction period ground disturbance, the applicant shall ensure that the project contractor implement measures to control dust and exhaust. Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less-than-significant level. The contractor shall implement the following best management practices that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

5.2 Long-Term (Operational)

The project would have emissions less than the BAAQMD thresholds for O₃ (i.e., O₃ precursors) and particulate matter (PM₁₀ and PM_{2.5}). Therefore, the project would not contribute substantially to

existing or projected violations of those standards. Roadways and intersections affected by the project would have traffic volumes less than the BAAQMD screening criteria and, thus, would not cause a violation of an ambient air quality standard or have a considerable contribution to cumulative violations of these standards.²⁷ Therefore, there are no avoidance and or minimization measures required or recommended to reduce operational air quality impacts or GHG emissions from the operation of the project.

²⁷ For a land-use project type, the BAAQMD CEQA Air Quality Guidelines state that a proposed project would result in a less-than-significant impact to localized carbon monoxide concentrations if the project would not increase traffic at affected intersections with more than 44,000 vehicles per hour.

6. References

Bay Area Air Quality Management District CEQA Air Quality Guidelines, May 2017.

Bay Area Air Quality Management District (2018) Air Pollutant Summaries. Available at <http://www.baaqmd.gov/about-air-quality/air-quality-summaries> California Air Resources Board (2005) Air Quality and Land Use Handbook: A Community Health Perspective. April.

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Garza V., Graney P., Sperling D., Niemeier D., Eisinger D., Kear T., and Chang D. (1997) Transportation project-level carbon monoxide protocol revised. Prepared for Environmental Program California Department of Transportation by the Institute of Transportation Studies, University of California, Davis, UCD-ITS-RR-97-21, December. Available at <http://www.dot.ca.gov/hq/env/air/pages/coprot.htm>.

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OEHHA, 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February.

U.S. Environmental Protection Agency (1995) Compilation of air pollutant emission factors, AP-42. Vol. 1: stationary point and area sources. 5th ed. (January 1995). Report prepared by the Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC. Available at <http://www.epa.gov/ttnchie1/ap42/>.

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http://www.eastbayeda.org/ebeda-assets/reports/2013/Econ%20Report_Economic_Outlook_May2013.pdf

Sacramento Metropolitan Air Quality Management District, Road COstruction Emissions Model, Version 8.1.0, <http://www.airquality.org/businesses/ceqa-land-use-planning/ceqa-guidance-tools>

7. Appendices

Appendix A - RTP and TIP Listings for the Project and FHWA Conformity Determination

VIEW PROJECT: Dublin Blvd. - North Canyons Pkwy Extension

Project Search

Project Detail

Funding

Air Quality

Project Documents

Contacts

Delivery Milestones

Location

Screening Criteria

Com

Alternate ID Information

TIP ID	ALA150003	FMS ID	6046.00
CTIPS ID	20600005846	RTP ID	17-01-0048
Version	5	TIP Revision No	2019-00
Revision Type	Amendment	RTP Page No	
RTP Cycle	PLANBAYAREA2040	RTP Project Cost	\$89
RTP Title	Dublin Boulevard - North Canyons Parkway Extension		
Regional Approval Date	09/26/2018	State Approval Date	11/02/2018
Federal Approval Date	12/17/2018	Final Approval Date	12/17/2018

Status Information

Created	03/03/2018	Last updated	08/13/2018	Status	ACTIVE
Current version	No	Locked	No		
Completed	No	Modified		Review Level	PR

General Information

Project Name	Dublin Blvd. - North Canyons Pkwy Extension		
Sponsor	Dublin	Implementing Agency	ACTC
Project Type	MAJOR ARTERIAL	Purpose	EXPANSION
Mode	AUTO:40% BUS:35% BIKE/PED:20% FREIGHT:5%		
Submode	AUTO:40% BRT:30% BICYCLE:10% PEDESTRIAN:10% FREIGHT TRUCK:5% LOCAL BUS:5%		
Primary Mode	AUTO:40%		
Primary Submode	AUTO:40%		
Transportation System	LOCAL ROAD		
Description	Alameda County, Dublin and Livermore: Dublin Blvd-North Canyons Parkway from Fallon Rd to Croak Rd: Construct six lane extension; Dublin Blvd-North Canyons Parkway from Croak Rd to Doolan Rd: Construct four lane extension		
Expanded Description	Alameda County, Dublin and Livermore: Dublin Blvd-North Canyons Parkway from Fallon Rd to Croak Rd: Construct six lane extension; Dublin Blvd-North Canyons Parkway from Croak Rd to Doolan Rd: Construct four lane extension. The new extended street is planned to have bike lanes, off-street Class I trail, sidewalks, landscaping curb and gutter, traffic signals, a raised median, bus stops, and all street utilities. This project will consider the provision of dedicated transit lanes and/or queue jump lanes in addition to the mixed flow travel lanes for higher level of transit service with 10 to 20 minute headways during appropriate peak demand periods. This project will also require enhanced multimodal connectivity to various land uses along its stretch and at its terminus, including creating connectivity to 5 PDAs in two cities.		
Reason for Revision	2019 TIP Update - Update scope and funding		
Reason Type	4E		
Description of Change	2019 TIP Update - Update scope and funding		
Transportation problem to be addressed	1. Reduce Single Occupant Vehicles (SOV) by providing a higher level transit system along the new roadway. 2. Increase bicycle and pedestrian access and circulation 3. Interconnect 5 PDAs in Dublin and Livermore through a BRT system in potential dedicated lanes 4. Improving overall mobility, access, connectivity, safety and efficiency of the multimodal transportation system for all users, including goods movement. 5. Providing approaches and technologies that enhance existing system's efficiency and capacity without widening streets.		

Primary Location Information

Location	Dublin and Livermore			
Area				
County	Alameda			
Urbanized Area				
State Hwy				
Post Mile	From		To	

Appendix B - Construction Emissions Calculations

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Dublin Road Extension - Road Work Only														
Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	9.70	77.54	97.54	44.96	4.96	40.00	12.90	4.58	8.32	0.11	10,592.49	2.96	0.10	10,695.86
Grading/Excavation	4.75	35.30	53.84	42.47	2.47	40.00	10.46	2.14	8.32	0.10	9,659.21	1.93	0.17	9,756.79
Drainage/Utilities/Sub-Grade	3.20	34.89	30.80	41.71	1.71	40.00	9.85	1.53	8.32	0.07	6,260.01	1.35	0.08	6,317.50
Paving	3.09	30.92	33.23	1.80	1.80	0.00	1.58	1.58	0.00	0.07	6,459.24	1.31	0.11	6,523.67
Maximum (pounds/day)	9.70	77.54	97.54	44.96	4.96	40.00	12.90	4.58	8.32	0.11	10,592.49	2.96	0.17	10,695.86
Total (tons/construction project)	0.60	5.11	6.36	4.80	0.32	4.49	1.21	0.28	0.93	0.01	1,089.37	0.23	0.02	1,100.08
Notes: Project Start Year -> 2020														
Project Length (months) -> 12														
Total Project Area (acres) -> 23														
Maximum Area Disturbed/Day (acres) -> 4														
Water Truck Used? -> Yes														
Total Material Imported/Exported Volume (yd³/day)														
Daily VMT (miles/day)														
Phase Soil Asphalt Soil Hauling Asphalt Hauling Worker Commute Water Truck														
Grubbing/Land Clearing 10 0 25 0 280 20														
Grading/Excavation 650 0 825 0 760 20														
Drainage/Utilities/Sub-Grade 180 0 225 0 680 20														
Paving 0 400 0 500 520 20														
PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.														
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.														
CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.														
Total Emission Estimates by Phase for -> Dublin Road Extension - Road Work Only														
Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	PM10 (tons/phase)	PM10 (tons/phase)	PM10 (tons/phase)	PM2.5 (tons/phase)	PM2.5 (tons/phase)	PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.18	1.02	1.29	0.59	0.07	0.53	0.17	0.06	0.11	0.00	139.82	0.04	0.00	128.08
Grading/Excavation	0.23	2.10	3.20	2.52	0.15	2.38	0.62	0.13	0.49	0.01	573.76	0.11	0.01	525.77
Drainage/Utilities/Sub-Grade	0.13	1.38	1.22	1.65	0.07	1.58	0.39	0.06	0.33	0.00	247.90	0.05	0.00	226.96
Paving	0.06	0.61	0.66	0.04	0.04	0.00	0.03	0.03	0.00	0.00	127.89	0.03	0.00	117.18
Maximum (tons/phase)	0.28	2.10	3.20	2.52	0.15	2.38	0.62	0.13	0.49	0.01	573.76	0.11	0.01	525.77
Total (tons/construction project)	0.60	5.11	6.36	4.80	0.32	4.49	1.21	0.28	0.93	0.01	1089.37	0.23	0.02	997.99
PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.														
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.														
CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.														
The CO2e emissions are reported as metric tons per phase.														

Road Construction Emissions Model		Version 8.1.0		
Data Entry Worksheet				
Note: Required data input sections have a yellow background. Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background. The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types. Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.				
Input Type				
Project Name	Dublin Road Extension - Road Work Only			
Construction Start Year	2020	Enter a Year between 2014 and 2025 (inclusive)		
Project Type	1	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction		
Project Construction Time	12.00	months		
Working Days per Month	22.00	days (assume 22 if unknown)		
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the lone formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)		
Project Length	1.33	miles		
Total Project Area	23.00	acres		
Maximum Area Disturbed/Day	4.00	acres		
Water Trucks Used?	1	1. Yes 2. No		
Material Hauling Quantity Input				
Material Type	Phase	Haul Truck Capacity (yd ³) (assume 20 if unknown)	Import Volume (yd ³ /day)	Export Volume (yd ³ /day)
Soil	Grubbing/Land Clearing	20.00		10.00
	Grading/Excavation	20.00		650.00
	Drainage/Utilities/Sub-Grade	20.00		180.00
	Paving	20.00		
Asphalt	Grubbing/Land Clearing	20.00		
	Grading/Excavation	20.00		
	Drainage/Utilities/Sub-Grade	20.00		
	Paving	20.00	400.00	
Mitigation Options				
On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer		
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard		



Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing		1.20		1/1/2020
Grading/Excavation		5.40		2/7/2020
Drainage/Utilities/Sub-Grade		3.60		7/21/2020
Paving		1.80		11/8/2020
Totals (Months)		12		

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions		User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT				
User Input										
Miles/round trip: Grubbing/Land Clearing		25.00	30.00		1		25.00			
Miles/round trip: Grading/Excavation		25.00	30.00		33		825.00			
Miles/round trip: Drainage/Utilities/Sub-Grade		25.00	30.00		9		225.00			
Miles/round trip: Paving		25.00	30.00		0		0.00			
Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Grading/Excavation (grams/mile)	0.11	0.44	4.12	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Drainage/Utilities/Sub-Grade (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Paving (grams/mile)	0.11	0.44	4.11	0.12	0.05	0.02	1,631.16	0.00	0.06	1,647.75
Hauling Emissions	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearing	0.01	0.02	0.23	0.01	0.00	0.00	89.93	0.00	0.00	90.85
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	1.19	0.00	0.00	1.20
Pounds per day - Grading/Excavation	0.19	0.79	7.51	0.21	0.10	0.03	2,967.78	0.01	0.10	2,997.97
Tons per const. Period - Grading/Excavation	0.01	0.05	0.45	0.01	0.01	0.00	176.29	0.00	0.01	178.08
Pounds per day - Drainage/Utilities/Sub-Grade	0.05	0.22	2.05	0.06	0.03	0.01	809.39	0.00	0.03	817.63
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.01	0.08	0.00	0.00	0.00	32.05	0.00	0.00	32.38
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.01	0.06	0.53	0.01	0.01	0.00	209.53	0.00	0.01	211.66

Note: Asphalt Hauling emission default values can be overridden in cells D87 through D90, and F87 through F90.

