4057 Jefferson Avenue Subdivision Project

Air Quality and Health Risk Assessment

August 2019

Prepared for:

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List of Acronyms, Abbreviations, and Symbols	
Acronym / Abbreviation	**Full Phrase or Description**
µm	micron
AB	Assembly Bill
ASF	Age Sensitivity Factor
AT	Averaging Time
ATCM	Airborne Toxic Control Measure
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BMP	Best Management Practice
CAAQS	California Ambient Air Quality Standards
CAAQS	Clean Air Act
CalEEMod	California Emissions Estimator Model
Cal-EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
CPF	Inhalation Cancer Potency Factor
CY	Cubic Yards
DPM	Diesel Particulate Matter
ED	Exposure Duration
FAH	Fraction of Time at Home
GVWR	Gross Vehicle Weight Rating
H_2S	Hydrogen Sulfide
HAP	Hazardous Air Pollutant
Hot Spots Act	Air Toxics Hot Spots Information and Assessment Act
HRA	Health Risk Assessment
KNUQ	Moffett Field
MEIR	Maximum Exposed Individual Receptor
MIG, Inc.	MIG
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
N_O	Nitric Oxide
NO_2	Nitrogen Dioxide
NOA	Naturally Occurring Asbestos

List of Acronyms, Abbreviations, and Symbols	
Acronym / Abbreviation	**Full Phrase or Description**
NOx	Oxides of Nitrogen
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
PM	Particulate Matter
PM_{10}	Coarse Particulate Matter
$PM_{2.5}$	Fine Particulate Matter
PMI	Point of Maximum Impact
REL	Reference Exposure Level
Report	Air Quality and Health Risk Assessment Report
ROG	Reactive Organic Gases
SFBAAB	San Francisco Bay Area Air Basin
SIP	State Implementation Plan
SMAQMD	Sacramento Metro Air Quality Management District
SO_2	Sulfur Dioxide
SOx	Sulfates
TAC	Toxic Air Contaminant
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

1 INTRODUCTION

Jefferson 10 Investors, LP has applied for a residential subdivision (Tentative Map), and Grading Permit to subdivide a 4.5-acre lot into 10 new parcels at the former horse ranch located at 4057 Jefferson Avenue in unincorporated Emerald Lake Hills in San Mateo County. The proposal includes the addition of a new cul-de-sac (private street) and pad for 10 new single-family homes. All existing structures would be demolished. Although the proposal from Jefferson 10 Investors, LP consists of subdividing the 4.5-acre lot into 10 new parcels, the proposed project being evaluated herein this report consists of the development of Lots 1-9, the western-most lots of the Tentative Map, as well as the cul-de-sac. Lot 10, which is the eastern-most parcel of the Tentative Map, will be developed as its own project, pursuant to a separate project and County permit.

The project site, historically used as a former horse ranch, is developed with a single-family home and ancillary structures (e.g., shed). Project development would generate emissions of air quality and toxic air contaminant (TAC) pollutants that could affect air quality and/or adversely affect the health of receptors in the project's vicinity. MIG, Inc. (MIG) has prepared this Air Quality and Health Risk Assessment Report (Report) at the request of San Mateo County. This Report evaluates the potential construction- and operational-related air quality and health risk impacts of the proposed project using specific information provided by Edenbridge Homes, the developer for the proposed project. Where necessary, MIG has supplemented available information with standardized sources of information, such as model assumptions pertaining to construction equipment activity levels. In general, this Report evaluates the potential "worst-case" conditions associated with the proposed project's construction and operational emissions levels to ensure a conservative (i.e., likely to overestimate) assessment of potential air quality and health risk impacts is presented.

This Report is intended for use by the Lead Agency to assess the potential air quality and GHG impacts of the proposed project in compliance with the California Environmental Quality Act (CEQA; PRC §21000 et seq.) and the State CEQA Guidelines (14 CCR §15000 et seq.), particularly in respect to the air quality and health risk issues identified in Appendix G of the State CEQA Guidelines. This report does not make determinations of significance pursuant to CEQA because such determinations are solely the purview of the Lead Agency.

1.1 REPORT ORGANIZATION

This Report is organized as follows:

- **Chapter 1, Introduction,** explains the contents of this Report and its intended use.
- **Chapter 2, Air Quality Setting and Regulatory Framework,** provides pertinent background information on the air quality, and provides information on the federal, state, and local regulations that govern the proposed project's air quality setting and potential air quality impacts.
- **Chapter 3, Proposed Project Description**, provides an overview of the construction and operational activities associated with the proposed project.
- **Chapter 4, Air Quality Impact Assessment,** identifies the potential construction and operational air quality impacts of the proposed project and evaluates these effects in accordance with Appendix G of the State CEQA Guidelines.

- **Chapter 5, Report Preparers and References,** list the individuals involved, and the references used, in the preparation of this Report.

2 AIR QUALITY SETTING AND REGULATORY FRAMEWORK

This chapter provides information on the environmental and regulatory air quality setting of the proposed project. Information on existing air quality conditions, federal and state ambient air quality standards, and pollutants of concern was obtained from the U.S. Environmental Protection Agency (U.S. EPA), California Air Resources Board (CARB), and Bay Area Air Quality Management District (BAAQMD).

2.1 ENVIRONMENTAL SETTING

Air quality is a function of pollutant emissions and topographic and meteorological influences. The physical features and atmospheric conditions of a landscape interact to affect the movement and dispersion of pollutants and determine its air quality.

2.1.1 Regulated Air Pollutants

The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) for six common air pollutants: ozone (O_3), particulate matter (PM), which consists of "inhalable coarse" PM (particles with an aerodynamic diameter between 2.5 and 10 microns in diameter, or PM_{10}) and "fine" PM (particles with an aerodynamic diameter smaller than 2.5 microns, or $PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. The U.S. EPA refers to these six common pollutants as "criteria" pollutants because the agency regulates the pollutants on the basis of human health and/or environmentally-based criteria.

CARB has established California Ambient Air Quality Standards (CAAQS) for the six common air pollutants regulated by the federal Clean Air Act (the CAAQS are more stringent than the NAAQS) plus the following additional air pollutants: hydrogen sulfide (H_2S), sulfates (SO_X), vinyl chloride, and visibility reducing particles. A description of these regulated air pollutants is provided below.

- **Ground-level ozone**, or smog, is not emitted directly into the atmosphere. It is created from chemical reactions between oxides of nitrogen (NO_X) and volatile organic compounds (VOCs), also called reactive organic gases (ROG), in the presence of sunlight (U.S. EPA, 2017a). Thus, ozone formation is typically highest on hot sunny days in urban areas with NO_X and ROG pollution. Ozone irritates the nose, throat, and air pathways and can cause or aggravate shortness of breath, coughing, asthma attacks, and lung diseases such as emphysema and bronchitis.
- **Particulate matter (PM)**, also known as particle pollution, is a mixture of extremely small solid and liquid particles made up of a variety of components such as organic chemicals, metals, and soil and dust particles (U.S. EPA, 2016a).
    - PM_{10}, also known as inhalable coarse, respirable, or suspended PM_{10}, consists of particles less than or equal to 10 micrometers in diameter (approximately 1/7th the thickness of a human hair). These particles can be inhaled deep into the lungs and possibly enter the blood stream, causing health effects that include, but are not limited to, increased respiratory symptoms (e.g., irritation, coughing), decreased lung capacity, aggravated asthma, irregular heartbeats, heart attacks, and premature death in people with heart or lung disease (U.S. EPA, 2016a).
    - $PM_{2.5}$, also known as fine PM, consists of particles less than or equal to 2.5 micrometers in diameter (approximately 1/30th the thickness of a human hair). These particles pose an

increased risk because they can penetrate the deepest parts of the lung, leading to and exacerbating heart and lung health effects (U.S. EPA, 2016a).

- **Carbon Monoxide (CO)** is an odorless, colorless gas that is formed by the incomplete combustion of fuels. At high concentrations, CO reduces the oxygen-carrying capacity of the blood and can aggravate cardiovascular disease and cause headaches, dizziness, unconsciousness, and even death (U.S. EPA, 2016b).
- **Nitrogen Dioxide (NO_2)** is a by-product of combustion. NO_2 is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_X and are major contributors to ozone formation. NO_2 also contributes to the formation of particulate matter. NO_2 can cause breathing difficulties at high concentrations (U.S. EPA, 2016c).
- **Sulfur Dioxide (SO_2)** is one of a group of highly reactive gases known as oxides of sulfur (SO_X). Fossil fuel combustion in power plants and industrial facilities are the largest emitters of SO_2. Short-term effects of SO_2 exposure can include adverse respiratory effects such as asthma symptoms. SO_2 and other SO_X can react to form PM (U.S. EPA, 2016d).
- **Sulfates (SO_4^{2-})** are the fully oxidized ionic form of sulfur. SO_4^{2-} are primarily produced from fuel combustion. Sulfur compounds in the fuel are oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. Sulfate exposure can increase risks of respiratory disease (CARB, 2009a).
- **Lead** is primarily emitted from metal processing facilities (i.e. secondary lead smelters) and other sources such as manufacturers of batteries, paints, ink, ceramics, and ammunition. Historically, automobiles were the primary sources before lead was phased out of gasoline. The health effects of exposure to lead include gastrointestinal disturbances, anemia, kidney diseases, and potential neuromuscular and neurologic dysfunction. Lead is also classified as a probable human carcinogen (U.S. EPA, 2017b).

In addition to criteria air pollutants, the U.S. EPA and CARB have classified certain pollutants as hazardous air pollutants (HAPs) or TACs, respectively. These pollutants can cause severe health effects at very low concentrations, and many are suspected or confirmed carcinogens. The U.S. EPA has identified 187 HAPs, including such substances as arsenic and chlorine; CARB considers all U.S. EPA designated HAPS, as well as particulate emissions from diesel-fueled engines (DPM) and other substances, to be a TAC. Since CARB's list of TACs references and includes U.S. EPA's list of HAPs, this document uses the term TAC when referring to HAPs and TACs.

Diesel engines emit both gaseous and solid material; the solid material is known as DPM. Almost all DPM is less than 1 micrometer, or micron (µm), in diameter, and thus is a subset of $PM_{2.5}$. DPM is typically composed of carbon particles and numerous organic compounds. Diesel exhaust also contains gaseous pollutants, including VOCs and NO_x. The primary sources of diesel emissions are ships, trains, trucks, rail yards and heavily traveled roadways. These sources are often located near highly populated areas, resulting in greater DPM related health consequences in urban areas. The majority of DPM is small enough to be inhaled into the lungs and what particles are not exhaled can be deposited on the lung surface and in the deepest regions of the lungs where the lung is most susceptible to injury. In 1998, CARB identified DPM as a TAC based on evidence of a relationship between diesel exhaust exposure, lung cancer and other adverse health effects. DPM also contributes to the same non-cancer health effects as $PM_{2.5}$ exposure (CARB, 2019).

Naturally occurring asbestos (NOA) includes fibrous minerals found in certain type of rock formations, such as serpentine rock. Serpentinite is a metamorphic rock, derived from ultramafic rock,

which is an igneous rock composed mostly of iron- and magnesium-rich minerals. Serpentinite is a rock composed mostly of the serpentine group of minerals. The serpentine mineral group includes at least twenty different hydrous, magnesium and iron silicate minerals derived from the metamorphism of ultramafic rock. Only a few specific minerals in the serpentine group may exhibit a fibrous texture. Those minerals, such as chrysotile, are termed asbestos. Soil derived from serpentinite rock may contain asbestos.

Common criteria air pollutants, such as ozone precursors, SO_2, and PM, are emitted by a large number of sources and have effects on a regional basis; other pollutants, such as HAPs, TACs, and fugitive dust, are generally not as prevalent and/or emitted by fewer and more specific sources. As such, these pollutants have much greater effects on local air quality conditions and local receptors.

2.1.2 San Francisco Bay Area Air Basin

An air basin is a CARB-designated management unit with similar meteorological and geographic conditions. CARB has geographically divided the state into 15 air basins for the purposes of managing air quality on a regional basis. The project site is located in the unincorporated community of Emerald Lake Hills, San Mateo County. The San Francisco Bay Area Air Basin (SFBAAB) covers all of Alameda, Contra Costa, Marin, Napa, Santa Clara, San Mateo, and San Francisco counties, as well as portions of Solano and Sonoma counties.

SFBAAB Topography and Meteorology

The topography and meteorology of the SFBAAB are characterized by the coast mountain ranges and the seasonal migration of the Pacific high-pressure cell. Regionally, basin airflow is affected by the coast mountain ranges, which create complex terrains consisting of higher elevations, valleys, and bays. The Golden Gate to the west and the Carquinez Strait to the east create gaps in the mountain ranges that allow air to flow into and out of the SFBAAB. In the summer, winds from the northwest are channeled through the Golden Gate and other narrow openings, resulting in localized areas of high wind speeds. Air flowing from the coast inland is called the sea breeze, which begins developing in the late morning or early afternoon; air flowing from the inland regions back to the coast, called drainage, occurs at night.

Basin climate is also influenced by the Pacific high-pressure cell, a semi-permanent area of high pressure located over the Pacific Ocean. In the summer, the cell is centered over the northeastern Pacific Ocean, pushing storms to the north and resulting in generally stable conditions in the Bay Area. In the winter, the cell weakens and migrates south, bringing cooler temperatures and stormy conditions.

The SFBAAB is most susceptible to air pollution during the summer when cool marine air flowing through the Golden Gate can become trapped under a layer of warmer air (known as an inversion) and prevented from escaping the valleys and bays created by the Coast Ranges. Air pollution potential is highest along the southeastern portion of the peninsula because this area is most protected from the high winds and fog of the marine layer, the emission density is relatively high, and pollutant transport from upwind sites is possible. Wintertime inversions are weaker and more localized and are the result of rapid heat radiation from the earth's surface.

As noted previously, the project site is located in San Mateo County, which lies in the middle of the San Francisco Peninsula, south of San Francisco County, and north of Santa Clara and Santa Cruz counties. It is bounded by the Pacific Ocean to the west and the San Francisco Bay to the east. Cool, foggy weather is prevalent along the western coast of the peninsula, particularly during the summer. Summertime average daily temperatures are moderate along the west coast and warm in the county's east side. In the winter, average daily temperatures across the county range from mild to moderate. Winds are mild, with the

highest wind speeds focused along the western coast. Rainfall averages about 20 to 25 inches per year at lower elevations and up to 36 inches in the Santa Cruz Mountains (BAAQMD, 2019a).