Asphalt Hauling Emissions		User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
User Input						
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00	
Miles/round trip: Grading/Excavation		30.00		0	0.00	
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		0	0.00	
Miles/round trip: Paving	25.00	30.00		20	500.00	

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Grading/Excavation (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Draining/Utilities/Sub-Grade (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Paving (grams/mile)	0.11	0.44	4.11	0.12	0.05	0.02	1,631.16	0.00	0.06	1,647.75
Emissions	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.12	0.48	4.53	0.13	0.06	0.02	1,798.05	0.01	0.06	1,816.34
Tons per const. Period - Paving	0.00	0.01	0.09	0.00	0.00	0.00	35.60	0.00	0.00	35.96
Total tons per construction project	0.00	0.01	0.09	0.00	0.00	0.00	35.60	0.00	0.00	35.96

Note: Worker commute default values can be overridden in cells D113 through D118.

Worker Commute Emissions		User Override of Worker Commute Default Values			Default Values						
User Input											
Miles/ one-way trip			20								
One-way trips/day			2		Calculated Daily Trips			Calculated Daily VMT			
No. of employees: Grubbing/Land Clearing			7		14			280.00			
No. of employees: Grading/Excavation			19		38			760.00			
No. of employees: Drainage/Utilities/Sub-Grade			17		34			680.00			
No. of employees: Paving			13		26			520.00			
Emission Rates											
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
Grubbing/Land Clearing (grams/mile)	0.02	1.08	0.11	0.05	0.02	0.00	371.46	0.01	0.00	373.08	
Grading/Excavation (grams/mile)	0.02	1.08	0.11	0.05	0.02	0.00	371.46	0.01	0.00	373.08	
Draining/Utilities/Sub-Grade (grams/mile)	0.02	1.08	0.11	0.05	0.02	0.00	371.46	0.01	0.00	373.08	
Paving (grams/mile)	0.02	1.07	0.11	0.05	0.02	0.00	371.10	0.01	0.00	372.71	
Grubbing/Land Clearing (grams/trip)	1.00	2.55	0.20	0.00	0.00	0.00	84.03	0.01	0.01	86.84	
Grading/Excavation (grams/trip)	1.00	2.55	0.20	0.00	0.00	0.00	84.03	0.01	0.01	86.84	
Draining/Utilities/Sub-Grade (grams/trip)	1.00	2.55	0.20	0.00	0.00	0.00	84.03	0.01	0.01	86.84	
Paving (grams/trip)	0.99	2.54	0.20	0.00	0.00	0.00	83.97	0.01	0.01	86.76	
Emissions											
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
Pounds per day - Grubbing/Land Clearing	0.04	0.74	0.08	0.03	0.01	0.00	231.90	0.01	0.00	232.98	
Tons per const. Period - Grubbing/Land Clearing	0.00	0.01	0.00	0.00	0.00	0.00	3.06	0.00	0.00	3.08	
Pounds per day - Grading/Excavation	0.12	2.02	0.21	0.08	0.03	0.01	629.43	0.02	0.01	632.37	
Tons per const. Period - Grading/Excavation	0.01	0.12	0.01	0.00	0.00	0.00	37.39	0.00	0.00	37.56	
Pounds per day - Drainage/Utilities/Sub-Grade	0.11	1.80	0.19	0.07	0.03	0.01	563.18	0.01	0.01	565.81	
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.07	0.01	0.00	0.00	0.00	22.30	0.00	0.00	22.41	
Pounds per day - Paving	0.08	1.38	0.14	0.05	0.02	0.00	430.24	0.01	0.01	432.25	
Tons per const. Period - Paving	0.00	0.03	0.00	0.00	0.00	0.00	8.52	0.00	0.00	8.56	
Total tons per construction project	0.01	0.23	0.02	0.01	0.00	0.00	71.27	0.00	0.00	71.60	

Note: Water Truck default values can be overridden in cells D145 through D148, and F145 through F148.

Water Truck Emissions		User Override of Default # Water Trucks		Program Estimate of Number of Water Trucks		User Override of Truck Miles Traveled/Vehicle/Day		Default Values Miles Traveled/Vehicle/Day		Calculated Daily VMT	
User Input											
Grubbing/Land Clearing - Exhaust			1		20.00			40.00		20.00	
Grading/Excavation - Exhaust			1		20.00			40.00		20.00	
Drainage/Utilities/Subgrade			1		20.00			40.00		20.00	
Paving			1		20.00			40.00		20.00	
Emission Rates											
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
Grubbing/Land Clearing (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31	
Grading/Excavation (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31	
Draining/Utilities/Sub-Grade (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31	
Paving (grams/mile)	0.11	0.44	4.11	0.12	0.05	0.02	1,631.16	0.00	0.06	1,647.75	
Emissions											
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
Pounds per day - Grubbing/Land Clearing	0.00	0.02	0.18	0.01	0.00	0.00	71.95	0.00	0.00	72.68	
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.96	
Pounds per day - Grading/Excavation	0.00	0.02	0.18	0.01	0.00	0.00	71.95	0.00	0.00	72.68	
Tons per const. Period - Grading/Excavation	0.00	0.00	0.01	0.00	0.00	0.00	4.27	0.00	0.00	4.32	
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.02	0.18	0.01	0.00	0.00	71.95	0.00	0.00	72.68	
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.01	0.00	0.00	0.00	2.85	0.00	0.00	2.88	
Pounds per day - Paving	0.00	0.02	0.18	0.01	0.00	0.00	71.92	0.00	0.00	72.65	
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	1.42	0.00	0.00	1.44	
Total tons per construction project	0.00	0.00	0.02	0.00	0.00	0.00	9.50	0.00	0.00	9.59	

Note: Fugitive dust default values can be overridden in cells D171 through D173.

Fugitive Dust		User Override of Max Acreage Disturbed/Day		Default Maximum Acreage/Day		PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing			4.00		40.00	0.53	8.32	0.11	
Fugitive Dust - Grading/Excavation			4.00		40.00	2.38	8.32	0.49	
Fugitive Dust - Drainage/Utilities/Subgrade			4.00		40.00	1.58	8.32	0.33	

Off-Road Equipment Emissions																			
Grubbing/Land Clearing	Default	Mitigation Option		Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e					
	Number of Vehicles	Override of																	
	Override of Default Number of Vehicles	Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day				
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
2.00			Model Default Tier	Concrete/Industrial Saws	0.84	7.37	6.60	0.40	0.40	0.01	1,185.33	0.08	0.01	1,189.86					
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	1		Model Default Tier	Crawler Tractors	0.57	2.45	7.31	0.28	0.25	0.01	746.04	0.24	0.01	754.08					
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
2.00	1		Model Default Tier	Excavators	0.51	6.74	4.98	0.24	0.22	0.01	1,031.89	0.33	0.01	1,043.01					
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
4.00			Model Default Tier	Graders	2.87	18.33	27.99	1.56	1.44	0.02	2,419.75	0.78	0.02	2,445.76					
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
4.00			Model Default Tier	Rubber Tired Dozers	3.85	31.74	40.59	1.86	1.72	0.04	3,452.28	1.12	0.03	3,489.36					
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
		3	Model Default Tier	Signal Boards	0.17	0.90	1.08	0.04	0.04	0.00	147.94	0.02	0.00	148.69					
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
4.00			Model Default Tier	Tractors/Loaders/Backhoes	0.85	9.21	8.51	0.54	0.49	0.01	1,215.48	0.39	0.01	1,228.57					
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
User-Defined Off-road Equipment					If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab				ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
Number of Vehicles					Equipment Tier				Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
0.00					N/A				0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00					N/A				0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00					N/A				0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00					N/A				0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00					N/A				0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00					N/A				0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00					N/A				0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Grubbing/Land Clearing				pounds per day	9.65	76.76	97.05	4.92	4.56	0.11	10,198.71	2.96	0.09	10,299.35
					Grubbing/Land Clearing				tons per phase	0.13	1.01	1.28	0.06	0.06	0.00	134.62	0.04	0.00	135.95

Grading/Excavation	Default		Mitigation Option		Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Number of Vehicles	Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type											
Override of Default Number of Vehicles		Program-estimate			pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0		Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1		Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	3		Model Default Tier	Excavators	0.51	6.74	4.98	0.24	0.22	0.01	1,031.89	0.33	0.01	1,043.01	
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Graders	1.43	9.16	14.00	0.78	0.72	0.01	1,209.88	0.39	0.01	1,222.88	
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2		Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	1		Model Default Tier	Rubber Tired Loaders	1.47	6.45	17.38	0.58	0.53	0.02	2,384.87	0.77	0.02	2,410.61	
0.00	2		Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Signal Boards	0.17	0.90	1.08	0.04	0.04	0.00	147.94	0.02	0.00	148.69	
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	2		Model Default Tier	Tractors/Loaders/Backhoes	0.85	9.21	8.51	0.54	0.49	0.01	1,215.48	0.39	0.01	1,228.57	
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User-Defined Off-road Equipment						ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab						pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
Number of Vehicles		Equipment Tier			Type										
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation					pounds per day	4.43	32.47	45.94	2.18	2.01	0.06	5,990.05	1.90	0.05	6,053.77
Grading/Excavation					tons per phase	0.26	1.93	2.73	0.13	0.12	0.00	355.81	0.11	0.00	359.59

Drainage/Utilities/Subgrade	Default		Mitigation Option		Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Number of Vehicles	Override of	Default												
	Override of Default Number of Vehicles	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier												
						pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
					Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	1			Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Cement and Mortar Mixers	0.12	0.62	0.74	0.03	0.03	0.00	101.03	0.01	0.00	101.55
	2.00				Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.00				Excavators	1.01	13.48	9.96	0.48	0.44	0.02	2,063.78	0.67	0.02	2,086.03
	2.00				Forklifts	0.29	2.36	2.60	0.19	0.18	0.00	296.06	0.10	0.00	299.26
	0.00	1			Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	1			Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		1			Plate Compactors	0.04	0.21	0.25	0.01	0.01	0.00	34.48	0.00	0.00	34.65
					Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		1			Pumps	0.42	3.76	3.53	0.21	0.21	0.01	623.04	0.04	0.00	625.36
					Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		1			Rough Terrain Forklifts	0.13	2.30	1.73	0.07	0.07	0.00	333.68	0.11	0.00	337.28
					Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	2			Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		3			Signal Boards	0.17	0.90	1.08	0.04	0.04	0.00	147.94	0.02	0.00	148.69
					Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.00	2			Tractors/Loaders/Backhoes	0.85	9.21	8.51	0.54	0.49	0.01	1,215.48	0.39	0.01	1,228.57
					Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User-Defined Off-road Equipment						ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab						pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
Number of Vehicles		Equipment Tier		Type											
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Paving	Default		Mitigation Option		Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Number of Vehicles	Override of	Default												
	Override of Default Number of Vehicles	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier												
	Program-estimate		Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Cement and Mortar Mixers	0.12	0.62	0.74	0.03	0.03	0.00	101.03	0.01	0.00	0.00	101.55
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Pavers	0.51	5.62	5.43	0.26	0.24	0.01	882.52	0.29	0.01	892.03	
2.00	1		Model Default Tier	Paving Equipment	0.41	5.03	4.24	0.21	0.19	0.01	783.07	0.25	0.01	791.52	
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	3		Model Default Tier	Rollers	0.84	7.67	8.41	0.54	0.49	0.01	1,028.97	0.33	0.01	1,040.06	
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Signal Boards	0.17	0.90	1.08	0.04	0.04	0.00	147.94	0.02	0.00	148.69	
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	2		Model Default Tier	Tractors/Loaders/Backhoes	0.84	9.21	8.48	0.54	0.49	0.01	1,215.49	0.39	0.01	1,228.58	
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User-Defined Off-road Equipment						ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab						pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
Number of Vehicles		Equipment Tier		Type											
0.00			N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving				pounds per day	2.89	29.05	28.38	1.62	1.49	0.04	4,159.03	1.29	0.04	4,202.43	
Paving				tons per phase	0.06	0.58	0.56	0.03	0.03	0.00	82.35	0.03	0.00	83.21	
Total Emissions all Phases (tons per construction period) =>					0.57	4.82	5.70	0.29	0.27	0.01	763.47	0.23	0.01	771.26	