The BAAQMD maintains publicly available meteorological data for use in air quality analyses. One of the closest meteorological stations to the proposed project site with recent data (i.e., 2013 through 2017) is from Moffett Field (KNUQ), located approximately 11.9 miles southeast of the project site.[1] The BAAQMD Moffett Field meteorological data includes five complete years of meteorological data from January 2013 to December 2017. The wind rose for the Moffett Field meteorological data set is shown in Figure 2-1.

SFBAAB Attainment Status

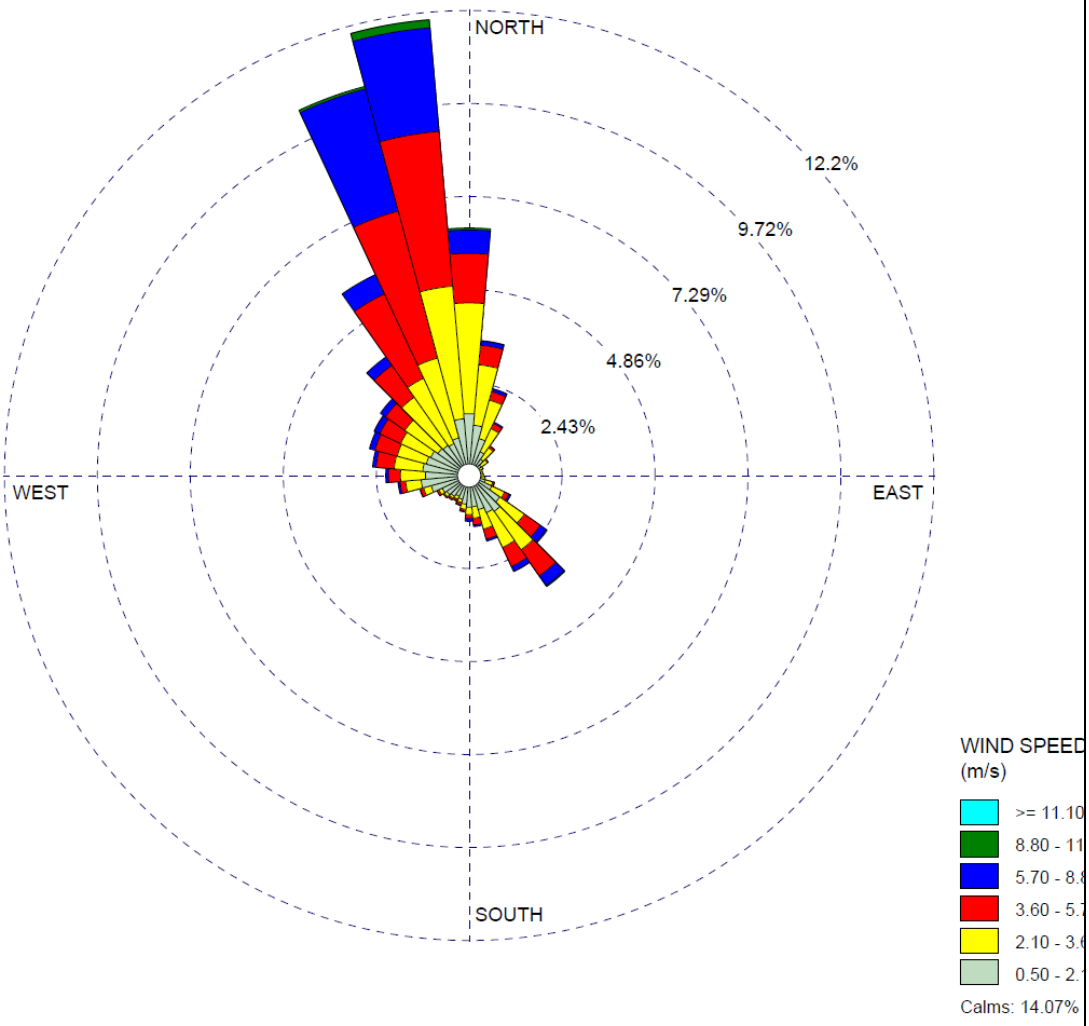
The U.S. EPA, CARB, and regional air agencies assess the air quality of an area by measuring and monitoring the amount of pollutants in the ambient air and comparing pollutant levels against NAAQS and CAAQS. Based on these comparisons, regions are classified into one of the following categories.

- **Attainment.** A region is "in attainment" if monitoring shows ambient concentrations of a specific pollutant are less than or equal to the NAAQS or CAAQS. In addition, an area that has been re-designated from nonattainment to attainment is classified as a "maintenance area" for 10 years to ensure that the air quality improvements are sustained.
- **Nonattainment.** If the NAAQS or CAAQS are exceeded for a pollutant, the region is designated as nonattainment for that pollutant. It is important to note that some NAAQS and CAAQS require multiple exceedances of the standard in order for a region to be classified as nonattainment. Federal and state laws require nonattainment areas to develop strategies, implementation plans, and control measures to reduce pollutant concentrations to levels that meet, or attain, standards.
- **Unclassified.** An area is unclassified if the ambient air monitoring data are incomplete and do not support a designation of attainment or nonattainment.

The NAAQS and CAAQS are shown in Table 2-1.

[1] For a previous project in Atherton, the BAAQMD had been contacted for readily available meteorological data from Palo Alto Airport, located approximately 8.1 miles east of the project site, and for Moffett Field. The BAAQMD indicated they did not have any Palo Alto AERMET data (i.e., the meteorological data used for AERMOD dispersion modeling) but had compared Palo Alto Airport meteorological data with Moffett Field in the past and, "found them to be a pretty good match" (Hull, 2019).

Figure 2-1 Wind Rose for Moffett Field Meteorological Station (Blowing From)



Source: Hull, 2019

Table 2-1: Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	California AAQS (A)		National AAQS (B)	
		Standard (C)	Attainment Status (D)	Standard (C)	Attainment Status (D)
Ozone	1-Hour	180 µg/m^3	**N**	--	**--**
	8-Hour	137 µg/m^3	**N**	137 µg/m^3	**N**
PM_{10}	24-Hour	50 µg/m^3	**N**	150 µg/m^3	U
	Annual Average	20 µg/m^3	**N**	--	--
$PM_{2.5}$	24-Hour	--	--	35 µg/m^3	**N** (E)
	Annual Average	12 µg/m^3	**N**	12 µg/m^3	U/A(F)
Carbon Monoxide	1-Hour	23,000 µg/m^3	A	40,000 µg/m^3	A
	8-Hour	10,000 µg/m^3	A	10,000 µg/m^3	A
Nitrogen Dioxide	1-Hour	339 µg/m^3	A	188 µg/m^3	U(G)
	Annual Average	57 µg/m^3	--	100 µg/m^3	A
Sulfur Dioxide	1-Hour	655 µg/m^3	A	196 µg/m^3	U(H)
	24-Hour	105 µg/m^3	A	--	--
Sulfates	24-Hour	25 µg/m^3	A	--	--
Hydrogen Sulfide	1-Hour	42 µg/m^3	U	--	--
Vinyl Chloride	24-Hour	26 µg/m^3	--	--	--

Source: BAAQMD, 2017a, modified by MIG.

(A) Table does not list CAAQS for lead and visibility reducing particles. California standards for ozone, carbon monoxide, sulfur dioxide (1 and 24-hour), nitrogen dioxide, suspended PM_{10} and $PM_{2.5}$ are values that are not to be exceeded. The standards for sulfates, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

(B) Standards shown are the primary NAAQS designed to protect public health.

(C) All standards shown in terms of micrograms per cubic meter (µg/m^3) for comparison purposes.

(D) A= Attainment, N= Nonattainment, U=Unclassifiable.

(E) On January 2013, the U.S. EPA issued a final rule to determine the Bay Area attains the 24-hour $PM_{2.5}$ national standard. This EPA rule suspends key SIP requirements as long as monitoring data continues to show that the Bay Area attains the standard. Despite this EPA action, the Bay Area will continue to be designated as "non-attainment" for the national 24-hour $PM_{2.5}$ standard until such time as the Air District submits a "redesignation request" and a "maintenance plan" to EPA, and EPA approves the proposed redesignation.

Local Air Quality Conditions

Ozone and fine particle pollution (i.e., $PM_{2.5}$) are the major regional pollutants of concern in the SBAAB. Ozone is primarily a problem in the summer, and $PM_{2.5}$ in the winter. In San Mateo County, ozone almost never exceeds health standards, and $PM_{2.5}$ exceeds the national standard only on about one day each year. San Mateo County frequently receives fresh marine air from the Pacific Ocean, which passes over the coastal hills. In winter, $PM_{2.5}$ may be transported into San Mateo County from other parts of the Bay Area, adding to wood smoke, which may lead to elevated concentrations, but these are rarely high enough to exceed health standards (BAAQMD, 2019a).

The BAAQMD maintains a comprehensive air comprehensive air quality monitoring network consisting of over 30 stations distributed among the nine Bay Area counties in its jurisdiction. Table 2-2 shows the three most recent years' worth of data from the monitor located at 897 Barron Avenue in Redwood City.

Table 2-2: Local Ambient Air Quality (2016-2018)

Monitoring Station	Pollutant Standard			Exceedances		
	Pollutant	State / Federal	Concentration	2016	2017	2018
Redwood City (Barron Ave)	PM_{10} 24-hour(A)	CAAQS	50 µg/m³	0	6	4
		NAAQS	150 µg/m³	0	0	0
	$PM_{2.5}$ 24-hour	CAAQS	N/A	--	--	--
		NAAQS	35 µg/m³	0	6	13
	Ozone 8-hour	Both	137 µg/m³	0	2	0
	Ozone 1-hour	CAAQS	180 µg/m³	0	2	0
		NAAQS	N/A	--	--	--
	CO 8-hour	Both	10,000 µg/m³	0	0	0
	CO 1-hour	CAAQS	23,000 µg/m³	0	0	0
		NAAQS	40,000 µg/m³	0	0	0
	NO_2 1-hour	CAAQS	339 µg/m³	0	0	0
		NAAQS	188 µg/m³	0	0	0
	SO_2 24-hour(A)	CAAQS	105 µg/m³	0	0	0
		NAAQS	N/A	--	--	--
	SO_2 1-hour(A)	CAAQS	655 µg/m³	0	0	0
		NAAQS	196 µg/m³	0	0	0

Source: BAAQMD 2017b, 2018a, 2019b

(A) Data for PM_{10} (24-hour) and SO_2 (24-hour and 1-hour) are from the monitoring station in San Jose on Jackson Street, which is the nearest station in proximity to the project site with this data available.

2.1.3 Sensitive Air Quality Receptors

Some people are more affected by air pollution than others. The BAAQMD defines sensitive receptors as "facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly and people with illnesses" (BAAQMD, 2017c). In general, children, senior citizens, and individuals with pre-existing health issues (e.g., asthmatics) are considered sensitive receptors. The BAAQMD considers schools, schoolyards, parks and playgrounds, daycare facilities, nursing homes, hospitals, and residential areas as sensitive air quality land uses and receptors (BAAQMD, 2017c).

The potentially sensitive air quality receptors in and near the proposed project site include:

- Single-family homes along Jefferson Avenue, Yanez Court, Revere Way, and Bayview Way, north of the project site.
- Single-family homes along Wilmington Way, south of the project site.

- Single-family homes along Fallen Leaf Way, east of the project site.
- Redwood Parent Nursery School, east of the project site.

2.1.4 Existing Project Site Emissions

The project site is currently developed with a former ranch house. It is assumed there are no existing emissions sources associated with the current land use at the site.

2.2 FEDERAL, STATE, AND LOCAL AIR QUALITY REGULATIONS

2.2.1 Federal Air Quality Regulations

Clean Air Act

The Federal Clean Air Act (CAA) defines the U.S. EPA's responsibilities for protecting and improving the United States air quality and ozone layer. Key components of the CAA include reducing ambient concentrations of air pollutants that cause health and aesthetic problems, reducing emission of toxic air pollutants, and stopping production and use of chemicals that destroy the ozone.

Federal clean air laws require areas with unhealthy levels of ozone, inhalable particulate matter, Carbon monoxide, nitrogen dioxide, and sulfur dioxide to develop State Implementation Plans (SIPs); comprehensive documents that identify how an area will attain NAAQS. Deadlines for attainment were established in the 1990 amendments to the CAA based on the severity of an area's air pollution problem. Failure to meet air quality deadlines can result in sanctions against the State or the EPA taking over enforcement of the CAA in the affected area. SIPs are a compilation of new and previously submitted plans, programs, district rules, and State and Federal regulations.

2.2.2 State Air Quality Regulations

California Clean Air Act

In addition to being subject to Federal requirements, air quality in the State is also governed by more stringent regulations under the California Clean Air Act, which was enacted in 1988 to develop plans and strategies for attaining the California Ambient Air Quality Standards. CARB, which is part of the California Environmental Protection Agency (Cal-EPA), develops statewide air quality regulations, including industry-specific limits on criteria, toxic, and nuisance pollutants. The California Clean Air Act is more stringent than Federal Law in a number of ways, including revised standards for PM_{10} and ozone and for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride.

In California, both the Federal and State Clean Air acts are administered by CARB. It sets all air quality standards including emission standards for vehicles, fuels, and consumer goods as well as monitors air quality and sets control measures for toxic air contaminants. CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional level.

In-Use Off-Road Diesel Equipment Program

CARB's In-Use Off-Road Diesel Equipment regulation is intended to reduce emissions of NO_x and PM from off-road diesel vehicles, including construction equipment, operating within California. The regulation imposes limits on idling; requires reporting equipment and engine information and labeling all vehicles reported; restricts adding older vehicles to fleets; and requires fleets to reduce their emissions by retiring, replacing, or repowering older engines or installing exhaust retrofits for PM. The requirements and

compliance dates of the off-road regulation vary by fleet size, and large fleets (fleets with more than 5,000 horsepower) must meet average targets or comply with Best Available Control Technology (BACT) requirements beginning in 2014. CARB has off-road anti-idling regulations affecting self-propelled diesel-fueled vehicles of 25 horsepower and up. The off-road anti-idling regulations limit idling on applicable equipment to no more than five minutes, unless exempted due to safety, operation, or maintenance requirements.

On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation

CARB's On-Road Heavy-Duty Diesel Vehicles (In-Use) regulation (also known as the Truck and Bus Regulation) is intended to reduce emission of NO_X, PM, and other criteria pollutants generated from existing on-road diesel vehicles operating in California. The regulation applies to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds that are privately or federally owned, and for privately and publicly owned school buses. Heavier trucks and buses with a GVWR greater than 26,000 pounds must comply with a schedule by engine model year or owners can report to show compliance with more flexible options. Fleets complying with the heavier trucks and buses schedule must install the best available PM filter on 1996 model year and newer engines, and replace the vehicle 8 years later. Trucks with 1995 model year and older engines had to be replaced starting in 2015. Replacements with a 2010 model year or newer engine meet the final requirements, but owners can also replace the equipment with used trucks that have a future compliance date (as specified in regulation). By 2023, all trucks and buses must have at least 2010 model year engines with few exceptions.

CARB Stationary Diesel Engines – Emission Regulations

In 1998, CARB identified DPM as a TAC. To reduce public exposure to DPM, in 2000, the Board approved the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Risk Reduction Plan) (CARB 2000). Integral to this plan is the implementation of control measures to reduce DPM such as the control measures for stationary diesel-fueled engines. As such, diesel generators must comply with regulations under CARB's amendments *to Airborne Toxic Control Measure for Stationary Compression Ignition Engines*.

Air Toxics "Hot Spots" Program

State requirements specifically address air toxic issues through Assembly Bill (AB) 1807 (known as the Tanner Bill) that established the State air toxics program and the Air Toxics Hot Spots Information and Assessment Act (AB 2588). The air quality regulations developed from these bills have been modified recently to incorporate the Federal regulations associated with the Federal Clean Air Act Amendments of 1990. The Air Toxics Hot Spots Information and Assessment Act (Hot Spots Act) was enacted in September 1987. Under this Bill, stationary sources of emissions are required to report the types and quantities of certain substances that their facilities routinely release into the air.

Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations

The EPA and CARB have adopted regulations to control emissions of asbestos-laden dust. The EPA's National Emission Standard for Asbestos (40 CFR Part 61, Subpart M) establishes inspection, notification, and asbestos emission control requirements for demolition and renovation activities. The standard defined demolition as the "wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility." Thus, this standard would not apply to the project.

CARB's Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR §93105) applies to any road construction, maintenance, or

construction and grading operations on any property that is located in a geographic ultramafic rock unit or has NOA, serpentine rock, or ultramafic rock. For construction and grading projects involving less than 1 acre of surface disturbance, such as the project, the ATCM requires the following dust mitigation measures to be implemented at the start and maintained throughout the duration of construction and grading activities:

- Construction vehicle speed at the work site must be limited to 15 miles per hour or less.
- Prior to any ground disturbance, sufficient water must be applied to the area to be disturbed to prevent visible emissions from crossing the property line.
- Areas to be graded or excavated must be kept adequately wetted to prevent visible emissions from crossing the property line.
- Storage piles must be kept adequately wetted, treated with chemical dust suppressant, or covered when material is not being added to or removed from the pile.
- Equipment must be washed down before moving from the property onto a paved public road.
- Visible track-out on the paved public road must be cleaned using wet sweeping or a HEPA filter equipped vacuum device within 24 hours.

An exemption from the ATCM requirements may be granted for activities occurring in remote locations that are more than 1 mile from any receptor, including any hospital, school, day care center, work site, business, residence, public road, or permanent campground.

California Building Industry Association vs. Bay Area Air Quality Management District

The California Supreme Court in *California Building Industry Association v. Bay Area Air Quality Management District*, 62 Cal.4th 369 (2015) ruled that CEQA review is focused on a project's impact on the environment "and not the environment's impact on the project." The opinion also holds that when a project has "potentially significant exacerbating effects on existing environmental hazards" those impacts are properly within the scope of CEQA because they can be viewed as impacts of the project on "existing conditions" rather than impacts of the environment on the project. The Supreme Court provided the example of a project that threatens to disperse existing buried environmental contaminants that would otherwise remain undisturbed. The Court concluded that it is proper under CEQA to undertake an analysis of the dispersal of existing contaminants because such an analysis would be focused on how the project "would worsen existing conditions." The court also found that the limited number of express CEQA provisions that require analysis of the impacts of the existing environment on a project – such as impacts associated with school siting and airports – should be viewed as specific statutory exceptions to the general rule that such impacts are not properly within CEQA's scope.

2.2.3 Bay Area Air Quality Management District

The BAAQMD is the agency primarily responsible for maintaining air quality and regulating emissions of criteria and toxic air pollutants within the SFBAAB. The BAAQMD carries out this responsibility by preparing, adopting, and implementing plans, regulations, and rules that are designed to achieve attainment of state and national air quality standards.

Rules and Regulations

The BAAQMD currently has 13 regulations containing more than 100 rules that control and limit emissions from sources of pollutants. Table 2-3 presents the major BAAQMD rules and regulations that may apply to the project.

Table 2-3: Potentially Applicable BAAQMD Rules and Regulations	
Regulation and Rule	**Description**
Regulation 6 (Particulate Matter)	
1 – General Requirements	Limits the quantity of particulate matter in the atmosphere by controlling emission rates, concentration, visible emissions and opacity
6 – Prohibition of Trackout	Addresses fugitive road dust emissions associated with trackout
Regulation 7 (Odorous Substances)	Establishes general limitations on odorous substances and specific emission limitations on certain odorous compounds
Regulation 8 (Organic Compounds)	
Rule 3 – Architectural Coatings	Limits the quantity of volatile organic compounds in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the BAAQMD
Regulation 11 (Hazardous Pollutants)	
Rule 2 – Asbestos Demolition, Renovation, and Manufacturing	Controls emissions of asbestos to the atmosphere during demolition

Source: BAAQMD, 2019c

2017 Clean Air Plan

On April 29, 2017, the BAAQMD adopted its Spare the Air-Cool the Climate 2017 Clean Air Plan (Clean Air Plan). The 2017 Clean Air Plan updates the most recent Bay Area ozone plan, the 2010 Clean Air Plan, in fulfillment of state ozone planning requirements. Over the next 35 years, the plan will focus on the three following goals:

- Attain all state and national air quality standards;
- Eliminate disparities among Bay Area communities in cancer health risk from toxic air contaminants; and
- Reduce Bay Area GHG emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050.

The plan includes 85 distinct control measures to help the region reduce air pollutants and has a long-term strategic vision which forecasts what a clean air Bay Area will look like in the year 2050. The control measures aggressively target the largest source of GHG, ozone pollutants, and particulate matter emissions – transportation. The 2017 plan includes more incentives for electric vehicle infrastructure, off-road electrification projects such as Caltrain and shore power at ports, and reducing emissions from trucks, school buses, marine vessels, locomotives and off-road equipment (BAAQMD, 2017d).

2.2.4 County of San Mateo General Plan

The County of San Mateo's General Plan Energy and Climate Change Element contains the following policies related to air quality:

- **Goal 2: Maximize energy efficiency in new and existing development**.
  - Policy 2.5: Continue implementation of green building standards that exceed state energy efficiency standards.
- **Goal 3: Promote the expansion of the use of renewable energy supplies.**
  - Policy 3.1: Identify opportunities for new and existing development to incorporate on-site distributed energy resources into project design and construction.
- **Goal 4: Promote and implement policies and programs to reduce vehicle miles traveled by all vehicles traveling in the unincorporated county.**
  - Policy 4.2: Promote non-motorized and alternative travel.
- **Goal 5: Encourage the use of clean, low-emissions vehicles and equipment.**
  - Policy 5.1: Facilitate the expansion of infrastructure for alternative fuel vehicles (County of San Mateo, 2013).

3 PROPOSED PROJECT DESCRIPTION

Jefferson 10 Investors, LP is proposing to construct nine (9) new single-family homes at the former horse ranch located at 4057 Jefferson Avenue in unincorporated Emerald Lake Hills in San Mateo County (designated as Lots 1 through 9 in the Tentative Map submitted to the County) (see Figure 3-1 for project location and Figure 3-2 for Tentative Map). In addition to the nine homes, construction activities would also include the addition of a new, private cul-de-sac, which would tie into Jefferson Ave.

Grading activities at the site are anticipated to result in 3,510 cubic yards (CY) of cut and require a total fill of 7,377 CY of fill. An additional 1,000 CY of cut is anticipated to occur when accounting for utility trench spoils, another 450 CY when accounting for the nine (9) house spoils, and another 370 CY when accounting for the additional fill that would be generated during construction at Lot 10, which is not part of the project, but would be developed around the same time as Lots 1 through 9. As such, the total amount of fill that is anticipated to be required at the site is estimated to be 2,047 CY.

3.1.1 Project Construction

Construction activities, duration, and typical equipment usage was generated using information supplied by the project Applicant and by default assumptions in the California Emissions Estimator Model (CalEEMod), V. 2016.3.2. Construction is anticipated to begin in late 2019 / early 2020 and last slightly over one year. Table 3-1 summarizes the anticipated phases and duration of construction activities.

Table 3-1: Construction Phases and Duration

Phase	Duration
Grading(A)	20
Building Construction(A)	270
Architectural Coating	18
Paving	5

Source: Edenbridge Homes, 2019a; 2019b
(A) Modified from model defaults, based on information provided by project Applicant.

In addition to providing project-specific construction phase durations, the project Applicant also provided specific, heavy-duty off-road construction equipment (e.g., horsepower, engine model year, runtime, etc.) that would be used during the grading and building construction phases. A list of this project specific equipment is shown in Table 3-2. Default equipment and runtime assumptions generated by CalEEMod were used for the architectural coating and paving phases.

Table 3-2: Project Specific Heavy-Duty Off-Road Equipment Use					
Phase	**Equipment**	**Equipment Model**	**Horsepower**	**Engine Model Year**	**Average Daily Runtime (Hours per Day)**
Grading	Scraper	CAT6015C	240	2005	1.5
Grading	Crawler-Tractor (Compactor)	CAT8015B	198	1985	4
Grading	Tractor/Loader/Backhoe	CAT963D	189	2007	8
Grading	Excavator	Doosan225	163	2015	4
Grading	Grader	CAT140M2	244	2013	8
Building Construction	Forklift	JLG742	74	2018	3
Source: Edenbridge Homes, 2019a; 2019b					

Operation of the heavy-duty off-road construction equipment, as well as haul truck trips, vendor trips, and worker trips to and from the site would generate criteria air pollutant emissions, as well as DPM.

3.1.2 Project Operation

Once constructed, the project would generate emissions of regulated air pollutants from area, energy, mobile, off-road, solid waste, and water /wastewater sources. The project is anticipated to be fully operational in early 2021.

Source: ESRI 2018; San Mateo County Planning 2015; MIG 2019

Project Area

Lot 10

Figure 3-1 Aerial View of the Project Site

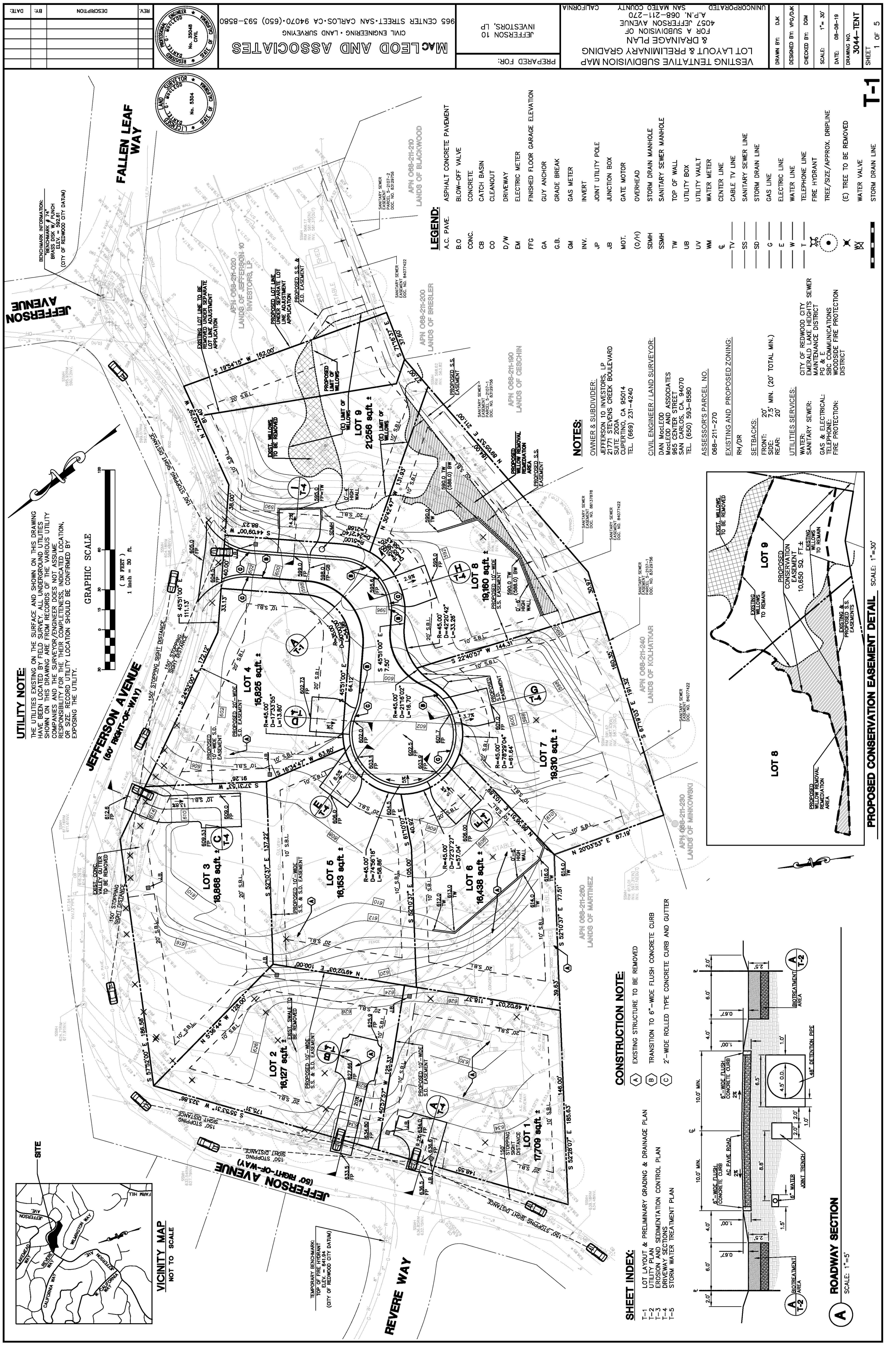


Figure 3-2 Tentative Map

4 AIR QUALITY IMPACT ANALYSIS

This chapter evaluates the direct and indirect air quality impacts that could result from construction and operation of the proposed 4057 Jefferson Avenue Subdivision Project.