Equipment default values for horsepower and hours/day can be overridden in cells D391 through D424 and F391 through F424.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		85		8
Excavators		163		8
Forklifts		89		8
Generator Sets		84		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		46		8

END OF DATA ENTRY SHEET

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Dublin Road Extension - Bridge Work Only

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	1.21	10.21	14.43	20.60	0.60	20.00	4.68	0.52	4.16	0.03	2,676.38	0.59	0.04	2,703.52
Grading/Excavation	4.33	33.65	47.88	22.17	2.17	20.00	6.09	1.93	4.16	0.08	7,422.95	2.00	0.08	7,496.81
Drainage/Utilities/Sub-Grade	3.56	30.91	34.64	21.83	1.83	20.00	5.85	1.69	4.16	0.06	5,389.40	1.09	0.05	5,432.24
Paving	1.23	13.09	12.57	0.71	0.71	0.00	0.63	0.63	0.00	0.02	2,371.85	0.56	0.03	2,395.30
Maximum (pounds/day)	4.33	33.65	47.88	22.17	2.17	20.00	6.09	1.93	4.16	0.08	7,422.95	2.00	0.08	7,496.81
Total (tons/construction project)	0.22	1.81	2.33	1.23	0.11	1.12	0.33	0.10	0.23	0.00	368.32	0.09	0.00	371.77

Notes:

Project Start Year -> 2020

Project Length (months) -> 6

Total Project Area (acres) -> 2

Maximum Area Disturbed/Day (acres) -> 2

Water Truck Used? -> Yes

Phase	Total Material Imported/Exported Volume (yd³/day)		Daily VMT (miles/day)			
	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	100	0	150	0	200	40
Grading/Excavation	30	0	60	0	1,120	40
Drainage/Utilities/Sub-Grade	0	0	0	0	720	40
Paving	0	40	0	60	320	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Dublin Road Extension - Bridge Work Only

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.01	0.07	0.10	0.14	0.00	0.13	0.03	0.00	0.03	0.00	17.66	0.00	0.00	16.19
Grading/Excavation	0.13	1.00	1.42	0.66	0.06	0.59	0.18	0.06	0.12	0.00	220.46	0.06	0.00	201.99
Drainage/Utilities/Sub-Grade	0.07	0.61	0.69	0.43	0.04	0.40	0.12	0.03	0.08	0.00	106.71	0.02	0.00	97.58
Paving	0.01	0.13	0.12	0.01	0.01	0.00	0.01	0.01	0.00	0.00	23.48	0.01	0.00	21.51
Maximum (tons/phase)	0.13	1.00	1.42	0.66	0.06	0.59	0.18	0.06	0.12	0.00	220.46	0.06	0.00	201.99
Total (tons/construction project)	0.22	1.81	2.33	1.23	0.11	1.12	0.33	0.10	0.23	0.00	368.32	0.09	0.00	337.27

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model		Version 8.1.0	
Data Entry Worksheet			
Note: Required data input sections have a yellow background. Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background. The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types. Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.			
Input Type			
Project Name	Dublin Road Extension - Bridge	Work Only	
Construction Start Year	2020	Enter a Year between 2014 and 2025 (inclusive)	
Project Type	3	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction	
Project Construction Time	6.00	months	
Working Days per Month	22.00	days (assume 22 if unknown)	
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the lone formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)	
Project Length	0.20	miles	
Total Project Area	2.00	acres	
Maximum Area Disturbed/Day	2.00	acres	
Water Trucks Used?	1	1. Yes 2. No	
Material Hauling Quantity Input			
Material Type	Phase	Haul Truck Capacity (yd ³) (assume 20 if unknown)	Import Volume (yd ³ /day)
Soil	Grubbing/Land Clearing	20.00	100.00
	Grading/Excavation	20.00	30.00
	Drainage/Utilities/Sub-Grade	20.00	
	Paving	20.00	
Asphalt	Grubbing/Land Clearing	20.00	
	Grading/Excavation	20.00	
	Drainage/Utilities/Sub-Grade	20.00	
	Paving	20.00	40.00
Mitigation Options			
On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer	
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard	



Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing		0.60		1/1/2020
Grading/Excavation		2.70		1/20/2020
Drainage/Utilities/Sub-Grade		1.80		4/12/2020
Paving		0.90		6/6/2020
Totals (Months)		6		

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions		User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT				
User Input										
Miles/round trip: Grubbing/Land Clearing		30.00		5		150.00				
Miles/round trip: Grading/Excavation		30.00		2		60.00				
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		0		0.00				
Miles/round trip: Paving		30.00		0		0.00				
Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Grading/Excavation (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Drainage/Utilities/Sub-Grade (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Paving (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Hauling Emissions	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearing	0.03	0.14	1.37	0.04	0.02	0.01	539.60	0.00	0.02	545.09
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.01	0.00	0.00	0.00	3.56	0.00	0.00	3.60
Pounds per day - Grading/Excavation	0.01	0.06	0.55	0.02	0.01	0.00	215.84	0.00	0.01	218.03
Tons per const. Period - Grading/Excavation	0.00	0.00	0.02	0.00	0.00	0.00	6.41	0.00	0.00	6.48
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.03	0.00	0.00	0.00	9.97	0.00	0.00	10.07

Note: Asphalt Hauling emission default values can be overridden in cells D87 through D90, and F87 through F90.

Asphalt Hauling Emissions		User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
User Input						
Miles/round trip: Grubbing/Land Clearing			30.00		0	0.00
Miles/round trip: Grading/Excavation			30.00		0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade			30.00		0	0.00
Miles/round trip: Paving			30.00		2	60.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Grading/Excavation (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Draining/Utilities/Sub-Grade (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Paving (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31
Emissions	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.01	0.06	0.55	0.02	0.01	0.00	215.84	0.00	0.01	218.03
Tons per const. Period - Paving	0.00	0.00	0.01	0.00	0.00	0.00	2.14	0.00	0.00	2.16
Total tons per construction project	0.00	0.00	0.01	0.00	0.00	0.00	2.14	0.00	0.00	2.16

Note: Worker commute default values can be overridden in cells D113 through D118.

Worker Commute Emissions		User Override of Worker Commute Default Values		Default Values							
User Input											
Miles/ one-way trip			20								
One-way trips/day			2		Calculated Daily Trips			Calculated Daily VMT			
No. of employees: Grubbing/Land Clearing			5		10			200.00			
No. of employees: Grading/Excavation			28		56			1,120.00			
No. of employees: Drainage/Utilities/Sub-Grade			18		36			720.00			
No. of employees: Paving			8		16			320.00			
Emission Rates											
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
Grubbing/Land Clearing (grams/mile)	0.02	1.08	0.11	0.05	0.02	0.00	371.46	0.01	0.00	373.08	
Grading/Excavation (grams/mile)	0.02	1.08	0.11	0.05	0.02	0.00	371.46	0.01	0.00	373.08	
Draining/Utilities/Sub-Grade (grams/mile)	0.02	1.08	0.11	0.05	0.02	0.00	371.46	0.01	0.00	373.08	
Paving (grams/mile)	0.02	1.08	0.11	0.05	0.02	0.00	371.46	0.01	0.00	373.08	
Grubbing/Land Clearing (grams/trip)	1.00	2.55	0.20	0.00	0.00	0.00	84.03	0.01	0.01	86.84	
Grading/Excavation (grams/trip)	1.00	2.55	0.20	0.00	0.00	0.00	84.03	0.01	0.01	86.84	
Draining/Utilities/Sub-Grade (grams/trip)	1.00	2.55	0.20	0.00	0.00	0.00	84.03	0.01	0.01	86.84	
Paving (grams/trip)	1.00	2.55	0.20	0.00	0.00	0.00	84.03	0.01	0.01	86.84	
Emissions											
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
Pounds per day - Grubbing/Land Clearing	0.03	0.53	0.05	0.02	0.01	0.00	165.64	0.00	0.00	166.41	
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	1.10	
Pounds per day - Grading/Excavation	0.17	2.97	0.30	0.12	0.05	0.01	927.59	0.02	0.01	931.92	
Tons per const. Period - Grading/Excavation	0.01	0.09	0.01	0.00	0.00	0.00	27.55	0.00	0.00	27.68	
Pounds per day - Drainage/Utilities/Sub-Grade	0.11	1.91	0.20	0.07	0.03	0.01	596.30	0.01	0.01	599.09	
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.04	0.00	0.00	0.00	0.00	11.81	0.00	0.00	11.86	
Pounds per day - Paving	0.05	0.85	0.09	0.03	0.01	0.00	265.02	0.01	0.00	266.26	
Tons per const. Period - Paving	0.00	0.01	0.00	0.00	0.00	0.00	2.62	0.00	0.00	2.64	
Total tons per construction project	0.01	0.14	0.01	0.01	0.00	0.00	43.07	0.00	0.00	43.27	

Note: Water Truck default values can be overridden in cells D145 through D148, and F145 through F148.

Water Truck Emissions		User Override of Default # Water Trucks		Program Estimate of Number of Water Trucks		User Override of Truck Miles Traveled/Vehicle/Day		Default Values Miles Traveled/Vehicle/Day		Calculated Daily VMT	
User Input											
Grubbing/Land Clearing - Exhaust			1					40.00		40.00	
Grading/Excavation - Exhaust			1					40.00		40.00	
Drainage/Utilities/Subgrade			1					40.00		40.00	
Paving			1					40.00		40.00	
Emission Rates											
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
Grubbing/Land Clearing (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31	
Grading/Excavation (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31	
Draining/Utilities/Sub-Grade (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31	
Paving (grams/mile)	0.11	0.44	4.13	0.12	0.05	0.02	1,631.71	0.00	0.06	1,648.31	
Emissions											
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
Pounds per day - Grubbing/Land Clearing	0.01	0.04	0.36	0.01	0.00	0.00	143.89	0.00	0.00	145.36	
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.96	
Pounds per day - Grading/Excavation	0.01	0.04	0.36	0.01	0.00	0.00	143.89	0.00	0.00	145.36	
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	4.27	0.00	0.00	4.32	
Pounds per day - Drainage/Utilities/Sub-Grade	0.01	0.04	0.36	0.01	0.00	0.00	143.89	0.00	0.00	145.36	
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.01	0.00	0.00	0.00	2.85	0.00	0.00	2.88	
Pounds per day - Paving	0.01	0.04	0.36	0.01	0.00	0.00	143.89	0.00	0.00	145.36	
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	1.42	0.00	0.00	1.44	
Total tons per construction project	0.00	0.00	0.02	0.00	0.00	0.00	9.50	0.00	0.00	9.59	

Note: Fugitive dust default values can be overridden in cells D171 through D173.