4.1 SIGNIFICANCE CRITERIA

In accordance with Appendix G of the State CEQA Guidelines, the proposed project could result in potentially significant impacts related to air quality if it would:

(a) Conflict with or obstruct implementation of applicable air quality plan;

(b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard;

(c) Expose sensitive receptors to substantial pollutant concentrations (e.g., TACs); or

(d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

4.1.1 Significance Thresholds

Consistent with the guidance contained in Appendix G of the State CEQA Guidelines, this Report relies upon BAAQMD-recommended methods and pollutant thresholds to evaluate whether the proposed project's emissions would violate any air quality standard, contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in nonattainment criteria air pollutants.

In May 2017, the BAAQMD published a new version of its CEQA Air Quality Guidelines, which includes revisions made to address the California Supreme Court's decision in *California Building Industry Association versus BAAQMD*. The Guidelines contain the BAAQMD's recommendations to lead agencies for evaluating and assessing the significance of a project's potential air quality impacts (BAAQMD, 2017c). The BAAQMD's construction-related thresholds of significance for criteria pollutants and toxic air contaminants are summarized in Table 4-1.

Table 4-1: BAAQMD CEQA Thresholds of Significance

Pollutant	Construction Emissions	Operational Emissions	
	Daily Emissions (pounds/day)	Daily Emissions (pounds/day)	Annual Emissions (tons/year)
ROG	54	54	10
NOx	54	54	10
Exhaust PM_{10}	82	82	15
Exhaust $PM_{2.5}$	54	54	10
Fugitive Dust $PM_{10}/PM_{2.5}$	Best Management Practices	*None*	
Local CO	*None*		

Table 4-1: BAAQMD CEQA Thresholds of Significance			
Pollutant	**Construction Emissions**	**Operational Emissions**	
	Daily Emissions (pounds/day)	Daily Emissions (pounds/day)	Annual Emissions (tons/year)
Risks and Hazards – New Source/Receptor (Individual)	Compliance with Qualified Community Risk Reduction Plan; or Increased cancer risk of >10.0 in a million; and Increased non-cancer risk of >1.0 Hazard Index (chronic or acute); and Ambient $PM_{2.5}$ increase: >0.3µg/m^3 annual average		
Risks and Hazards – New Source/Receptor (Cumulative)	Compliance with Qualified Community Risk Reduction Plan; or Increased cancer risk of >100 in a million (from all local sources); and Increased non-cancer risk of >10.0 Hazard Index (from all local sources) (chronic); and Ambient $PM_{2.5}$ increase: >0.8µg/m^3 annual average (from all local sources)		
Accidental Release of Acutely Hazardous Pollutants	*None*	Storage or use of acutely hazardous materials locating near receptors or receptors locating near stored or used acutely hazardous materials considered significant	
Odors	*None*	Complaint History – 5 confirmed complaints per year averaged over three years	
Source: BAAQMD, 2017c			

4.2 ANALYSIS METHODOLOGY

Construction and operational emissions associated with buildout of the project were calculated and evaluated against the significance thresholds identified in Section 4.1.1 to determine potential impacts on air quality standards, as well as to evaluate potential impacts associated with DPM emissions on sensitive receptors. In addition, a discussion is provided below on the potential for the project to generate objectionable odors. An evaluation of whether the project is consistent with existing plans and policies protecting air quality is also included in Section 4.3.

4.2.1 Construction and Operational Criteria Air Pollutant Emissions

Potential construction and operational emissions were estimated using CalEEMod, version 2016.3.2, based on project-specific details described in Section 3.1.1.

4.2.2 Construction Health Risk Assessment

The construction health risk assessment (HRA) was conducted consistent with Office of Environmental Health Hazard Assessment (OEHHA) (OEHHA, 2015) and BAAQMD guidelines (BAAQMD, 2016) for determining local community risks and hazards. The EPA's AERMOD dispersion model (version 18081) was used to predict pollutant concentrations at existing sensitive receptors near the project site. The AERMOD dispersion model is an EPA-approved and BAAQMD-recommended model for simulating the dispersion of pollutant emissions and estimating ground level concentrations of pollutants at specified receptor locations. AERMOD requires the user to input information on the source(s) of pollutants being modeled, the receptors where pollutant concentrations are modeled, and the meteorology, terrain, and

other factors that affect the potential dispersion of pollutants. These variables are described below and shown in further detail in Appendix B.

Modeled Construction Sources / Emission Rates

On- and off-site construction emissions were modeled as a series of area and line volume sources, as shown in Table 4-2. Consistent with BAAQMD-recommendations, $PM_{2.5}$ construction exhaust emissions were presumed to be 100 percent DPM; $PM_{2.5}$ fugitive dust emissions were not modeled to determine total combined $PM_{2.5}$ exposure pursuant to BAAQMD CEQA Guidelines and guidance provided by staff of the BAAQMD's Planning and Climate Protection Division (Kirk, 2018). An emissions rate for each source listed in Table 4-2 was derived from the CalEEMod emissions estimates presented in Section 4.3.2. The annual emissions generated during construction of the proposed subdivision were converted to an average emission rate in terms of grams / second per hour per hour of construction activity.[2]

On-site DPM emissions from construction of Lots 1 through 9 and Lot 10 were modeled as two area sources (i.e., one for Lots 1 through 9 and one for Lot 10) and assigned a release height of five meters; this elevated source height reflects the height of the equipment exhaust pipes, plus an additional distance for the height of the exhaust plume above the exhaust pipes to account for the plume rise of the exhaust gases.[3]

Off-site DPM emissions from vehicles were modeled as a line area source. All haul truck and vendor trips were assumed to travel to and from the project site via the portion of Jefferson Ave that runs west of the project site. Vendor trips and hauling trips were modeled as area line sources, with a release height of 4.15 meters (13.6 feet).[4]

Table 4-2. AERMOD Source Parameters

ID	Description	UTM Coordinates(A)		Size (m^2)
		X	Y	
PAREA1	Year 1 On-site $PM_{2.5}$ Exhaust (Lots 1-9)	564912.48	4145945.94	8,068.3
PAREA2	Year 1 On-site $PM_{2.5}$ Exhaust (Lot 10)	565083.34	4145883.18	411.9
ARLN1	Year 1 Off-site $PM_{2.5}$ Exhaust	565079.36	4145898.31	--

Source: MIG, see Appendix B

(A) UTM coordinates represent the southwest corner of the source.

[2] Although project construction is anticipated to last slightly more than one year, emissions have been summed and evaluated as if they were to occur over the duration of one year. This provides a conservative assessment of emissions and potential health risks associated with construction of the proposed project.

[3] The Sacramento Metro Air Quality Management District (SMAQMD) recommends a release height of 5 meters. Since the BAAQMD does not have a recommended release height for PM exhaust emissions generated by construction equipment, the SMAQMD's release heights have been used instead (SMAQMD 2013).

[4] The release height of 4.15 meters is based on the modeling inputs from CARB's *2000 Diesel Risk Reduction Plan, Appendix VII, Table 2*. Although the inputs in the *Diesel Risk Reduction Plan* are for a "truck stop," the release height has been used in other studies, including CARB's HRA for the Union Pacific Railyard in Oakland (CARB 2000, CARB 2008).

Meteorological Data Inputs

AERMOD requires meteorological data as an input into the model. The meteorological data is processed using AERMET, a pre-processor to AERMOD. AERMET requires surface meteorological data, upper air meteorological data, and surface parameter data such as albedo (reflectivity) and surface roughness. For the proposed project, pre-processed surface data was obtained from the BAAQMD for Moffett Field Airbase (KNUQ); upper air data was obtained from Oakland International Airport, since this is one of the closest upper air meteorological station with recent data available.[5] Five complete years of meteorological data from January 2013 to December 2017 were utilized. The meteorological data was processed using AERMET version 18081 with the adjusted U*. Emissions were modeled to be generated during potential construction hours only (i.e., 7 AM to 6 PM, Monday through Friday, and 9 AM to 5 PM, Saturdays).

Terrain Inputs

Terrain was incorporated by using AERMAP (an AERMOD pre-processor) to import the elevation of the project site using data from the National Elevation Dataset (NED) with a resolution of 1/3 arcsecond.

Modeled Receptors

For construction activities, a 1,000-meter by 1,000-meter grid was generated with a receptor spacing of 50 meters. The grid's center coordinates were 564997.04 meters Easting and 4145900.86 meters Northing. The grid was converted to discrete Cartesian receptors. An additional eleven (11) receptors were placed on top of residences in proximity to the project site, as well as on top of Redwood Parents Nursery School.

Risk Assessment

Health Risks were assessed according to the recommendations in the BAAQMD's *Recommended Methods for Screening and Modeling Local Risks and Hazards* and *Air Toxics New Source Review Program Health Risk Guidelines*, as well as the Office of Environmental Health Hazard Assessment's *Air Toxics Hot Spots Program Guidance Manual*. The ground level concentrations of pollutants produced by the project during construction, as estimated using AERMOD, were used to derive:

1. **Individual excess cancer risk:** Cancer risk is the calculated, pollutant-specific estimated probability of developing cancer based upon the dose and exposure to the TAC. Cancer risk is calculated using predefined cancer potency factors, ground level exposure concentration, duration of exposure, and other parameters such as age sensitivity. For the proposed project, cancer risk was estimated for the inhalation pathway (i.e., breathing). In general, the inhalation dose is a function of the concentration of a chemical and the intake of that chemical. The dose can be calculated as follows:

$$\mathbf{RISK_{(Inh)} = DOSE_{air} \times CPF \times ASF \times (ED/AT) \times FAH \times 1{,}000{,}000}$$

[5] The BAAQMD also maintains AERMET meteorological data for San Carlos airport; however, Moffett Field's was used for a couple of reasons: 1) this was the data set recommended for another, recent project in the area, and 2) Moffett Field has 99.65% of its data readily available, whereas San Carlos only has 85.54%.

Where:

Risk = Cancer Risk per million population; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)
Dose = Dose of chemical in the air (mg/kg-day)
CPF = Inhalation cancer potency factor (mg/kg-day)
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (in years) for specified age group (unitless)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

The cancer potency factor for DPM is 1.1 mg/kg-day. The age sensitivity factor, exposure duration, and fraction of time spent at home for 3rd trimester, 0-2, 0-16, and 16-70 age bins were set to BAAQMD-recommended levels.

The risk parameters used to calculate excess individual cancer risk for residential and student receptors are summarized in Table 4-3 and Table 4-4, respectively.

Table 4-3. Residential Health Risk Assessment Parameters

Risk Assessment Parameter	Infant Receptor		Child Receptor	Adult Receptor
	3rd Trimester	0-2 Years	2-16 Years	16-30 Years
Daily Breathing Rate (L/kg-day)	361	1090	572	261
Exposure Frequency	0.96	0.96	0.96	0.96
DPM Inhalation Cancer Potency (mg/kg-day)	1.1	1.1	1.1	1.1
Age Sensitivity Factor	10	10	3	1
Exposure Duration (Years)	0.25	2	14	14
Averaging Time (Years)	70	70	70	70
Fraction of Time at Home(A)	1	1	0.72	0.73

Source: OEHHA, 2015

(A) Consistent with OEHHA guidance, the FAH for 3rd trimester and ages 0-2 was set to "1", since there is school within the 1 x 10^{-6} risk isopleth.

Table 4-4. Student Health Risk Assessment Parameters		
Risk Assessment Parameter	Infant Receptor	Child Receptor
	0-2 Years	2-9 Years
Daily Breathing Rate (L/kg-day)	1200	640
Exposure Frequency	0.28(A)	0.57(B)
DPM Inhalation Cancer Potency (mg/kg-day)	1.1	1.1
Age Sensitivity Factor	10	3
Exposure Duration (Years)	2	14
Averaging Time (Years)	70	70
Fraction of Time at School(C)	0.85	0.72

Source: OEHHA, 2015; Redwood Parents Nursery School, 2019

(A) Assumes 2-year-old would be at the site two times per week, every week of the year (104 days per year).
(B) Assumes children 3 years of age or older would be at the school for days per week.
(C) Assumes each class is 4 hours long (Redwood Parents Nursery School, 2019; increased by one hour to account for being at the site before and after class).

2. **Noncancer hazard quotient.** The noncancer hazard quotient is the calculated pollutant-specific indicator for risk of developing an adverse health effect on specific organ system(s) targeted by the identified TAC. The potential for exposure to result in chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the chemical-specific, non-cancer chronic reference exposure levels (RELs). The REL is a concentration below which there is assumed to be no observable adverse health impact to a target organ system. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index. For an acute hazard quotient, the one-hour maximum concentration is divided by the acute REL for the substance.

   In general, the equations used to calculate chemical-specific hazard quotients and summed hazard index are:

$$Chronic\ HQ_i = C_i / REL_i$$

$$Chronic\ HI = \sum HQ_i$$

   Where:

   Chronic HQ_i = Chronic Hazard quotient for chemical$_i$ (unitless)
   Chronic HI = Hazard Index (unitless)
   C_i = Annual average air concentration for chemical$_i$ ($\mu g/m^3$)
   REL_i = Chronic non-cancer Reference Exposure Level for chemical$_i$ ($\mu g/m^3$)

   The chronical inhalation REL for DPM is 5 $\mu g/m^3$. No acute non-cancer impacts were estimated, since there is no acute REL for DPM.

4.3 ENVIRONMENTAL IMPACTS

4.3.1 Consistency with the BAAQMD 2017 Clean Air Plan

The proposed project would not conflict with nor obstruct implementation of the BAAQMD *Clean Air Plan*. The *Clean Air Plan* includes increases in regional construction, area, mobile, and stationary source activities, and operations in its emission inventories and plans for achieving attainment of air quality standards. Chapter 5 of the *Clean Air Plan* contains the BAAQMD's strategy for achieving the plan's climate and air quality goals. This control strategy is the backbone of the *Clean Air Plan*.

The proposed project consists of the construction and operation of nine (9) new, single-family homes. The control measures in the *Clean Air Plan* do not apply to the proposed project and, therefore, the proposed project would not conflict with the *Clean Air Plan*. No impact would occur.

4.3.2 Result in Cumulatively Considerable Increase in Criteria Air Pollutants

The proposed project would generate both short-term construction emissions and long-term operational emissions. The project's potential emissions were estimated using CalEEMod, V. 2016.3.2. As described in more detail below, with implementation of the BAAQMD's recommended best management practices (BMPs) for controlling fugitive dust emissions, the proposed project would not generate short-term or long-term emissions that exceed BAAQMD-recommended pollutant thresholds.

Construction Emissions

As described in Chapter 3, the proposed project involves the construction and operation of nine (9), new single-family homes. Construction activities are anticipated to begin in late 2019 / early 2020 and last slightly longer than one year. Criteria air pollutant emissions were estimated using CalEEMod, version 2016.3.2, and are presented below in Table 4-5. As a conservative approach, emissions resulting from project construction have been summed as if they were to occur in the same calendar year, and compared against the BAAQMD annual thresholds.

Table 4-5. Estimated Project Construction Emissions							
Emissions Scenario	**Pollutant Emissions (Tons Per Year)[A]**						
	ROG	**NOx**	**CO**	**PM_{10}**		**$PM_{2.5}$**	
				Dust[B]	**Exhaust**	**Dust[B]**	**Exhaust**
UNMITIGATED							
2020	0.2	0.3	0.3	<0.0[C]	<0.0[C]	<0.0[C]	<0.0[C]
MITIGATED							
2020	0.2	0.3	0.3	<0.0[C]	<0.0[C]	<0.0[C]	<0.0[C]
Emissions Scenario	**Pollutant Emissions (Average Pounds per Day)[D]**						
	ROG	**NOx**	**CO**	**PM_{10}**		**$PM_{2.5}$**	
				Dust[B]	**Exhaust**	**Dust[B]**	**Exhaust**
UNMITIGATED							
2020	1.5	2.4	2.1	0.1	<0.0[C]	<0.0[C]	<0.0[C]
MITIGATED							
2020	1.5	2.4	2.1	0.1	<0.0[C	<0.0[C	<0.0[C
BAAQMD CEQA Threshold	**54**	**54**	**--**	**BMPs**	**82**	**BMPs**	**82**
Potentially Significant Impact?	**No**	**No**	**No**	**Yes**	**No**	**Yes**	**No**

BAAQMD 2017c. See Appendix A.

(A) Unmitigated emissions for ROG, NOx, CO and PM_{10} and $PM_{2.5}$ exhaust are shown as "mitigated" in the CalEEMod output files (see Appendix A), since that is the only way the project-specific equipment (i.e., engine model years) can be accounted for in the modeling.

(B) For all projects, the BAAQMD recommends implementing eight basic construction best management practices (BMPs) to control fugitive dust from construction activities.

(C) <0.00 does not mean 0.00; rather it refers to a value less than 0.005, but greater than zero.

(D) Average daily emissions assume 264 total active construction days.

As shown in Table 4-5, construction emissions associated with the proposed project would be below all BAAQMD significance thresholds for criteria air pollutant emissions; however, as indicated in the BAAQMD's *CEQA Guidelines*, fugitive dust emissions are considered potentially significant, regardless of the quantity of PM_{10} or $PM_{2.5}$ emitted unless the BAAQMD's eight, recommended fugitive dust BMPs are implemented during construction activities (BAAQMD 2017c, pg. 8-4). Accordingly, Mitigation Measure AIR-1, is presented below, to reduce fugitive dust emissions from the proposed project's construction activities.

> **Mitigation Measure AIR-1:** To reduce fugitive dust that would be generated during project construction activities, the County shall require the project Applicant and/or the Applicant's designated contractors, contractor's representatives, or other appropriate personnel to implement the following BAAQMD basic dust control measures.
>
> - Water all exposed surfaces (e.g., staging areas, soil piles, graded areas, and unpaved access roads) two times per day during construction and adequately wet demolition surfaces to limit visible dust emissions.
> - Cover all haul trucks transporting soil, sand, or other loose materials off the project site.
> - Use wet power vacuum street sweepers at least once per day to remove all visible mud or dirt track-out onto adjacent public roads (dry power sweeping is prohibited) during construction of the proposed project.
> - Vehicle speeds on unpaved roads/areas shall not exceed 15 miles per hour.

- Complete all areas to be paved as soon as possible and lay building pads as soon as possible after grading unless seeding or soil binders are used.
- Minimize idling time of diesel-powered construction equipment to five minutes and post signs reminding workers of this idling restriction at access points and equipment staging areas during construction of the proposed project.
- Maintain and properly tune all construction equipment in accordance with manufacturer's specifications and have a CARB-certified visible emissions evaluator check equipment prior to use at the site.
- Post a publicly visible sign with the name and telephone number of the construction contractor and County staff person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The publicly visible sign shall also include the contact phone number for the Bay Area Air Quality Management District to ensure compliance with applicable regulations.

Effectiveness: These measures would minimize and/or avoid local impacts from fugitive dust.

Implementation: The County shall include these measures on all appropriate bid, contract, and engineering and site plan (e.g., building, grading, and improvement plans) documents.

Timing: During construction activities.

Monitoring: The County shall review all appropriate bid, contract, and engineering and site plan documents for inclusion of dust control measures.

Operational Emissions

The BAAQMD's CEQA Air Quality Guidelines contain screening criteria to provide lead agencies with a conservative indication of whether a proposed project could result in potentially significant air quality impacts. Consistent with the BAAQMD's guidance, if a project meets all of the screening criteria, then the project would emit criteria pollutants (including particulate matter, ROG, and NO_x) at levels below the BAAQMD's significance thresholds. The BAAQMD's operational screening criteria for single-family residential homes is 56 dwelling units. Since the proposed project consists of nine (9), single-family homes, which is below the 56 dwelling unit screening threshold, the proposed project would result in less-than-significant operational air quality impacts for criteria air pollutants.

4.3.3 Sensitive Receptors and Substantial Pollutant Concentrations

As described in 2.1.3, sensitive receptors are located on all side of the project site. Project-related construction activities would emit $PM_{2.5}$ from equipment exhaust. Nearly all the project's $PM_{2.5}$ emissions from equipment exhaust would be DPM, a TAC.

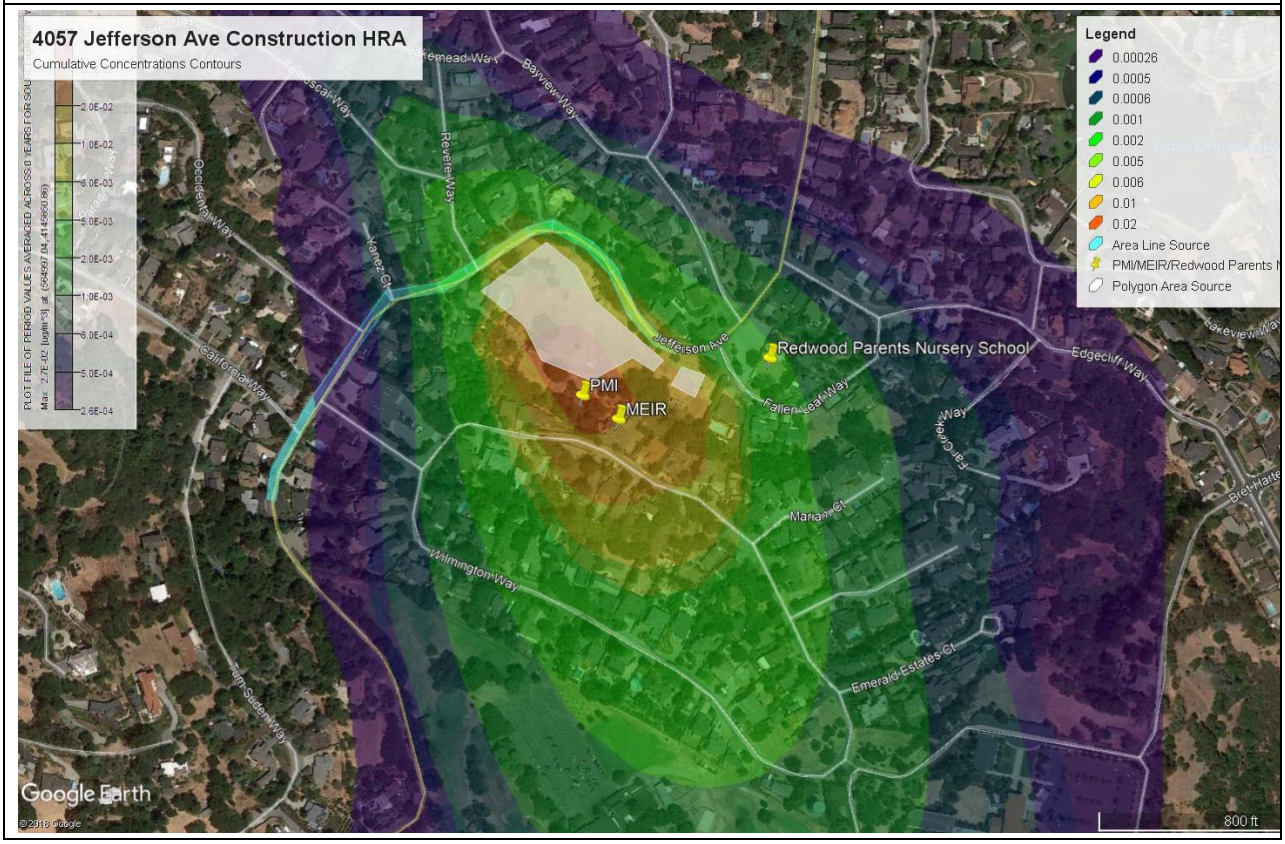
The construction HRA evaluated DPM emissions associated with on- and off-road diesel fuel trucks and equipment. Gasoline-fuel vehicles emit various TACs in much smaller quantities and health toxicity compared to DPM. Thus, gasoline fueled emission sources were not included in the HRA.

The proposed project would involve different construction activities occurring at different intensities over an approximately one-year timeframe, with initial groundbreaking taking place in late 2019 / early 2020. Receptors would be exposed to varying concentrations of pollutants throughout the construction period.

Individual Cancer Risk from Exposure to DPM

The predicted locations of the annual, unmitigated point of maximum impact (PMI) and the maximum exposed individual receptor (MEIR) for DPM exposure are shown in Figure 4-1. The predicted PMI is located on vacant land due south of the project site. Since the PMI for DPM exposure is located on lands that are not occupied by a receptor on a permanent basis, lifetime excess cancer risks and chronic non-cancer health hazards, which are based on exposure to annual average pollutant concentrations, were not estimated for the modeled PMI location.

Figure 4-1 Construction Health Risk Assessment – PMI, MEIR, and Student Receptor



Accordingly, health risks were assessed at the modeled residential MEIR location, which is located at approximately 1019 Willington Way. The HRA for residential receptors evaluated worst-case carcinogenic and non-carcinogenic risks to child (3rd trimester, 0-2 years, and 2-16 years) and adult (16-30 years and 30-70 years) receptors. Potential health risks were also assessed for student receptors at the Redwood Parents Nursery School.[6] As shown in Table 4-6 the calculated risks are greatest for residential child receptors; in particular, child receptors that are less than two years old at the start of construction

[6] As shown in Appendix C, health risks at the school were also assessed for students older than 2 (e.g., 4-year-olds) who are at the site four day per week; however, risks are higher for the 0-2 age bin primarily as a result of the age sensitivity factor (see Table 4-4)

activities. The calculated excess individual cancer risk for this subset of the population is less than the BAAQMD-recommended significance threshold value of 10 excess cancers per million population.

Table 4-6 Maximum Increased Cancer Risk from Project Construction DPM Emissions (Project)

Year	Health Risk Increase at MEIR(A)
	Unmitigated
Residential Child Receptor (0-2 Years of Age)	3.17
Residential Adult Receptor	0.06
School Child Receptor (0-2 Years of Age)	0.02
BAAQMD Significance Threshold	10
Significant Impact?	**No**

Source: Appendix C
(A) Maximum exposed residential receptor located at 564997.04 m E and 1415850.86 m N.
(B) <0.0 does not mean the risk is zero; rather, it means the risk is less than 0.05 but greater than zero.

In addition to construction activities occurring at the proposed project site, DPM would also be generated by construction activities occurring at Lot 10, which abuts the project site's eastern border. As such, cumulative health risks resulting from receptor exposure to DPM emissions were also assessed. The results of the cumulative analysis are presented in Table 4-7.

Table 4-7 Maximum Increased Cancer Risk from Project Construction DPM Emissions (Cumulative)

Year	Health Risk Increase at MEIR(A)
	Unmitigated
Residential Child Receptor (0-2 Years of Age)	3.21
Residential Adult Receptor	0.06
School Child Receptor (0-2 Years of Age)	0.02
BAAQMD Significance Threshold	10
Significant Impact?	**No**

Source: Appendix C.
(A) Maximum exposed residential receptor located at 564997.04 m E and 1415850.86 m N.
(B) <0.0 does not mean the risk is zero; rather, it means the risk is less than 0.05 but greater than zero.

As shown in Table 4-6 and Table 4-7 DPM emissions associated with the proposed project and development occurring on Lot 10 would not result in health risks that exceed the BAAQMDs thresholds of significance. As such, this impact would be less than significant.

Non-Carcinogenic Health Hazard from Exposure to DPM

The maximum annual average DPM concentration at any receptor location would be approximately 0.02 µg/m^3, which would occur at the MEIR location. This concentration reflects development at the proposed project site, as well as at Lot 10. Based on the chronic inhalation REL for DPM (5 µg/m^3), the calculated chronic hazard quotient during the maximum exposure to DPM concentration would be 0.004, which is below the BAAQMD's non-cancer hazard index threshold value of 1.0. The proposed project,

therefore, would not individually or cumulatively result in significant non-carcinogenic health risks to receptors from DPM exposure. As such, this impact would be less than significant.

Naturally Occurring Asbestos

As noted on page 3 of the geotechnical report prepared by Berlogar Stevens & Associates, approximately 1 to 4 feet of stiff gray-green silty clay, underlain with serpentine, was encountered on the western portion of the site (Berlogar Stevens & Associates, 2018). Serpentine is known to potentially contain NOA. During grading and/or excavation of areas containing serpentine rock, the project Applicant and/or the Applicant's designated contractors would be required to comply with CARB ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR §93105) (see Section 2.2.2). The implementation of these measures would ensure NOA does not become airborne and result in health risks at nearby sensitive receptor locations and pose an individual or combined risk that would be in excess of BAAQMD thresholds. Furthermore, the BAAQMD requires Applicants submit an Asbestos Dust Mitigation Plan application that documents the potential sources of dust emissions that may contain asbestos, and the actions that would be taken to prevent its accidental release (e.g., tire shaker, wheel wash system, etc.). This impact would be less than significant.