Fugitive Dust		User Override of Max Acreage Disturbed/Day		Default Maximum Acreage/Day		PM10 pounds/day		PM10 tons/per period		PM2.5 pounds/day		PM2.5 tons/per period	
Fugitive Dust - Grubbing/Land Clearing			2.00			20.00		0.13		4.16		0.03	
Fugitive Dust - Grading/Excavation			2.00			20.00		0.59		4.16		0.12	
Fugitive Dust - Drainage/Utilities/Subgrade			2.00			20.00		0.40		4.16		0.08	

Off-Road Equipment Emissions																
Grubbing/Land Clearing	Default	Mitigation Option		Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e		
	Number of Vehicles	Override of														
	Override of Default Number of Vehicles	Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
				Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	1			Model Default Tier	Crawler Tractors	0.57	2.45	7.31	0.28	0.25	0.01	746.04	0.24	0.01	754.08	
				Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	2			Model Default Tier	Excavators	0.51	6.74	4.98	0.24	0.22	0.01	1,031.89	0.33	0.01	1,043.01	
				Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	1			Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56	
				Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
				Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
User-Defined Off-road Equipment						If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab										
	Number of Vehicles		Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day		
	0.00		N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Grubbing/Land Clearing		pounds per day	1.13	9.50	12.64	0.53	0.49	0.02	1,827.25	0.58	0.02	1,846.66		
		Grubbing/Land Clearing		tons per phase	0.01	0.06	0.08	0.00	0.00	0.00	12.06	0.00	0.00	12.19		

Grading/Excavation	Default		Mitigation Option		Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Number of Vehicles	Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type											
Override of Default Number of Vehicles		Program-estimate			pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Cranes	0.44	2.07	5.27	0.22	0.20	0.01	546.70	0.18	0.00	0.00	552.59
1.00	2		Model Default Tier	Crawler Tractors	0.57	2.45	7.31	0.28	0.25	0.01	746.04	0.24	0.01	0.01	754.08
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	4		Model Default Tier	Excavators	0.51	6.74	4.98	0.24	0.22	0.01	1,031.89	0.33	0.01	0.01	1,043.01
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2		Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	3		Model Default Tier	Rollers	0.42	3.83	4.21	0.27	0.25	0.01	514.48	0.17	0.00	0.00	520.03
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	3		Model Default Tier	Rubber Tired Loaders	0.74	3.22	8.69	0.29	0.27	0.01	1,192.43	0.39	0.01	0.01	1,205.31
1.00	4		Model Default Tier	Scrapers	0.98	7.36	11.59	0.45	0.42	0.02	1,447.03	0.47	0.01	0.01	1,462.63
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Tractors/Loaders/Backhoes	0.42	4.61	4.25	0.27	0.25	0.01	607.74	0.20	0.01	0.01	614.28
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User-Defined Off-road Equipment					ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab					pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
Number of Vehicles		Equipment Tier		Type											
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation				pounds per day	4.14	30.59	46.67	2.03	1.87	0.06	6,135.63	1.97	0.06	0.06	6,201.50
Grading/Excavation				tons per phase	0.12	0.91	1.39	0.06	0.06	0.00	182.23	0.06	0.00	0.00	184.18

Drainage/Utilities/Subgrade	Default		Mitigation Option		Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Number of Vehicles	Override of	Default												
	Override of Default Number of Vehicles	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier												
						pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Air Compressors	0.32	2.44	2.25	0.15	0.15	0.00	375.26	0.03	0.00	0.00	376.83
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Generator Sets	0.40	3.71	3.48	0.20	0.20	0.01	623.04	0.04	0.00	0.00	625.31
1.00	2		Model Default Tier	Graders	0.72	4.58	7.00	0.39	0.36	0.01	604.94	0.20	0.01	0.00	611.44
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Plate Compactors	0.04	0.21	0.25	0.01	0.01	0.00	34.48	0.00	0.00	0.00	34.65
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pumps	0.42	3.76	3.53	0.21	0.21	0.01	623.04	0.04	0.00	0.00	625.36
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rough Terrain Forklifts	0.13	2.30	1.73	0.07	0.07	0.00	333.68	0.11	0.00	0.00	337.28
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00	4		Model Default Tier	Scrapers	0.98	7.36	11.59	0.45	0.42	0.02	1,447.03	0.47	0.01	0.00	1,462.63
0.00	1		Model Default Tier	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Tractors/Loaders/Backhoes	0.42	4.61	4.25	0.27	0.25	0.01	607.74	0.20	0.01	0.00	614.28
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User-Defined Off-road Equipment						ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab						pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
Number of Vehicles		Equipment Tier			Type										
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade					pounds per day	3.44	28.96	34.08	1.74	1.65	0.05	4,649.20	1.07	0.04	4,687.79
Drainage/Utilities/Sub-Grade					tons per phase	0.07	0.57	0.67	0.03	0.03	0.00	92.05	0.02	0.00	92.82

Paving	Default	Mitigation Option		Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Number of Vehicles	Override of	Default											
	Override of Default Number of Vehicles	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pavers	0.25	2.81	2.72	0.13	0.12	0.00	441.26	0.14	0.00	446.02
	1		Model Default Tier	Paving Equipment	0.21	2.52	2.13	0.11	0.10	0.00	391.54	0.13	0.00	395.76
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rollers	0.21	1.92	2.11	0.13	0.12	0.00	257.24	0.08	0.00	260.01
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Tractors/Loaders/Backhoes	0.42	4.61	4.25	0.27	0.25	0.01	607.74	0.20	0.01	614.28
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User-Defined Off-road Equipment					ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab					pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
Number of Vehicles		Equipment Tier	Type											
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving					pounds per day	1.15	12.15	11.57	0.66	0.60	1,747.10	0.55	0.02	1,765.65
Paving					tons per phase	0.01	0.12	0.11	0.01	0.01	17.30	0.01	0.00	17.48
Total Emissions all Phases (tons per construction period) =>						0.21	1.66	2.26	0.10	0.10	303.64	0.09	0.00	306.67

Equipment default values for horsepower and hours/day can be overridden in cells D391 through D424 and F391 through F424.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		85		8
Excavators		163		8
Forklifts		89		8
Generator Sets		84		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		46		8

END OF DATA ENTRY SHEET

Appendix C – MSAT Calculations

2013

Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
HC	0.395832	0.269879	0.178157	0.122708	0.092408	0.073302	0.060657	0.052489	0.047649	0.045515	0.045845	0.048849	0.054741	0.059098	0.059098
ROG	0.354341	0.245502	0.160626	0.109264	0.082215	0.06519	0.053782	0.046314	0.041806	0.039718	0.039826	0.042328	0.0473	0.050997	0.050997
TOG	0.46088	0.31732	0.207902	0.141775	0.106575	0.084415	0.069623	0.059973	0.054165	0.051486	0.051643	0.054885	0.061347	0.066159	0.066159
CO	2.881601	2.441114	2.075955	1.806535	1.608079	1.453072	1.329244	1.230924	1.15489	1.099935	1.06691	1.060125	1.086181	1.115483	1.115483
NOx	1.495171	1.246539	0.934433	0.738628	0.6354	0.576353	0.536856	0.509897	0.49207	0.481562	0.477394	0.481413	0.491771	0.499515	0.499515
CO2	1274.458	983.3876	764.9698	621.2769	527.6522	464.1201	422.1933	395.1004	380.1992	377.154	385.3012	405.6262	440.8327	464.7993	464.7993
CH4	0.084665	0.056258	0.037359	0.025998	0.019504	0.015406	0.012736	0.011035	0.010041	0.009612	0.009696	0.01033	0.011589	0.012526	0.012526
PM10	0.026014	0.01957	0.013773	0.009975	0.008048	0.006887	0.006135	0.005713	0.005577	0.005705	0.006091	0.006497	0.006848	0.007181	0.007181
PM2.5	0.024496	0.018474	0.013009	0.009425	0.007612	0.00652	0.005812	0.005416	0.00529	0.005415	0.005783	0.006169	0.006498	0.006812	0.006812
Benzene	0.010819	0.007399	0.004884	0.003358	0.002533	0.002009	0.001663	0.001441	0.001306	0.00125	0.001258	0.001338	0.001493	0.001493	0.001493
Acrolein	0.000436	0.000284	0.000194	0.00014	0.000107	0.000085	0.000071	0.000063	0.000058	0.000057	0.000058	0.000063	0.000071	0.000071	0.000071
Acetaldehyde	0.011812	0.008991	0.005476	0.003357	0.002478	0.001933	0.001535	0.00125	0.001054	0.000933	0.000879	0.000888	0.000935	0.000935	0.000935
Formaldehyde	0.026662	0.01996	0.012307	0.007688	0.005696	0.004455	0.003565	0.002936	0.002512	0.002261	0.002163	0.00221	0.002359	0.002359	0.002359
Butadiene	0.002107	0.001406	0.000946	0.000667	0.000505	0.000402	0.000335	0.000294	0.000269	0.000261	0.000265	0.000284	0.000319	0.000319	0.000319
Naphthalene	0.000333	0.000233	0.000152	0.000102	0.000077	0.000061	0.00005	0.000043	0.000039	0.000037	0.000036	0.000039	0.000043	0.000043	0.000043
POM	0.000535	0.000382	0.000242	0.000157	0.000118	0.000094	0.000078	0.000067	0.00006	0.000057	0.000057	0.00006	0.000065	0.000065	0.000065
Diesel PM	0.015234	0.012712	0.009182	0.00674	0.005646	0.005008	0.004587	0.00437	0.004348	0.004519	0.004882	0.005178	0.005323	0.005323	0.005323
DEOG	0.141558	0.109795	0.065903	0.039469	0.028983	0.022512	0.017695	0.01418	0.011717	0.010127	0.009338	0.009245	0.009506	0.009506	0.009506

2025

Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
HC	0.211625	0.143105	0.096044	0.067341	0.050285	0.039381	0.032197	0.027544	0.024729	0.023369	0.023304	0.02475	0.027851	0.030135	0.030135
ROG	0.181651	0.124326	0.083456	0.058395	0.043556	0.034037	0.027712	0.023573	0.021027	0.019739	0.019561	0.020711	0.02328	0.025182	0.025182
TOG	0.242212	0.165348	0.110788	0.077413	0.057707	0.045079	0.036698	0.031219	0.02785	0.02615	0.025919	0.027437	0.030825	0.033333	0.033333
CO	1.545686	1.324905	1.120452	0.970352	0.860883	0.774565	0.704427	0.647293	0.601148	0.564883	0.538241	0.523309	0.521688	0.526744	0.526744
NOx	1.368577	1.068678	0.694853	0.449802	0.304677	0.234379	0.194514	0.170037	0.154444	0.144568	0.13874	0.13855	0.142596	0.145709	0.145709
CO2	1006.251	782.1453	611.2952	499.2885	427.2873	378.4869	346.0193	324.7563	312.6662	309.4284	314.6661	329.4139	355.639	373.5124	373.5124
CH4	0.049854	0.033456	0.022296	0.015544	0.01158	0.009055	0.007396	0.006324	0.005676	0.005363	0.005348	0.005673	0.006371	0.006886	0.006886
PM10	0.013296	0.009022	0.006218	0.004489	0.003478	0.002839	0.002418	0.002147	0.001989	0.001921	0.001939	0.002052	0.002275	0.002468	0.002468
PM2.5	0.012343	0.008394	0.005791	0.004184	0.003245	0.002652	0.002261	0.002009	0.001861	0.001798	0.001814	0.001919	0.002127	0.002307	0.002307
Benzene	0.005581	0.003787	0.002545	0.001784	0.001334	0.001045	0.000855	0.000732	0.000657	0.000622	0.000621	0.000659	0.00074	0.00074	0.00074
Acrolein	0.000227	0.000146	0.000099	0.000071	0.000054	0.000043	0.000036	0.000031	0.000029	0.000028	0.000029	0.000031	0.000035	0.000035	0.000035
Acetaldehyde	0.005493	0.004238	0.002777	0.001855	0.001356	0.001026	0.000789	0.000619	0.000498	0.000416	0.000369	0.000362	0.000384	0.000384	0.000384
Formaldehyde	0.012605	0.009518	0.006261	0.004215	0.003092	0.002354	0.00183	0.001459	0.001201	0.001031	0.000943	0.000944	0.001016	0.001016	0.001016
Butadiene	0.001105	0.000731	0.000494	0.00035	0.000263	0.000207	0.000172	0.000149	0.000136	0.000131	0.000133	0.000142	0.00016	0.00016	0.00016
Naphthalene	0.000169	0.000118	0.000079	0.000055	0.000041	0.000032	0.000026	0.000022	0.000019	0.000018	0.000018	0.000019	0.000021	0.000021	0.000021
POM	0.000248	0.000172	0.000113	0.000077	0.000057	0.000045	0.000036	0.000031	0.000027	0.000025	0.000025	0.000026	0.000029	0.000029	0.000029
Diesel PM	0.003144	0.002617	0.001956	0.001497	0.001263	0.00111	0.000995	0.000913	0.000859	0.000832	0.000831	0.000857	0.000909	0.000909	0.000909
DEOG	0.064493	0.051005	0.033245	0.021993	0.015984	0.012002	0.009092	0.006969	0.005431	0.004338	0.003677	0.003467	0.003563	0.003563	0.003563

2040

Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
HC	0.155851	0.107209	0.072049	0.050514	0.037542	0.029147	0.023544	0.01985	0.017538	0.016311	0.016026	0.016905	0.018994	0.020507	0.020507
ROG	0.137725	0.095825	0.064404	0.045084	0.033457	0.025894	0.020807	0.017418	0.015262	0.014067	0.013703	0.014384	0.016123	0.017384	0.017384
TOG	0.181003	0.125906	0.084522	0.059092	0.043824	0.0339	0.027222	0.022771	0.019937	0.018362	0.017872	0.01875	0.02101	0.022648	0.022648
CO	1.047369	0.884924	0.72399	0.610725	0.532873	0.473486	0.426295	0.388653	0.358877	0.33601	0.319755	0.312079	0.313841	0.318566	0.318566
NOx	1.453449	1.109039	0.677417	0.392937	0.227027	0.152078	0.111909	0.088221	0.073357	0.063686	0.057327	0.055453	0.056608	0.057408	0.057408
CO2	816.3367	642.6877	505.5261	415.7059	358.9012	320.7901	295.1651	277.8361	267.7899	264.227	266.7674	276.7834	296.0614	309.1992	309.1992
CH4	0.034984	0.024078	0.016105	0.011231	0.008325	0.006447	0.005192	0.004362	0.003839	0.003556	0.003481	0.003662	0.004108	0.004431	0.004431
PM10	0.005655	0.003867	0.002732	0.002038	0.001611	0.001337	0.001154	0.001033	0.000957	0.000915	0.000906	0.00094	0.00102	0.001084	0.001084
PM2.5	0.005246	0.003596	0.002545	0.001902	0.001506	0.001251	0.001081	0.000969	0.000897	0.000858	0.000849	0.00088	0.000954	0.001014	0.001014
Benzene	0.004231	0.002918	0.001963	0.001376	0.001025	0.000796	0.000644	0.000544	0.00048	0.000448	0.000442	0.000468	0.000525	0.000525	0.000525
Acrolein	0.000158	0.000102	0.000069	0.000049	0.000037	0.000029	0.000025	0.000022	0.00002	0.00002	0.00002	0.000022	0.000025	0.000025	0.000025
Acetaldehyde	0.005162	0.004028	0.002674	0.001818	0.001322	0.000986	0.000744	0.000569	0.000442	0.000352	0.000298	0.000283	0.000296	0.000296	0.000296
Formaldehyde	0.011419	0.008762	0.005827	0.003977	0.002901	0.002177	0.001659	0.001288	0.001023	0.000839	0.000734	0.000716	0.000762	0.000762	0.000762
Butadiene	0.000809	0.00054	0.000365	0.000258	0.000193	0.000152	0.000125	0.000108	0.000098	0.000094	0.000094	0.000101	0.000114	0.000114	0.000114
Naphthalene	0.000139	0.000098	0.000066	0.000046	0.000034	0.000026	0.000021	0.000018	0.000015	0.000014	0.000013	0.000014	0.000016	0.000016	0.000016
POM	0.000167	0.000118	0.000079	0.000055	0.000041	0.000031	0.000025	0.000021	0.000018	0.000016	0.000016	0.000016	0.000018	0.000018	0.000018
Diesel PM	0.001216	0.001072	0.000876	0.000738	0.000651	0.000588	0.000539	0.000499	0.000468	0.000444	0.000426	0.000424	0.000434	0.000434	0.000434
DEOG	0.062395	0.049723	0.032936	0.022268	0.016121	0.01194	0.008885	0.006644	0.004999	0.003792	0.003025	0.002742	0.002759	0.002759	0.002759

Annual VMT

Existing 2013	2025	2040	2025 Build	2040 Build
1,197,741,358	1,349,057,818	1,528,944,016	1,348,999,732	1,529,387,024

Grams

HC	72651397.57	37158448.54	30349538.72	37156848.63	30358332.43
ROG	64416925.73	31801339.94	26631146.87	31799970.69	26638863.19
TOG	83390346.59	42116236.02	34815584.19	42114422.64	34825671.93
CO	1592090514	873235682.1	594228678.7	873198083.8	594400855.2
NOx	643014634.7	229389744.2	134884970	229379867.5	134924052.7
CO2	5.05678E+11	4.38115E+11	4.24796E+11	4.38096E+11	4.24919E+11
CH4	15254433.94	8531441.64	6669253.798	8531074.307	6671186.2
PM10	7348143.233	2896427.135	1579399.169	2896302.425	1579856.796
PM2.5	6961272.775	2710257.156	1481546.752	2710140.462	1481976.027
Benzene	1991843.879	987510.3227	831745.5447	987467.8041	831986.5413
Acrolein	85039.63644	41820.79235	33636.76835	41818.9917	33646.51454
Acetaldehyde	1838532.985	835066.7893	869969.1451	835030.8343	870221.2169
Formaldehyde	4269947.943	1968275.356	1969279.893	1968190.609	1969850.487
Butadiene	401243.355	201009.6149	165125.9537	201000.9601	165173.7986
Naphthalene	59887.06792	29679.27199	27520.99229	29677.99411	27528.96644
POM	93423.82595	41820.79235	32107.82434	41818.9917	32117.12751
Diesel PM	5494039.611	1231689.788	762943.064	1231636.756	763164.1252
DEOG	21194033.34	9401583.933	10158304.04	9401179.135	10161247.39

	1.00E-06	0.00220462	1.10231	<i>Metric Tons</i>		
HC	73	37	30	37	30	
ROG	64	32	27	32	27	
TOG	83	42	35	42	35	
CO	1,592	873	594	873	594	
NOx	643	229	135	229	135	
CO2	505,678	438,115	424,796	438,096	424,919	
CH4	15	9	7	9	7	
PM10	7	3	2	3	2	
PM2.5	7	3	1	3	1	
Benzene	2	1	1	1	1	
Acrolein	0.0850	0.0418	0.0336	0.0418	0.0336	
Acetaldehyde	2	1	1	1	1	
Formaldehyde	4	2	2	2	2	
Butadiene	0.401	0.201	0.165	0.201	0.165	
Naphthalene	0.060	0.030	0.028	0.030	0.028	
POM	0.093	0.042	0.032	0.042	0.032	
Diesel PM	5	1	1	1	1	
DEOG	21	9	10	9	10	

	Metric Tons per year				
	Existing	2025 No-Build	2025 Build	2040 No-build	2040 Build
	505,693.6	438,123.5	424,802.5	438,104.7	424,925.6
		87%	84%	87%	84%
		-15%	-19%	-15%	-19%
			97%		97%
			-3%		-3%
CO	1754.98	962.58	655.02	962.53	655.21
Nox	708.80	252.86	148.69	252.85	148.73
PM10	8.10	3.19	1.74	3.19	1.74
PM2.5	7.67	2.99	1.63	2.99	1.63

Daily VMT

Existing 2013	2025	2040	2025 Build	2040 Build
4,589,047	5,168,804	5,858,023	5,168,581	5,859,720

Grams

HC	278357.8451	142369.5346	116281.7575	142363.4047	116315.4499
ROG	246808.1446	121844.2143	102035.0455	121838.9682	102064.6099
TOG	319503.2436	161364.889	133393.0429	161357.9412	133431.6932
CO	6099963.656	3345730.583	2276738.232	3345586.528	2277397.913
NOx	2463657.604	878887.9087	516800.6515	878850.067	516950.3934
CO2	1937464898	1678601563	1627570401	1678529288	1628041986
CH4	58446.10705	32687.51586	25552.69654	32686.10846	25560.10038
PM10	28153.80549	11097.42197	6051.337811	11096.94416	6053.091173
PM2.5	26671.5432	10384.12704	5676.424335	10383.67993	5678.069068
Benzene	7631.585743	3783.564455	3186.764539	3783.401548	3187.687898
Acrolein	325.8223619	160.2329209	128.8765071	160.2260219	128.9138488
Acetaldehyde	7044.187682	3199.489614	3333.215115	3199.351856	3334.180908
Formaldehyde	16359.9538	7541.28489	7545.133688	7540.96019	7547.319875
Butadiene	1537.330862	770.1517811	632.6664894	770.1186212	632.8498032
Naphthalene	229.4523675	113.7136858	105.4444149	113.7087897	105.4749672
POM	357.9456933	160.2329209	123.0184841	160.2260219	123.0541284
Diesel PM	21049.96019	4719.117961	2923.153502	4718.914773	2924.00048
DEOG	81203.19286	36021.39438	38920.70514	36019.84343	38931.98234