4.3.4 Odors

Construction of the project would generate typical odors associated with construction activities, such as vehicle exhaust odors. The odors generated by the project would be intermittent and localized in nature and would disperse quickly. There are no other anticipated odor emissions. Therefore, the project would not create emissions or odors that adversely affect a substantial number of people. This impact would be less than significant.

5 REPORT PREPARERS AND REFERENCES

This report was prepared by MIG under contract to the County of San Mateo. This report reflects the independent, objective, professional opinion of MIG.

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APPENDIX A: CalEEMod Output Files

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1057 Jefferson Drive Subdivision

San Mateo County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	10.00	Dwelling Unit	4.50	25,000.00	29

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - MIG Modeler: Phil Gleason

Land Use - Lot acreage from IS Project Description

Construction Phase - Grading, building construction, and paving schedule per applicant and IS project description.

Off-road Equipment -

Off-road Equipment - Building construction equipment provided by Applicant.

Off-road Equipment - No demolition equipment assumed.

Off-road Equipment - Grading equipment provided by project Applicant.

Off-road Equipment - Paving equipment reduced to reflect project size.

Off-road Equipment - No site preparation equipment assumed.

Trips and VMT - Updated to reflect 2,417CY import and 755CY export using 10CY trucks.

Grading - Soil import (~2,417 cubic yards) from 07/19/19 email re: cut/fill. Import reflects Lot 10; although not officially part of project. Material exported is based on 20% of gross fill earthwork to account for tree and concrete rip rap removal.

Construction Off-road Equipment Mitigation - Water two times per day in compliance with BAAQMD Fugitive Dust BMPs. Mitigation applied to reflect contractor's fleet characteristics.

Energy Use -

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	20.00	1.00

tblConstructionPhase	NumDays	5.00	1.00
tblConstructionPhase	NumDays	8.00	20.00
tblConstructionPhase	NumDays	230.00	270.00
tblConstructionPhase	NumDays	18.00	5.00
tblGrading	AcresOfGrading	18.75	4.00
tblGrading	MaterialExported	0.00	775.00
tblGrading	MaterialImported	0.00	2,417.00
tblLandUse	LandUseSquareFeet	18,000.00	25,000.00
tblLandUse	LotAcreage	3.25	4.50
tblOffRoadEquipment	HorsePower	212.00	198.00
tblOffRoadEquipment	HorsePower	158.00	163.00
tblOffRoadEquipment	HorsePower	187.00	244.00
tblOffRoadEquipment	HorsePower	367.00	240.00
tblOffRoadEquipment	HorsePower	97.00	189.00
tblOffRoadEquipment	HorsePower	89.00	74.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	3.00
tblTripsAndVMT	HaulingTripNumber	399.00	634.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0200	0.3181	0.1272	5.2000e-004	8.7800e-003	7.8400e-003	0.0166	2.0300e-003	7.2300e-003	9.2600e-003	0.0000	49.8658	49.8658	0.0103	0.0000	50.1223
2020	0.1882	0.1053	0.1036	2.0000e-004	5.3100e-003	6.2000e-003	0.0115	1.4300e-003	5.7900e-003	7.2200e-003	0.0000	17.8654	17.8654	3.2500e-003	0.0000	17.9466
2021	2.1000e-004	1.9100e-003	1.9200e-003	0.0000	1.5000e-004	1.1000e-004	2.6000e-004	4.0000e-005	1.0000e-004	1.4000e-004	0.0000	0.3733	0.3733	7.0000e-005	0.0000	0.3750
Maximum	**0.1882**	**0.3181**	**0.1272**	**5.2000e-004**	**8.7800e-003**	**7.8400e-003**	**0.0166**	**2.0300e-003**	**7.2300e-003**	**9.2600e-003**	**0.0000**	**49.8658**	**49.8658**	**0.0103**	**0.0000**	**50.1223**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0110	0.2259	0.1709	5.2000e-004	7.5200e-003	3.7900e-003	0.0113	1.8900e-003	3.6300e-003	5.5200e-003	0.0000	49.8658	49.8658	0.0103	0.0000	50.1223
2020	0.1835	0.0865	0.1030	2.0000e-004	5.3100e-003	2.3300e-003	7.6300e-003	1.4300e-003	2.2600e-003	3.6900e-003	0.0000	17.8654	17.8654	3.2500e-003	0.0000	17.9465
2021	1.0000e-004	1.5200e-003	1.9200e-003	0.0000	1.5000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	5.0000e-005	0.0000	0.3733	0.3733	7.0000e-005	0.0000	0.3750
Maximum	**0.1835**	**0.2259**	**0.1709**	**5.2000e-004**	**7.5200e-003**	**3.7900e-003**	**0.0113**	**1.8900e-003**	**3.6300e-003**	**5.5200e-003**	**0.0000**	**49.8658**	**49.8658**	**0.0103**	**0.0000**	**50.1223**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**6.59**	**26.17**	**-18.51**	**0.00**	**8.85**	**56.75**	**32.75**	**4.00**	**55.11**	**44.28**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**8-1-2019**	**10-31-2019**	0.3113	0.2175
2	**11-1-2019**	**1-31-2020**	0.0065	0.0047
3	**2-1-2020**	**4-30-2020**	0.0189	0.0135
4	**5-1-2020**	**7-31-2020**	0.0192	0.0137
5	**8-1-2020**	**10-31-2020**	0.2353	0.2288
6	**11-1-2020**	**1-31-2021**	0.0151	0.0109
		Highest	0.3113	0.2288

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1764	2.1500e-003	0.1601	1.8000e-004		0.0128	0.0128		0.0128	0.0128	1.2711	0.4334	1.7045	2.5200e-003	7.0000e-005	1.7891
Energy	2.2800e-003	0.0195	8.3000e-003	1.2000e-004		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003	0.0000	45.8076	45.8076	1.4800e-003	6.3000e-004	46.0328
Mobile	0.0232	0.0710	0.2619	8.8000e-004	0.0809	7.6000e-004	0.0816	0.0217	7.1000e-004	0.0224	0.0000	80.7718	80.7718	2.9600e-003	0.0000	80.8459
Waste						0.0000	0.0000		0.0000	0.0000	2.4724	0.0000	2.4724	0.1461	0.0000	6.1253
Water						0.0000	0.0000		0.0000	0.0000	0.2067	1.4438	1.6505	0.0213	5.1000e-004	2.3363
Total	**0.2019**	**0.0926**	**0.4304**	**1.1800e-003**	**0.0809**	**0.0151**	**0.0960**	**0.0217**	**0.0151**	**0.0368**	**3.9502**	**128.4566**	**132.4069**	**0.1744**	**1.2100e-003**	**137.1294**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1764	2.1500e-003	0.1601	1.8000e-004		0.0128	0.0128		0.0128	0.0128	1.2711	0.4334	1.7045	2.5200e-003	7.0000e-005	1.7891
Energy	2.2800e-003	0.0195	8.3000e-003	1.2000e-004		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003	0.0000	45.8076	45.8076	1.4800e-003	6.3000e-004	46.0328
Mobile	0.0232	0.0710	0.2619	8.8000e-004	0.0809	7.6000e-004	0.0816	0.0217	7.1000e-004	0.0224	0.0000	80.7718	80.7718	2.9600e-003	0.0000	80.8459
Waste						0.0000	0.0000		0.0000	0.0000	2.4724	0.0000	2.4724	0.1461	0.0000	6.1253
Water						0.0000	0.0000		0.0000	0.0000	0.2067	1.4438	1.6505	0.0213	5.1000e-004	2.3363
Total	**0.2019**	**0.0926**	**0.4304**	**1.1800e-003**	**0.0809**	**0.0151**	**0.0960**	**0.0217**	**0.0151**	**0.0368**	**3.9502**	**128.4566**	**132.4069**	**0.1744**	**1.2100e-003**	**137.1294**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2019	8/1/2019	5	1	
2	Site Preparation	Site Preparation	8/2/2019	8/2/2019	5	1	
3	Grading	Grading	8/5/2019	8/30/2019	5	20	
4	Building Construction	Building Construction	1/1/2020	1/12/2021	5	270	
5	Architectural Coating	Architectural Coating	8/28/2020	9/22/2020	5	18	
6	Paving	Paving	8/31/2020	9/4/2020	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0

Residential Indoor: 50,625; Residential Outdoor: 16,875; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	0	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Crawler Tractors	1	4.00	198	0.43
Grading	Excavators	1	4.00	163	0.38
Grading	Graders	1	8.00	244	0.41
Grading	Off-Highway Trucks	1	1.00	402	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	1	1.50	240	0.48
Grading	Tractors/Loaders/Backhoes	1	8.00	189	0.37
Building Construction	Cranes	0	7.00	231	0.29
Building Construction	Forklifts	1	3.00	74	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	6.00	132	0.36
Paving	Rollers	1	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	634.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	1	4.00	1.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3000e-003	0.0000	2.3000e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0164	0.2070	0.0814	2.4000e-004		7.3900e-003	7.3900e-003		6.8000e-003	6.8000e-003	0.0000	21.9940	21.9940	6.9600e-003	0.0000	22.1680
Total	**0.0164**	**0.2070**	**0.0814**	**2.4000e-004**	**2.3000e-003**	**7.3900e-003**	**9.6900e-003**	**2.6000e-004**	**6.8000e-003**	**7.0600e-003**	**0.0000**	**21.9940**	**21.9940**	**6.9600e-003**	**0.0000**	**22.1680**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.1800e-003	0.1107	0.0426	2.6000e-004	5.3000e-003	4.4000e-004	5.7400e-003	1.4600e-003	4.2000e-004	1.8800e-003	0.0000	26.8562	26.8562	3.2800e-003	0.0000	26.9382
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.1000e-004	3.2200e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0156	1.0156	2.0000e-005	0.0000	1.0161
Total	**3.6200e-003**	**0.1110**	**0.0458**	**2.7000e-004**	**6.4800e-003**	**4.5000e-004**	**6.9300e-003**	**1.7700e-003**	**4.3000e-004**	**2.2000e-003**	**0.0000**	**27.8718**	**27.8718**	**3.3000e-003**	**0.0000**	**27.9543**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0400e-003	0.0000	1.0400e-003	1.2000e-004	0.0000	1.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.4100e-003	0.1149	0.1251	2.4000e-004		3.3400e-003	3.3400e-003		3.2000e-003	3.2000e-003	0.0000	21.9940	21.9940	6.9600e-003	0.0000	22.1680
Total	**7.4100e-003**	**0.1149**	**0.1251**	**2.4000e-004**	**1.0400e-003**	**3.3400e-003**	**4.3800e-003**	**1.2000e-004**	**3.2000e-003**	**3.3200e-003**	**0.0000**	**21.9940**	**21.9940**	**6.9600e-003**	**0.0000**	**22.1680**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.1800e-003	0.1107	0.0426	2.6000e-004	5.3000e-003	4.4000e-004	5.7400e-003	1.4600e-003	4.2000e-004	1.8800e-003	0.0000	26.8562	26.8562	3.2800e-003	0.0000	26.9382
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.1000e-004	3.2200e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0156	1.0156	2.0000e-005	0.0000	1.0161
Total	**3.6200e-003**	**0.1110**	**0.0458**	**2.7000e-004**	**6.4800e-003**	**4.5000e-004**	**6.9300e-003**	**1.7700e-003**	**4.3000e-004**	**2.2000e-003**	**0.0000**	**27.8718**	**27.8718**	**3.3000e-003**	**0.0000**	**27.9543**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.8800e-003	0.0530	0.0482	6.0000e-005		3.9500e-003	3.9500e-003		3.6300e-003	3.6300e-003	0.0000	5.4852	5.4852	1.7700e-003	0.0000	5.5296
Total	**5.8800e-003**	**0.0530**	**0.0482**	**6.0000e-005**		**3.9500e-003**	**3.9500e-003**		**3.6300e-003**	**3.6300e-003**	**0.0000**	**5.4852**	**5.4852**	**1.7700e-003**	**0.0000**	**5.5296**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.1000e-004	0.0152	6.0500e-003	3.0000e-005	8.5000e-004	8.0000e-005	9.3000e-004	2.5000e-004	7.0000e-005	3.2000e-004	0.0000	3.4714	3.4714	3.0000e-004	0.0000	3.4790
Worker	1.4300e-003	9.7000e-004	0.0102	4.0000e-005	4.1300e-003	3.0000e-005	4.1500e-003	1.1000e-003	2.0000e-005	1.1200e-003	0.0000	3.4350	3.4350	7.0000e-005	0.0000	3.4367
Total	**1.9400e-003**	**0.0162**	**0.0163**	**7.0000e-005**	**4.9800e-003**	**1.1000e-004**	**5.0800e-003**	**1.3500e-003**	**9.0000e-005**	**1.4400e-003**	**0.0000**	**6.9064**	**6.9064**	**3.7000e-004**	**0.0000**	**6.9156**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.5400e-003	0.0351	0.0474	6.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	5.4852	5.4852	1.7700e-003	0.0000	5.5295
Total	**1.5400e-003**	**0.0351**	**0.0474**	**6.0000e-005**		**1.0000e-004**	**1.0000e-004**		**1.0000e-004**	**1.0000e-004**	**0.0000**	**5.4852**	**5.4852**	**1.7700e-003**	**0.0000**	**5.5295**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.1000e-004	0.0152	6.0500e-003	3.0000e-005	8.5000e-004	8.0000e-005	9.3000e-004	2.5000e-004	7.0000e-005	3.2000e-004	0.0000	3.4714	3.4714	3.0000e-004	0.0000	3.4790
Worker	1.4300e-003	9.7000e-004	0.0102	4.0000e-005	4.1300e-003	3.0000e-005	4.1500e-003	1.1000e-003	2.0000e-005	1.1200e-003	0.0000	3.4350	3.4350	7.0000e-005	0.0000	3.4367
Total	**1.9400e-003**	**0.0162**	**0.0163**	**7.0000e-005**	**4.9800e-003**	**1.1000e-004**	**5.0800e-003**	**1.3500e-003**	**9.0000e-005**	**1.4400e-003**	**0.0000**	**6.9064**	**6.9064**	**3.7000e-004**	**0.0000**	**6.9156**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6000e-004	1.4700e-003	1.4600e-003	0.0000		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	0.1675	0.1675	5.0000e-005	0.0000	0.1688
Total	**1.6000e-004**	**1.4700e-003**	**1.4600e-003**	**0.0000**		**1.0000e-004**	**1.0000e-004**		**1.0000e-004**	**1.0000e-004**	**0.0000**	**0.1675**	**0.1675**	**5.0000e-005**	**0.0000**	**0.1688**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	4.2000e-004	1.8000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1047	0.1047	1.0000e-005	0.0000	0.1049
Worker	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	1.3000e-004	0.0000	1.3000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1012	0.1012	0.0000	0.0000	0.1012
Total	**5.0000e-005**	**4.5000e-004**	**4.7000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.2058**	**0.2058**	**1.0000e-005**	**0.0000**	**0.2061**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.0000e-005	1.0700e-003	1.4500e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.1675	0.1675	5.0000e-005	0.0000	0.1688
Total	**5.0000e-005**	**1.0700e-003**	**1.4500e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.1675**	**0.1675**	**5.0000e-005**	**0.0000**	**0.1688**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	4.2000e-004	1.8000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1047	0.1047	1.0000e-005	0.0000	0.1049
Worker	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	1.3000e-004	0.0000	1.3000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1012	0.1012	0.0000	0.0000	0.1012
Total	**5.0000e-005**	**4.5000e-004**	**4.7000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.2058**	**0.2058**	**1.0000e-005**	**0.0000**	**0.2061**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1760					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1800e-003	0.0152	0.0165	3.0000e-005		1.0000e-003	1.0000e-003		1.0000e-003	1.0000e-003	0.0000	2.2979	2.2979	1.8000e-004	0.0000	2.3024
Total	**0.1782**	**0.0152**	**0.0165**	**3.0000e-005**		**1.0000e-003**	**1.0000e-003**		**1.0000e-003**	**1.0000e-003**	**0.0000**	**2.2979**	**2.2979**	**1.8000e-004**	**0.0000**	**2.3024**