	1.00E-06	0.0022046	<i>Pounds per day</i>		
HC	613.7	313.9	256.4	313.9	256.4
ROG	544.1	268.6	224.9	268.6	225.0
TOG	704.4	355.7	294.1	355.7	294.2
CO	13,448.0	7,376.0	5,019.3	7,375.7	5,020.8
NOx	5,431.4	1,937.6	1,139.3	1,937.5	1,139.7
CO2	1,937	1,679	1,628	1,679	1,628
CH4	0.058	0.033	0.026	0.033	0.026
PM10	62.1	24.5	13.3	24.5	13.3
PM2.5	58.8	22.9	12.5	22.9	12.5
Benzene	16.8	8.3	7.0	8.3	7.0
Acrolein	0.7	0.4	0.3	0.4	0.3
Acetaldehyde	15.5	7.1	7.3	7.1	7.4
Formaldehyde	36.1	16.6	16.6	16.6	16.6
Butadiene	3.4	1.7	1.4	1.7	1.4
Naphthalene	0.5	0.3	0.2	0.3	0.2
POM	0.8	0.4	0.3	0.4	0.3
Diesel PM	46.4	10.4	6.4	10.4	6.4
DEOG	179.0	79.4	85.8	79.4	85.8

Pounds per day				
1,937.5	1,678.6	1,627.6	1,678.6	1,628.1
	87%	84%	87%	84%
	-15.4%	-19.0%	-15.4%	-19.0%

2013

Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
HC	0.395832	0.269879	0.178157	0.122708	0.092408	0.073302	0.060657	0.052489	0.047649	0.045515	0.045845	0.048849	0.054741	0.059098	0.059098
ROG	0.354341	0.245502	0.160626	0.109264	0.082215	0.06519	0.053782	0.046314	0.041806	0.039718	0.039826	0.042328	0.0473	0.050997	0.050997
TOG	0.46088	0.31732	0.207902	0.141775	0.106575	0.084415	0.069623	0.059973	0.054165	0.051486	0.051643	0.054885	0.061347	0.066159	0.066159
CO	2.881601	2.441114	2.075955	1.806535	1.608079	1.453072	1.329244	1.230924	1.15489	1.099935	1.06691	1.060125	1.086181	1.115483	1.115483
NOx	1.495171	1.246539	0.934433	0.738628	0.6354	0.576353	0.536856	0.509897	0.49207	0.481562	0.477394	0.481413	0.491771	0.499515	0.499515
CO2	1274.458	983.3876	764.9698	621.2769	527.6522	464.1201	422.1933	395.1004	380.1992	377.154	385.3012	405.6262	440.8327	464.7993	464.7993
CH4	0.084665	0.056258	0.037359	0.025998	0.019504	0.015406	0.012736	0.011035	0.010041	0.009612	0.009696	0.01033	0.011589	0.012526	0.012526
PM10	0.026014	0.01957	0.013773	0.009975	0.008048	0.006887	0.006135	0.005713	0.005577	0.005705	0.006091	0.006497	0.006848	0.007181	0.007181
PM2.5	0.024496	0.018474	0.013009	0.009425	0.007612	0.00652	0.005812	0.005416	0.00529	0.005415	0.005783	0.006169	0.006498	0.006812	0.006812
Benzene	0.010819	0.007399	0.004884	0.003358	0.002533	0.002009	0.001663	0.001441	0.001306	0.00125	0.001258	0.001338	0.001493	0.001493	0.001493
Acrolein	0.000436	0.000284	0.000194	0.00014	0.000107	0.000085	0.000071	0.000063	0.000058	0.000057	0.000058	0.000063	0.000071	0.000071	0.000071
Acetaldehyde	0.011812	0.008991	0.005476	0.003357	0.002478	0.001933	0.001535	0.00125	0.001054	0.000933	0.000879	0.000888	0.000935	0.000935	0.000935
Formaldehyde	0.026662	0.01996	0.012307	0.007688	0.005696	0.004455	0.003565	0.002936	0.002512	0.002261	0.002163	0.00221	0.002359	0.002359	0.002359
Butadiene	0.002107	0.001406	0.000946	0.000667	0.000505	0.000402	0.000335	0.000294	0.000269	0.000261	0.000265	0.000284	0.000319	0.000319	0.000319
Naphthalene	0.000333	0.000233	0.000152	0.000102	0.000077	0.000061	0.00005	0.000043	0.000039	0.000037	0.000036	0.000039	0.000043	0.000043	0.000043
POM	0.000535	0.000382	0.000242	0.000157	0.000118	0.000094	0.000078	0.000067	0.00006	0.000057	0.000057	0.00006	0.000065	0.000065	0.000065
Diesel PM	0.015234	0.012712	0.009182	0.00674	0.005646	0.005008	0.004587	0.00437	0.004348	0.004519	0.004882	0.005178	0.005323	0.005323	0.005323
DEOG	0.141558	0.109795	0.065903	0.039469	0.028983	0.022512	0.017695	0.01418	0.011717	0.010127	0.009338	0.009245	0.009506	0.009506	0.009506

2025

Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
HC	0.211625	0.143105	0.096044	0.067341	0.050285	0.039381	0.032197	0.027544	0.024729	0.023369	0.023304	0.02475	0.027851	0.030135	0.030135
ROG	0.181651	0.124326	0.083456	0.058395	0.043556	0.034037	0.027712	0.023573	0.021027	0.019739	0.019561	0.020711	0.02328	0.025182	0.025182
TOG	0.242212	0.165348	0.110788	0.077413	0.057707	0.045079	0.036698	0.031219	0.02785	0.02615	0.025919	0.027437	0.030825	0.033333	0.033333
CO	1.545686	1.324905	1.120452	0.970352	0.860883	0.774565	0.704427	0.647293	0.601148	0.564883	0.538241	0.523309	0.521688	0.526744	0.526744
NOx	1.368577	1.068678	0.694853	0.449802	0.304677	0.234379	0.194514	0.170037	0.154444	0.144568	0.13874	0.13855	0.142596	0.145709	0.145709
CO2	1006.251	782.1453	611.2952	499.2885	427.2873	378.4869	346.0193	324.7563	312.6662	309.4284	314.6661	329.4139	355.639	373.5124	373.5124
CH4	0.049854	0.033456	0.022296	0.015544	0.01158	0.009055	0.007396	0.006324	0.005676	0.005363	0.005348	0.005673	0.006371	0.006886	0.006886
PM10	0.013296	0.009022	0.006218	0.004489	0.003478	0.002839	0.002418	0.002147	0.001989	0.001921	0.001939	0.002052	0.002275	0.002468	0.002468
PM2.5	0.012343	0.008394	0.005791	0.004184	0.003245	0.002652	0.002261	0.002009	0.001861	0.001798	0.001814	0.001919	0.002127	0.002307	0.002307
Benzene	0.005581	0.003787	0.002545	0.001784	0.001334	0.001045	0.000855	0.000732	0.000657	0.000622	0.000621	0.000659	0.00074	0.00074	0.00074
Acrolein	0.000227	0.000146	0.000099	0.000071	0.000054	0.000043	0.000036	0.000031	0.000029	0.000028	0.000029	0.000031	0.000035	0.000035	0.000035
Acetaldehyde	0.005493	0.004238	0.002777	0.001855	0.001356	0.001026	0.000789	0.000619	0.000498	0.000416	0.000369	0.000362	0.000384	0.000384	0.000384
Formaldehyde	0.012605	0.009518	0.006261	0.004215	0.003092	0.002354	0.00183	0.001459	0.001201	0.001031	0.000943	0.000944	0.001016	0.001016	0.001016
Butadiene	0.001105	0.000731	0.000494	0.00035	0.000263	0.000207	0.000172	0.000149	0.000136	0.000131	0.000133	0.000142	0.00016	0.00016	0.00016
Naphthalene	0.000169	0.000118	0.000079	0.000055	0.000041	0.000032	0.000026	0.000022	0.000019	0.000018	0.000018	0.000019	0.000021	0.000021	0.000021
POM	0.000248	0.000172	0.000113	0.000077	0.000057	0.000045	0.000036	0.000031	0.000027	0.000025	0.000025	0.000026	0.000029	0.000029	0.000029
Diesel PM	0.003144	0.002617	0.001956	0.001497	0.001263	0.00111	0.000995	0.000913	0.000859	0.000832	0.000831	0.000857	0.000909	0.000909	0.000909
DEOG	0.064493	0.051005	0.033245	0.021993	0.015984	0.012002	0.009092	0.006969	0.005431	0.004338	0.003677	0.003467	0.003563	0.003563	0.003563

2040

Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
HC	0.155851	0.107209	0.072049	0.050514	0.037542	0.029147	0.023544	0.01985	0.017538	0.016311	0.016026	0.016905	0.018994	0.020507	0.020507
ROG	0.137725	0.095825	0.064404	0.045084	0.033457	0.025894	0.020807	0.017418	0.015262	0.014067	0.013703	0.014384	0.016123	0.017384	0.017384
TOG	0.181003	0.125906	0.084522	0.059092	0.043824	0.0339	0.027222	0.022771	0.019937	0.018362	0.017872	0.01875	0.02101	0.022648	0.022648
CO	1.047369	0.884924	0.72399	0.610725	0.532873	0.473486	0.426295	0.388653	0.358877	0.33601	0.319755	0.312079	0.313841	0.318566	0.318566
NOx	1.453449	1.109039	0.677417	0.392937	0.227027	0.152078	0.111909	0.088221	0.073357	0.063686	0.057327	0.055453	0.056608	0.057408	0.057408
CO2	816.3367	642.6877	505.5261	415.7059	358.9012	320.7901	295.1651	277.8361	267.7899	264.227	266.7674	276.7834	296.0614	309.1992	309.1992
CH4	0.034984	0.024078	0.016105	0.011231	0.008325	0.006447	0.005192	0.004362	0.003839	0.003556	0.003481	0.003662	0.004108	0.004431	0.004431
PM10	0.005655	0.003867	0.002732	0.002038	0.001611	0.001337	0.001154	0.001033	0.000957	0.000915	0.000906	0.00094	0.00102	0.001084	0.001084
PM2.5	0.005246	0.003596	0.002545	0.001902	0.001506	0.001251	0.001081	0.000969	0.000897	0.000858	0.000849	0.00088	0.000954	0.001014	0.001014
Benzene	0.004231	0.002918	0.001963	0.001376	0.001025	0.000796	0.000644	0.000544	0.00048	0.000448	0.000442	0.000468	0.000525	0.000525	0.000525
Acrolein	0.000158	0.000102	0.000069	0.000049	0.000037	0.000029	0.000025	0.000022	0.00002	0.00002	0.00002	0.000022	0.000025	0.000025	0.000025
Acetaldehyde	0.005162	0.004028	0.002674	0.001818	0.001322	0.000986	0.000744	0.000569	0.000442	0.000352	0.000298	0.000283	0.000296	0.000296	0.000296
Formaldehyde	0.011419	0.008762	0.005827	0.003977	0.002901	0.002177	0.001659	0.001288	0.001023	0.000839	0.000734	0.000716	0.000762	0.000762	0.000762
Butadiene	0.000809	0.00054	0.000365	0.000258	0.000193	0.000152	0.000125	0.000108	0.000098	0.000094	0.000094	0.000101	0.000114	0.000114	0.000114
Naphthalene	0.000139	0.000098	0.000066	0.000046	0.000034	0.000026	0.000021	0.000018	0.000015	0.000014	0.000013	0.000014	0.000016	0.000016	0.000016
POM	0.000167	0.000118	0.000079	0.000055	0.000041	0.000031	0.000025	0.000021	0.000018	0.000016	0.000016	0.000016	0.000018	0.000018	0.000018
Diesel PM	0.001216	0.001072	0.000876	0.000738	0.000651	0.000588	0.000539	0.000499	0.000468	0.000444	0.000426	0.000424	0.000434	0.000434	0.000434
DEOG	0.062395	0.049723	0.032936	0.022268	0.016121	0.01194	0.008885	0.006644	0.004999	0.003792	0.003025	0.002742	0.002759	0.002759	0.002759

Existing 2013	2025	2040	2025 Build	2040 Build
0	0	0	38,735	46,592
0	0	0	14,138,275	17,006,080

Annual VMT					
Pollutant	Existing 2013	2025	2040	2025 Build	2040 Build
	0	0	0	14,138,275	17,006,080
	<i>Grams per year</i>				
HC	0	0	0	389424.6466	337570.688
ROG	0	0	0	333281.5566	296211.9014
TOG	0	0	0	441382.8072	387245.4477
CO	0	0	0	9151606.44	6609464.01
NOx	0	0	0	2404029.866	1500293.384
CO2	0	0	0	4591493694	4724903301
CH4	0	0	0	89410.4511	74180.52096
PM10	0	0	0	30354.87643	17567.28064
PM2.5	0	0	0	28403.79448	16478.89152
Benzene	0	0	0	10349.2173	9251.30752
Acrolein	0	0	0	438.286525	374.13376
Acetaldehyde	0	0	0	8751.592225	9676.45952
Formaldehyde	0	0	0	20627.74323	21903.83104
Butadiene	0	0	0	2106.602975	1836.65664
Naphthalene	0	0	0	311.04205	306.10944
POM	0	0	0	438.286525	357.12768
Diesel PM	0	0	0	12908.24508	8486.03392
DEOG	0	0	0	98529.63848	112988.3955

	1.00E-06	0.00220462	1.10231E-06	Metric Tons per year	
HC	0.00	0.00	0.00	0.39	0.34
ROG	0.00	0.00	0.00	0.33	0.30
TOG	0.00	0.00	0.00	0.44	0.39
CO	0.00	0.00	0.00	10.09	7.29
NOx	0.00	0.00	0.00	2.65	1.65
CO2	0.00	0.00	0.00	4,591.49	4,724.90
CH4	0.00	0.00	0.00	0.09	0.07
PM10	0.00	0.00	0.00	0.03	0.02
PM2.5	0.00	0.00	0.00	0.03	0.02
Benzene	0.00	0.00	0.00	0.01	0.01
Acrolein	0.00	0.00	0.00	0.00	0.00
Acetaldehyde	0.00	0.00	0.00	0.01	0.01
Formaldehyde	0.00	0.00	0.00	0.02	0.02
Butadiene	0.00	0.00	0.00	0.00	0.00
Naphthalene	0.00	0.00	0.00	0.00	0.00
POM	0.00	0.00	0.00	0.00	0.00
Diesel PM	0.00	0.00	0.00	0.01	0.01
DEOG	0.00	0.00	0.00	0.10	0.11

	Metric Tons per year Existing 0	20205 no build 0 #DIV/0! #DIV/0! 0	2040 no build 0 #DIV/0! #DIV/0! 0 #DIV/0! 100.000%	2025 build 4,592 #DIV/0! 100% -4,592	2040 build 4,725 #DIV/0! 100% -4,725 103% 100.000%
CO	0.00	0.00	0.00	0.00	0.00
Nox	0.00	0.00	0.00	0.00	0.00
PM10	0.00	0.00	0.00	0.00	0.00
PM2.5	0.00	0.00	0.00	0.00	0.00

295.170323 Metric tons
96815.86594

Pounds
0.10
35
213.4156
77,896.694

Daily VMT					
	Existing 2013	2025	2040	2025 Build	2040 Build
	0	0	0	38,735	46,592
	<i>Grams</i>				
HC	0	0	0	1066.91684	924.8512
ROG	0	0	0	913.100155	811.539456
TOG	0	0	0	1209.267965	1060.946432
CO	0	0	0	25072.89436	18108.12058
NOx	0	0	0	6586.383195	4110.392832
CO2	0	0	0	12579434.78	12944940.55
CH4	0	0	0	244.96014	203.234304
PM10	0	0	0	83.164045	48.129536
PM2.5	0	0	0	77.818615	45.147648
Benzene	0	0	0	28.35402	25.346048
Acrolein	0	0	0	1.200785	1.025024
Acetaldehyde	0	0	0	23.976965	26.510848
Formaldehyde	0	0	0	56.514365	60.010496
Butadiene	0	0	0	5.771515	5.031936
Naphthalene	0	0	0	0.85217	0.838656
POM	0	0	0	1.200785	0.978432
Diesel PM	0	0	0	35.365055	23.249408
DEOG	0	0	0	269.944215	309.557248

Pounds per day

1.00E-06

0.0022046

HC	0.00	0.00	0.00	2.35	2.04
ROG	0.00	0.00	0.00	2.01	1.79
TOG	0.00	0.00	0.00	2.67	2.34
CO	0.00	0.00	0.00	55.28	39.92
NOx	0.00	0.00	0.00	14.52	9.06
CO2	0.00	0.00	0.00	12.58	12.94
CH4	0.00	0.00	0.00	0.00	0.00
PM10	0.00	0.00	0.00	0.18	0.11
PM2.5	0.00	0.00	0.00	0.17	0.10
Benzene	0.00	0.00	0.00	0.06	0.06
Acrolein	0.00	0.00	0.00	0.00	0.00
Acetaldehyde	0.00	0.00	0.00	0.05	0.06
Formaldehyde	0.00	0.00	0.00	0.12	0.13
Butadiene	0.00	0.00	0.00	0.01	0.01
Naphthalene	0.00	0.00	0.00	0.00	0.00
POM	0.00	0.00	0.00	0.00	0.00
Diesel PM	0.00	0.00	0.00	0.08	0.05
DEOG	0.00	0.00	0.00	0.60	0.68

Required	Optional
1. Introduction 2. Background 3. Methodology 4. Results 5. Conclusion	6. References 7. Appendix 8. Notes 9. References 10. Appendix 11. Notes

Scenario	Base Case	Opening Year No Build	Opening Year Build	Horizon Year No Build	Horizon Year Build
Scenario Name	Existing	2025	2025	2040	2040
Geographic Area	Alameda (SF)	Santa Clara (SF)	Alameda (SF)	Alameda (SF)	Alameda (SF)
Analysis Year	2017	2025	2025	2040	2040
Season	Annual	Annual	annual	annual	annual
Peak Truck %	3.0	3.0	3.0	3.0	3.0
Off-Peak Truck %	1.0	1.0	1.0	1.0	1.0

[illegible]

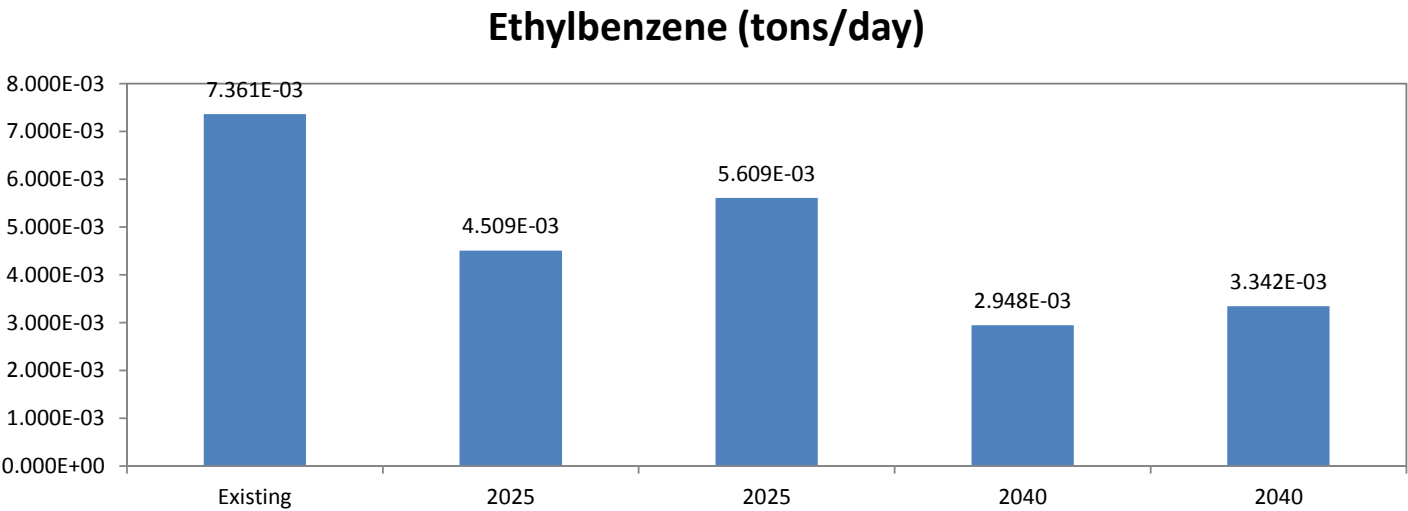
Scenario Setup

Scenario	Base Case	Opening Year No Build	Opening Year Build	Horizon Year No Build	Horizon Year Build
Scenario Name	Existing	2025	2025	2040	2040
Geographic Area	Alameda (SF)	Santa Clara (SF)	Alameda (SF)	Alameda (SF)	Alameda (SF)
Analysis Year	2017	2025	2025	2040	2040
Season	Annual	Annual	annual	annual	annual
Peak Truck %	3.0	3.0	3.0	3.0	3.0
Off-Peak Truck %	1.0	1.0	1.0	1.0	1.0

VMT by Speed by Peak/Off-Peak

[illegible]

Total Emissions	Existing	2025	2025	2040	2040
Ethylbenzene (tons/day)	7.361E-03	4.509E-03	5.609E-03	2.948E-03	3.342E-03



Required	Optional
1. Introduction 2. Background 3. Methodology 4. Results 5. Conclusion	6. References 7. Appendix 8. Notes 9. References 10. Appendix 11. Notes

Scenario	Base Case	Opening Year No Build	Opening Year Build	Horizon Year No Build	Horizon Year Build
Scenario Name	Existing	2025	2025	2040	2040
Geographic Area	Alameda (SF)	Alameda (SF)	Alameda (SF)	Alameda (SF)	Alameda (SF)
Analysis Year	2017	2025	2025	2040	2040
Season	Annual	Annual	annual	annual	annual
Peak Truck %	4.3	4.3	4.3	4.3	4.3
Off-Peak Truck %	1.0	1.0	1.0	1.0	1.0

[illegible]