3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	1.8000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0590	0.0590	0.0000	0.0000	0.0590
Total	**2.0000e-005**	**2.0000e-005**	**1.8000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0590**	**0.0590**	**0.0000**	**0.0000**	**0.0590**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1760					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1800e-003	0.0152	0.0165	3.0000e-005		1.0000e-003	1.0000e-003		1.0000e-003	1.0000e-003	0.0000	2.2979	2.2979	1.8000e-004	0.0000	2.3024
Total	**0.1782**	**0.0152**	**0.0165**	**3.0000e-005**		**1.0000e-003**	**1.0000e-003**		**1.0000e-003**	**1.0000e-003**	**0.0000**	**2.2979**	**2.2979**	**1.8000e-004**	**0.0000**	**2.3024**

3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	1.8000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0590	0.0590	0.0000	0.0000	0.0590
Total	**2.0000e-005**	**2.0000e-005**	**1.8000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0590**	**0.0590**	**0.0000**	**0.0000**	**0.0590**

3.7 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.0700e-003	0.0209	0.0218	3.0000e-005		1.1500e-003	1.1500e-003		1.0600e-003	1.0600e-003	0.0000	2.9038	2.9038	9.2000e-004	0.0000	2.9269
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.0700e-003**	**0.0209**	**0.0218**	**3.0000e-005**		**1.1500e-003**	**1.1500e-003**		**1.0600e-003**	**1.0600e-003**	**0.0000**	**2.9038**	**2.9038**	**9.2000e-004**	**0.0000**	**2.9269**

3.7 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	6.0000e-005	6.3000e-004	0.0000	2.6000e-004	0.0000	2.6000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2131	0.2131	0.0000	0.0000	0.2132
Total	**9.0000e-005**	**6.0000e-005**	**6.3000e-004**	**0.0000**	**2.6000e-004**	**0.0000**	**2.6000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2131**	**0.2131**	**0.0000**	**0.0000**	**0.2132**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.7400e-003	0.0200	0.0220	3.0000e-005		1.1200e-003	1.1200e-003		1.0600e-003	1.0600e-003	0.0000	2.9038	2.9038	9.2000e-004	0.0000	2.9268
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.7400e-003**	**0.0200**	**0.0220**	**3.0000e-005**		**1.1200e-003**	**1.1200e-003**		**1.0600e-003**	**1.0600e-003**	**0.0000**	**2.9038**	**2.9038**	**9.2000e-004**	**0.0000**	**2.9268**

3.7 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	6.0000e-005	6.3000e-004	0.0000	2.6000e-004	0.0000	2.6000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2131	0.2131	0.0000	0.0000	0.2132
Total	**9.0000e-005**	**6.0000e-005**	**6.3000e-004**	**0.0000**	**2.6000e-004**	**0.0000**	**2.6000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2131**	**0.2131**	**0.0000**	**0.0000**	**0.2132**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0232	0.0710	0.2619	8.8000e-004	0.0809	7.6000e-004	0.0816	0.0217	7.1000e-004	0.0224	0.0000	80.7718	80.7718	2.9600e-003	0.0000	80.8459
Unmitigated	0.0232	0.0710	0.2619	8.8000e-004	0.0809	7.6000e-004	0.0816	0.0217	7.1000e-004	0.0224	0.0000	80.7718	80.7718	2.9600e-003	0.0000	80.8459

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	95.20	99.10	86.20	218,192	218,192
Total	95.20	99.10	86.20	218,192	218,192

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.482816	0.049967	0.258264	0.138365	0.017696	0.006700	0.022365	0.006431	0.004044	0.003214	0.008927	0.000452	0.000759

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	23.2220	23.2220	1.0500e-003	2.2000e-004	23.3130
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	23.2220	23.2220	1.0500e-003	2.2000e-004	23.3130
NaturalGas Mitigated	2.2800e-003	0.0195	8.3000e-003	1.2000e-004		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003	0.0000	22.5856	22.5856	4.3000e-004	4.1000e-004	22.7198
NaturalGas Unmitigated	2.2800e-003	0.0195	8.3000e-003	1.2000e-004		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003	0.0000	22.5856	22.5856	4.3000e-004	4.1000e-004	22.7198

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	423238	2.2800e-003	0.0195	8.3000e-003	1.2000e-004		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003	0.0000	22.5856	22.5856	4.3000e-004	4.1000e-004	22.7198
Total		**2.2800e-003**	**0.0195**	**8.3000e-003**	**1.2000e-004**		**1.5800e-003**	**1.5800e-003**		**1.5800e-003**	**1.5800e-003**	**0.0000**	**22.5856**	**22.5856**	**4.3000e-004**	**4.1000e-004**	**22.7198**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	423238	2.2800e-003	0.0195	8.3000e-003	1.2000e-004		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003	0.0000	22.5856	22.5856	4.3000e-004	4.1000e-004	22.7198
Total		**2.2800e-003**	**0.0195**	**8.3000e-003**	**1.2000e-004**		**1.5800e-003**	**1.5800e-003**		**1.5800e-003**	**1.5800e-003**	**0.0000**	**22.5856**	**22.5856**	**4.3000e-004**	**4.1000e-004**	**22.7198**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	79824.9	23.2220	1.0500e-003	2.2000e-004	23.3130
Total		**23.2220**	**1.0500e-003**	**2.2000e-004**	**23.3130**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	79824.9	23.2220	1.0500e-003	2.2000e-004	23.3130
Total		**23.2220**	**1.0500e-003**	**2.2000e-004**	**23.3130**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1764	2.1500e-003	0.1601	1.8000e-004		0.0128	0.0128		0.0128	0.0128	1.2711	0.4334	1.7045	2.5200e-003	7.0000e-005	1.7891
Unmitigated	0.1764	2.1500e-003	0.1601	1.8000e-004		0.0128	0.0128		0.0128	0.0128	1.2711	0.4334	1.7045	2.5200e-003	7.0000e-005	1.7891

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0176					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0976					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0589	1.2900e-003	0.0857	1.8000e-004		0.0124	0.0124		0.0124	0.0124	1.2711	0.3121	1.5832	2.4000e-003	7.0000e-005	1.6649
Landscaping	2.2500e-003	8.6000e-004	0.0744	0.0000		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	0.1213	0.1213	1.2000e-004	0.0000	0.1242
Total	**0.1764**	**2.1500e-003**	**0.1601**	**1.8000e-004**		**0.0128**	**0.0128**		**0.0128**	**0.0128**	**1.2711**	**0.4334**	**1.7045**	**2.5200e-003**	**7.0000e-005**	**1.7891**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0176					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0976					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0589	1.2900e-003	0.0857	1.8000e-004		0.0124	0.0124		0.0124	0.0124	1.2711	0.3121	1.5832	2.4000e-003	7.0000e-005	1.6649
Landscaping	2.2500e-003	8.6000e-004	0.0744	0.0000		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	0.1213	0.1213	1.2000e-004	0.0000	0.1242
Total	**0.1764**	**2.1500e-003**	**0.1601**	**1.8000e-004**		**0.0128**	**0.0128**		**0.0128**	**0.0128**	**1.2711**	**0.4334**	**1.7045**	**2.5200e-003**	**7.0000e-005**	**1.7891**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	1.6505	0.0213	5.1000e-004	2.3363
Unmitigated	1.6505	0.0213	5.1000e-004	2.3363

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.65154 / 0.410754	1.6505	0.0213	5.1000e-004	2.3363
Total		**1.6505**	**0.0213**	**5.1000e-004**	**2.3363**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.65154 / 0.410754	1.6505	0.0213	5.1000e-004	2.3363
Total		**1.6505**	**0.0213**	**5.1000e-004**	**2.3363**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	2.4724	0.1461	0.0000	6.1253
Unmitigated	2.4724	0.1461	0.0000	6.1253

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	12.18	2.4724	0.1461	0.0000	6.1253
Total		**2.4724**	**0.1461**	**0.0000**	**6.1253**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	12.18	2.4724	0.1461	0.0000	6.1253
Total		**2.4724**	**0.1461**	**0.0000**	**6.1253**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX B: AERMOD Output Files

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Control Pathway

Dispersion Options

Titles

C:\Lakes\JeffersonAve_HRA_20190725\JeffersonAve_HRA_20190725.isc

Dispersion Options

☑ Regulatory Default ☐ Non-Default Options

Dispersion Coefficient

Rural

Output Type

☑ Concentration
☐ Total Deposition (Dry & Wet)
☐ Dry Deposition
☐ Wet Deposition

Plume Depletion

☐ Dry Removal
☐ Wet Removal

Output Warnings

☐ No Output Warnings
☐ Non-fatal Warnings for Non-sequential Met Data

Pollutant / Averaging Time / Terrain Options

Pollutant Type

PM2.5

Averaging Time Options

Hours ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 6 ☐ 8 ☐ 12 ☐ 24

☐ Month ☑ Period ☐ Annual

Exponential Decay

Option not available

Terrain Height Options

☐ Flat ☑ Elevated

SO: Meters
RE: Meters
TG: Meters

Flagpole Receptors

☑ Yes ☐ No

Default Height = 1.80 m

Control Pathway

Optional Files

Re-Start File	Init File	Multi-Year Analyses	Event Input File	Error Listing File
☐	☐	☐	☐	■

Detailed Error Listing File

Filename: JeffersonAve_HRA_20190725.err

Meteorology Pathway

AERMOD

Met Input Data

Surface Met Data

Filename: T:\CASE\Env\16149_Atherton Cartan Field Stormwater Capture IS.MND\Project_Data\Air Quality and GHG\A

Format Type: Default AERMET format

Profile Met Data

Filename: T:\CASE\Env\16149_Atherton Cartan Field Stormwater Capture IS.MND\Project_Data\Air Quality and GHG\A

Format Type: Default AERMET format

Wind Speed

☐ Wind Speeds are Vector Mean (Not Scalar Means)

Wind Direction

Rotation Adjustment [deg]:

Potential Temperature Profile

Base Elevation above MSL (for Primary Met Tower): 11.90 [m]

Meteorological Station Data

Stations	Station No.	Year	X Coordinate [m]	Y Coordinate [m]	Station Name
Surface Upper Air		2013 2013			OAKLAND/WSO AP

Data Period

Data Period to Process

Start Date: 1/1/2013 Start Hour: 1 End Date: 12/31/2017 End Hour: 24

Wind Speed Categories

Stability Category	Wind Speed [m/s]	Stability Category	Wind Speed [m/s]
A	1.54	D	8.23
B	3.09	E	10.8
C	5.14	F	No Upper Bound

Receptor Pathway

Receptor Networks

Note: Terrain Elavations and Flagpole Heights for Network Grids are in Page RE2 - 1 (If applicable)
Generated Discrete Receptors for Multi-Tier (Risk) Grid and Receptor Locations for Fenceline Grid are in Page RE3 - 1 (If applicable)

Discrete Receptors

Discrete Cartesian Receptors

Record Number	X-Coordinate [m]	Y-Coordinate [m]	Group Name (Optional)	Terrain Elevations	Flagpole Heights [m] (Optional)
1	564497.04	4145400.86	UCART1	220.24	
2	564547.04	4145400.86	UCART1	217.14	
3	564597.04	4145400.86	UCART1	206.44	
4	564647.04	4145400.86	UCART1	205.73	
5	564697.04	4145400.86	UCART1	201.10	
6	564747.04	4145400.86	UCART1	197.37	
7	564797.04	4145400.86	UCART1	197.79	
8	564847.04	4145400.86	UCART1	188.53	
9	564897.04	4145400.86	UCART1	183.89	
10	564947.04	4145400.86	UCART1	179.14	
11	564997.04	4145400.86	UCART1	171.24	
12	565047.04	4145400.86	UCART1	160.29	
13	565097.04	4145400.86	UCART1	157.21	
14	565147.04	4145400.86	UCART1	158.66	
15	565197.04	4145400.86	UCART1	161.38	
16	565247.04	4145400.86	UCART1	160.64	
17	565297.04	4145400.86	UCART1	158.29	
18	565347.04	4145400.86	UCART1	155.56	
19	565397.04	4145400.86	UCART1	153.12	
20	565447.04	4145400.86	UCART1	149.69	
21	565497.04	4145400.86	UCART1	139.08	
22	564497.04	4145450.86	UCART1	223.83	
23	564547.04	4145450.86	UCART1	216.45	
24	564597.04	4145450.86	UCART1	216.77	
25	564647.04	4145450.86	UCART1	216.58	
26	564697.04	4145450.86	UCART1	206.76	
27	564747.04	4145450.86	UCART1	205.01	
28	564797.04	4145450.86	UCART1	204.22	
29	564847.04	4145450.86	UCART1	192.76	
30	564897.04	4145450.86	UCART1	192.28	