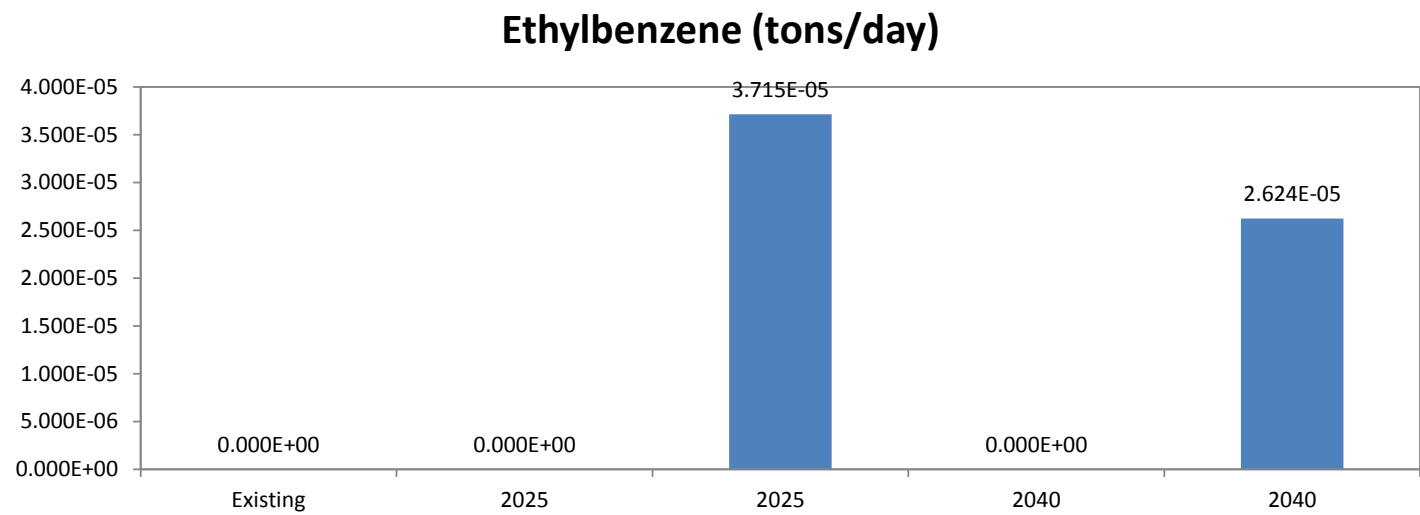
Scenario Setup

Scenario	Base Case	Opening Year No Build	Opening Year Build	Horizon Year No Build	Horizon Year Build
Scenario Name	Existing	2025	2025	2040	2040
Geographic Area	Alameda (SF)	Alameda (SF)	Alameda (SF)	Alameda (SF)	Alameda (SF)
Analysis Year	2017	2025	2025	2040	2040
Season	Annual	Annual	annual	annual	annual
Peak Truck %	4.3	4.3	4.3	4.3	4.3
Off-Peak Truck %	1.0	1.0	1.0	1.0	1.0

VMT by Speed by Peak/Off-Peak

[illegible]

Total Emissions	Existing	2025	2025	2040	2040
Ethylbenzene (tons/day)	0.000E+00	0.000E+00	3.715E-05	0.000E+00	2.624E-05



Appendix D - Interagency Consultation Documentation

From: [Obaid Khan](#)
To: [Brianna Bohonok](#); [Audrey Zagazeta](#); [Gordon Sweet \(GSweet@BKF.com\)](#); [Holstein, Thomas@DOT \(tom.holstein@dot.ca.gov\)](#); ["Bob Vinn"](#); [Ruben Izon](#); [Jhay Delos Reyes](#)
Subject: FW: FMS POAQC Project TIP ID ALA150003 (Dublin Blvd. - North Canyons Pkwy Extension) update: Project is a not a POAQC
Date: Thursday, October 25, 2018 2:52:11 PM

Hi all, I wanted to provide the below email confirming the completion of the Air Quality Conformity consultation and approval.

Obaid.

-----Original Message-----

From: Fund Management System <fms@bayareametro.gov>
Sent: Thursday, October 25, 2018 1:33 PM
To: Obaid Khan <Obaid.Khan@dublin.ca.gov>; ybhat@alamedactc.org
Cc: Fund Management System <fms@bayareametro.gov>; Harold Brazil <HBrazil@bayareametro.gov>
Subject: FMS POAQC Project TIP ID ALA150003 (Dublin Blvd. - North Canyons Pkwy Extension) update: Project is a not a POAQC

Dear Project Sponsor

Based on the recent interagency consultation with the Air Quality Conformity Task force, Project TIP ID ALA150003 (FMS ID:6046.00) does not fit the definition of a project of air quality concern as defined by 40 CFR 93.123(b)(1) or 40 CFR 93.128 and therefore is not subject to PM2.5 project level conformity requirement. Please save this email as documentation confirming the project has undergone and completed the interagency consultation requirement for PM2.5 project level conformity. Note project sponsors are required to undergo a proactive public involvement process which provides opportunity for public review as outlined by 40 CFR 93.105(e). For projects that are not of air quality concern, a comment period is only required for project level conformity determinations if such a comment period would have been required under NEPA. For more information, please see FHWA PM2.5 Project Level Conformity Frequently Asked Questions (FAQ): http://www.fhwa.dot.gov/environment/air_quality/conformity/reference/faqs/pm25faqs.cfm

If you have any questions, please direct them to Harold Brazil at hbrazil@bayareametro.gov or by phone at 415-778-6747

Total Control Panel

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To: b.bohonok@circlepoint.com [Remove](#) this sender from my allow list

From:
obaid.khan@dublin.ca.gov

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street
San Francisco, CA 94105-3901

MAR 21 2018

Muhaned Aljabiry, Chief
Office of Federal Transportation Management Program
California Department of Transportation
1120 N Street, Rm 4400, MS-82
Sacramento, CA 95814

Dear Mr. Aljabiry:

The U.S. Environmental Protection Agency (EPA) is providing this letter to document that the transportation conformity requirements under Clean Air Act (CAA) section 176(c) for the Carbon Monoxide (CO) maintenance areas included in the table below will end on June 1, 2018. This date marks 20 years from the redesignation of the areas to attainment for the CO National Ambient Air Quality Standard (NAAQS)¹.

California Carbon Monoxide Maintenance Areas

Bakersfield	Chico
Fresno	Modesto
Lake Tahoe North Shore	Lake Tahoe South Shore
Sacramento	San Diego
San Francisco-Oakland-San Jose	Stockton

Under 40 CFR 93.102(b)(4) of the EPA's regulations, transportation conformity applies to maintenance areas through the 20-year maintenance planning period, unless the maintenance plan specifies that the transportation conformity requirements apply for a longer time period. Pursuant to CAA's section 176(c)(5) and as explained in the preamble of the 1993 final rule, conformity applies to areas that are designated nonattainment or are subject to a maintenance plan approved under CAA section 175A. The section 175A maintenance planning period is 20 years, unless the applicable implementation plan specifies a longer maintenance period². The EPA further clarified this conformity provision in its January 24, 2008 final rule³.

The approved maintenance plan for these areas did not extend the maintenance plan period beyond 20 years from redesignation. Consequently, transportation conformity requirements for CO will cease to apply after June 1, 2018 (i.e., 20 years after the effective date of the EPA's approval of the first 10-year maintenance plan and redesignation of the areas to attainment for the CO NAAQS). As a result, these areas' Metropolitan Planning Organizations may reference this letter to indicate that as of June 1, 2018,

¹ See 63 FR 15305 (March 31, 1998) (approval of redesignation request and first 10-year maintenance plan) and 70 FR 71776 (November 30, 2005) (approval of second 10-year maintenance plan)

² See 58 FR 62188, 62206 (November 24, 1993)

³ See 73 FR 4420, at 4434-5 (January 24, 2008)

transportation conformity requirements no longer apply for the CO NAAQS for Federal Highway Administration / Federal Transit Association projects as defined in 40 CFR 93.101. Even though the conformity obligation for CO has ended, the terms of the maintenance plans remain in effect and all measures and requirements contained in the plans apply until the state submits, and the EPA approves, a revision to the state plan⁴. Such a State Implementation Plan revision would have to comply with the anti-backsliding requirements of CAA section 110(l), and if applicable, CAA section 193, if the intent of the revision is to remove a control measure or to reduce its stringency.

If you have any questions about the transportation conformity requirements, please contact me at (415) 972-3183 or Karina O'Connor of my staff at (775) 434-8176.

Sincerely,



Elizabeth J. Adams
Acting Director, Air Division

cc: Rodeny Langstaff, Caltrans
Nesamani Kalandiyur, California Air Resources Board
Tasha Clemons, Federal Highway Administration
Stew Sonnenberg, Federal Highway Administration
Christina Leach, Federal Highway Administration
Ted Matley, Federal Transit Administration
Ahron Hakimi, Kern Council of Governments
Jon Clark, Butte County Association of Governments
Steve Heminger, Metropolitan Transportation Commission
James Corless, Sacramento Area Council of Governments
Kim Kawanda, San Diego Association of Governments
Tony Boren, Fresno Council of Governments
Rosa De Leon Park, Stanislaus Council of Governments
Andrew Chesley, San Joaquin Council of Governments
Joanne Marchetta, Tahoe Regional Planning Association

⁴ See *General Motors Corp. v. United States*, 496 U.S. 530 (1990)

Hi James – you are correct. I am curious as to who is using 1.12 as an adjustment? I can't imagine what factors they are using to get such a low adjustment factor.

Virginia Lau

Bay Area Air Quality Management District

375 Beale Street, Suite 600

San Francisco, CA 94105

Direct: (415) 749-4696

Fax: (415) 749-4741

Email: vlau@baaqmd.gov

From: James Reyff [mailto:jreyff@illingworthrodkin.com]

Sent: Tuesday, May 1, 2018 9:55 AM

To: Areana Flores <aflores@baaqmd.gov>

Cc: Virginia Lau <VLau@baaqmd.gov>

Subject: RE: City View San Jose SSIF Request

Hi Areana,

We used 1.7 to adjust pre-2010 risk to post 2010-2015 risk and then 1.3744 to adjust 2010-2015 risk to post 2015 risk. These are factors that Virginia and Alison provided us and apply to continuous sources. I just wanted to confirm those because I saw some other Consultants are using 1.12 to adjust 2010-2015 risk to post 2015 risk.

I hope I have that right!

Thank you

-James

James A. Reyff

Illingworth & Rodkin, Inc.

1 Willowbrook Court, Suite 120

Petaluma, CA 94954

(T) 707.794.0400 x 24

(F) 707.794.0405

From: Areana Flores <aflores@baaqmd.gov>

Sent: Tuesday, May 1, 2018 9:28 AM

To: James Reyff <jreyff@illingworthrodkin.com>

Cc: Virginia Lau <VLau@baaqmd.gov>

Subject: RE: City View San Jose SSIF Request

Hi James,

We use a more conservative factor of 1.7. I am ccing Virginia who can better answer this question.

Another thing to keep in mind is that the updated 2014 data is different than the 2012 data that is online. Facility's reported emissions can vary from year to year.

-Areana

From: James Reyff <jreyff@illingworthrodkin.com>

Sent: Monday, April 30, 2018 5:38 PM

To: Areana Flores <aflores@baaqmd.gov>

Subject: RE: City View San Jose SSIF Request

Hi Areana,

Quick question – how is older cancer risk adjusted for new OEHHA? IS it a factor of 1.3744? I see some consultants use 1.12.

Thanks,

-James

James A. Reyff

Illingworth & Rodkin, Inc.

1 Willowbrook Court, Suite 120

Petaluma, CA 94954

(T) 707.794.0400 x 24

(F) 707.794.0405

From: Virginia Lau [mailto:VLau@baaqmd.gov]

Sent: Monday, November 16, 2015 1:17 PM

To: Bill Popenuck

Subject: RE: OEHHA Exposure Factors

Hi Bill - In response to your request, the District plans to follow the recommended exposure factors set forth by CAPCOA. However, to save you some time, I have outlined the values we are proposing to use:

Units

trimester

0<2

2<16

16-30

Breathing Rates (95th percentile for under 2 yrs age and 80% for over 2 yrs)

L/kg-day

361

1090

572

261

Age Sensitivity

unitless

10

10

3

1

Fraction of time at home

unitless

1

1

1

0.73

Exposure duration is 30 years.

Please contact me if you have any questions.

Virginia

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