31	564947.04	4145450.86	UCART1	191.76
32	564997.04	4145450.86	UCART1	170.16
33	565047.04	4145450.86	UCART1	167.83
34	565097.04	4145450.86	UCART1	163.42
35	565147.04	4145450.86	UCART1	163.12
36	565197.04	4145450.86	UCART1	164.66
37	565247.04	4145450.86	UCART1	163.15
38	565297.04	4145450.86	UCART1	160.07
39	565347.04	4145450.86	UCART1	157.20
40	565397.04	4145450.86	UCART1	155.83
41	565447.04	4145450.86	UCART1	152.37
42	565497.04	4145450.86	UCART1	146.17
43	564497.04	4145500.86	UCART1	225.40
44	564547.04	4145500.86	UCART1	226.24
45	564597.04	4145500.86	UCART1	227.91
46	564647.04	4145500.86	UCART1	226.58
47	564697.04	4145500.86	UCART1	220.53
48	564747.04	4145500.86	UCART1	214.08
49	564797.04	4145500.86	UCART1	207.35
50	564847.04	4145500.86	UCART1	202.40
51	564897.04	4145500.86	UCART1	197.28
52	564947.04	4145500.86	UCART1	190.00
53	564997.04	4145500.86	UCART1	179.34
54	565047.04	4145500.86	UCART1	172.44
55	565097.04	4145500.86	UCART1	168.95
56	565147.04	4145500.86	UCART1	168.83
57	565197.04	4145500.86	UCART1	169.85
58	565247.04	4145500.86	UCART1	166.04
59	565297.04	4145500.86	UCART1	161.67
60	565347.04	4145500.86	UCART1	159.79
61	565397.04	4145500.86	UCART1	159.33
62	565447.04	4145500.86	UCART1	157.23
63	565497.04	4145500.86	UCART1	149.03
64	564497.04	4145550.86	UCART1	232.23
65	564547.04	4145550.86	UCART1	235.95
66	564597.04	4145550.86	UCART1	238.95
67	564647.04	4145550.86	UCART1	238.35
68	564697.04	4145550.86	UCART1	227.82

69	564747.04	4145550.86	UCART1	219.37
70	564797.04	4145550.86	UCART1	212.86
71	564847.04	4145550.86	UCART1	202.05
72	564897.04	4145550.86	UCART1	192.30
73	564947.04	4145550.86	UCART1	181.09
74	564997.04	4145550.86	UCART1	182.96
75	565047.04	4145550.86	UCART1	174.55
76	565097.04	4145550.86	UCART1	170.16
77	565147.04	4145550.86	UCART1	172.12
78	565197.04	4145550.86	UCART1	171.42
79	565247.04	4145550.86	UCART1	167.97
80	565297.04	4145550.86	UCART1	163.56
81	565347.04	4145550.86	UCART1	162.57
82	565397.04	4145550.86	UCART1	161.37
83	565447.04	4145550.86	UCART1	158.25
84	565497.04	4145550.86	UCART1	150.76
85	564497.04	4145600.86	UCART1	243.56
86	564547.04	4145600.86	UCART1	252.53
87	564597.04	4145600.86	UCART1	256.28
88	564647.04	4145600.86	UCART1	244.08
89	564697.04	4145600.86	UCART1	222.87
90	564747.04	4145600.86	UCART1	215.44
91	564797.04	4145600.86	UCART1	211.21
92	564847.04	4145600.86	UCART1	199.88
93	564897.04	4145600.86	UCART1	189.00
94	564947.04	4145600.86	UCART1	180.17
95	564997.04	4145600.86	UCART1	179.77
96	565047.04	4145600.86	UCART1	175.09
97	565097.04	4145600.86	UCART1	173.35
98	565147.04	4145600.86	UCART1	172.96
99	565197.04	4145600.86	UCART1	169.41
100	565247.04	4145600.86	UCART1	164.46
101	565297.04	4145600.86	UCART1	161.53
102	565347.04	4145600.86	UCART1	161.84
103	565397.04	4145600.86	UCART1	160.14
104	565447.04	4145600.86	UCART1	154.48
105	565497.04	4145600.86	UCART1	146.04
106	564497.04	4145650.86	UCART1	259.94

107	564547.04	4145650.86	UCART1	263.41
108	564597.04	4145650.86	UCART1	254.48
109	564647.04	4145650.86	UCART1	233.20
110	564697.04	4145650.86	UCART1	218.42
111	564747.04	4145650.86	UCART1	210.92
112	564797.04	4145650.86	UCART1	202.87
113	564847.04	4145650.86	UCART1	194.04
114	564897.04	4145650.86	UCART1	184.38
115	564947.04	4145650.86	UCART1	181.22
116	564997.04	4145650.86	UCART1	178.92
117	565047.04	4145650.86	UCART1	176.75
118	565097.04	4145650.86	UCART1	175.40
119	565147.04	4145650.86	UCART1	172.15
120	565197.04	4145650.86	UCART1	167.40
121	565247.04	4145650.86	UCART1	160.43
122	565297.04	4145650.86	UCART1	157.46
123	565347.04	4145650.86	UCART1	157.67
124	565397.04	4145650.86	UCART1	152.02
125	565447.04	4145650.86	UCART1	147.21
126	565497.04	4145650.86	UCART1	134.21
127	564497.04	4145700.86	UCART1	261.05
128	564547.04	4145700.86	UCART1	254.68
129	564597.04	4145700.86	UCART1	239.59
130	564647.04	4145700.86	UCART1	225.42
131	564697.04	4145700.86	UCART1	213.49
132	564747.04	4145700.86	UCART1	203.70
133	564797.04	4145700.86	UCART1	196.37
134	564847.04	4145700.86	UCART1	189.63
135	564897.04	4145700.86	UCART1	184.06
136	564947.04	4145700.86	UCART1	181.26
137	564997.04	4145700.86	UCART1	180.91
138	565047.04	4145700.86	UCART1	176.96
139	565097.04	4145700.86	UCART1	174.52
140	565147.04	4145700.86	UCART1	170.75
141	565197.04	4145700.86	UCART1	166.36
142	565247.04	4145700.86	UCART1	161.15
143	565297.04	4145700.86	UCART1	159.80
144	565347.04	4145700.86	UCART1	156.68

145	565397.04	4145700.86	UCART1	146.88
146	565447.04	4145700.86	UCART1	138.75
147	565497.04	4145700.86	UCART1	124.05
148	564497.04	4145750.86	UCART1	251.16
149	564547.04	4145750.86	UCART1	236.08
150	564597.04	4145750.86	UCART1	228.91
151	564647.04	4145750.86	UCART1	217.99
152	564697.04	4145750.86	UCART1	208.73
153	564747.04	4145750.86	UCART1	198.88
154	564797.04	4145750.86	UCART1	193.16
155	564847.04	4145750.86	UCART1	188.98
156	564897.04	4145750.86	UCART1	184.47
157	564947.04	4145750.86	UCART1	183.28
158	564997.04	4145750.86	UCART1	181.98
159	565047.04	4145750.86	UCART1	178.59
160	565097.04	4145750.86	UCART1	173.27
161	565147.04	4145750.86	UCART1	168.68
162	565197.04	4145750.86	UCART1	165.61
163	565247.04	4145750.86	UCART1	163.69
164	565297.04	4145750.86	UCART1	163.08
165	565347.04	4145750.86	UCART1	160.59
166	565397.04	4145750.86	UCART1	154.30
167	565447.04	4145750.86	UCART1	142.32
168	565497.04	4145750.86	UCART1	137.89
169	564497.04	4145800.86	UCART1	253.06
170	564547.04	4145800.86	UCART1	249.02
171	564597.04	4145800.86	UCART1	233.03
172	564647.04	4145800.86	UCART1	212.53
173	564697.04	4145800.86	UCART1	204.63
174	564747.04	4145800.86	UCART1	198.96
175	564797.04	4145800.86	UCART1	196.01
176	564847.04	4145800.86	UCART1	191.45
177	564897.04	4145800.86	UCART1	188.95
178	564947.04	4145800.86	UCART1	182.14
179	564997.04	4145800.86	UCART1	189.64
180	565047.04	4145800.86	UCART1	178.23
181	565097.04	4145800.86	UCART1	172.59
182	565147.04	4145800.86	UCART1	168.88

183	565197.04	4145800.86	UCART1	166.90
184	565247.04	4145800.86	UCART1	159.82
185	565297.04	4145800.86	UCART1	159.72
186	565347.04	4145800.86	UCART1	160.32
187	565397.04	4145800.86	UCART1	155.20
188	565447.04	4145800.86	UCART1	146.27
189	565497.04	4145800.86	UCART1	146.94
190	564497.04	4145850.86	UCART1	255.92
191	564547.04	4145850.86	UCART1	244.29
192	564597.04	4145850.86	UCART1	223.82
193	564647.04	4145850.86	UCART1	210.31
194	564697.04	4145850.86	UCART1	203.78
195	564747.04	4145850.86	UCART1	199.80
196	564797.04	4145850.86	UCART1	196.12
197	564847.04	4145850.86	UCART1	193.32
198	564897.04	4145850.86	UCART1	187.98
199	564947.04	4145850.86	UCART1	176.88
200	564997.04	4145850.86	UCART1	181.64
201	565047.04	4145850.86	UCART1	174.75
202	565097.04	4145850.86	UCART1	171.97
203	565147.04	4145850.86	UCART1	173.47
204	565197.04	4145850.86	UCART1	169.84
205	565247.04	4145850.86	UCART1	159.32
206	565297.04	4145850.86	UCART1	156.90
207	565347.04	4145850.86	UCART1	151.27
208	565397.04	4145850.86	UCART1	147.18
209	565447.04	4145850.86	UCART1	146.79
210	565497.04	4145850.86	UCART1	147.73
211	564497.04	4145900.86	UCART1	237.60
212	564547.04	4145900.86	UCART1	228.42
213	564597.04	4145900.86	UCART1	217.53
214	564647.04	4145900.86	UCART1	210.27
215	564697.04	4145900.86	UCART1	204.82
216	564747.04	4145900.86	UCART1	200.23
217	564797.04	4145900.86	UCART1	196.74
218	564847.04	4145900.86	UCART1	191.83
219	564897.04	4145900.86	UCART1	190.97
220	564947.04	4145900.86	UCART1	191.44

221	564997.04	4145900.86	UCART1	179.95
222	565047.04	4145900.86	UCART1	176.72
223	565097.04	4145900.86	UCART1	178.73
224	565147.04	4145900.86	UCART1	176.46
225	565197.04	4145900.86	UCART1	173.14
226	565247.04	4145900.86	UCART1	167.49
227	565297.04	4145900.86	UCART1	161.81
228	565347.04	4145900.86	UCART1	157.62
229	565397.04	4145900.86	UCART1	151.63
230	565447.04	4145900.86	UCART1	150.14
231	565497.04	4145900.86	UCART1	147.97
232	564497.04	4145950.86	UCART1	222.97
233	564547.04	4145950.86	UCART1	219.53
234	564597.04	4145950.86	UCART1	215.86
235	564647.04	4145950.86	UCART1	213.42
236	564697.04	4145950.86	UCART1	205.67
237	564747.04	4145950.86	UCART1	199.91
238	564797.04	4145950.86	UCART1	196.02
239	564847.04	4145950.86	UCART1	196.19
240	564897.04	4145950.86	UCART1	194.89
241	564947.04	4145950.86	UCART1	192.57
242	564997.04	4145950.86	UCART1	187.19
243	565047.04	4145950.86	UCART1	183.11
244	565097.04	4145950.86	UCART1	182.11
245	565147.04	4145950.86	UCART1	176.17
246	565197.04	4145950.86	UCART1	171.05
247	565247.04	4145950.86	UCART1	166.04
248	565297.04	4145950.86	UCART1	162.14
249	565347.04	4145950.86	UCART1	157.71
250	565397.04	4145950.86	UCART1	151.02
251	565447.04	4145950.86	UCART1	147.38
252	565497.04	4145950.86	UCART1	146.28
253	564497.04	4146000.86	UCART1	219.67
254	564547.04	4146000.86	UCART1	216.74
255	564597.04	4146000.86	UCART1	214.18
256	564647.04	4146000.86	UCART1	208.52
257	564697.04	4146000.86	UCART1	201.01
258	564747.04	4146000.86	UCART1	201.96

259	564797.04	4146000.86	UCART1	202.34
260	564847.04	4146000.86	UCART1	200.39
261	564897.04	4146000.86	UCART1	198.74
262	564947.04	4146000.86	UCART1	192.04
263	564997.04	4146000.86	UCART1	193.34
264	565047.04	4146000.86	UCART1	186.30
265	565097.04	4146000.86	UCART1	178.53
266	565147.04	4146000.86	UCART1	170.53
267	565197.04	4146000.86	UCART1	164.67
268	565247.04	4146000.86	UCART1	159.31
269	565297.04	4146000.86	UCART1	157.06
270	565347.04	4146000.86	UCART1	152.61
271	565397.04	4146000.86	UCART1	149.14
272	565447.04	4146000.86	UCART1	146.08
273	565497.04	4146000.86	UCART1	144.18
274	564497.04	4146050.86	UCART1	227.27
275	564547.04	4146050.86	UCART1	220.75
276	564597.04	4146050.86	UCART1	215.86
277	564647.04	4146050.86	UCART1	211.66
278	564697.04	4146050.86	UCART1	211.66
279	564747.04	4146050.86	UCART1	212.54
280	564797.04	4146050.86	UCART1	208.26
281	564847.04	4146050.86	UCART1	203.48
282	564897.04	4146050.86	UCART1	205.51
283	564947.04	4146050.86	UCART1	198.24
284	564997.04	4146050.86	UCART1	199.31
285	565047.04	4146050.86	UCART1	186.59
286	565097.04	4146050.86	UCART1	179.23
287	565147.04	4146050.86	UCART1	171.32
288	565197.04	4146050.86	UCART1	161.77
289	565247.04	4146050.86	UCART1	156.11
290	565297.04	4146050.86	UCART1	151.15
291	565347.04	4146050.86	UCART1	147.40
292	565397.04	4146050.86	UCART1	146.64
293	565447.04	4146050.86	UCART1	145.04
294	565497.04	4146050.86	UCART1	142.79
295	564497.04	4146100.86	UCART1	222.06
296	564547.04	4146100.86	UCART1	216.06

297	564597.04	4146100.86	UCART1	212.83
298	564647.04	4146100.86	UCART1	208.75
299	564697.04	4146100.86	UCART1	213.16
300	564747.04	4146100.86	UCART1	214.09
301	564797.04	4146100.86	UCART1	208.39
302	564847.04	4146100.86	UCART1	205.85
303	564897.04	4146100.86	UCART1	209.67
304	564947.04	4146100.86	UCART1	213.20
305	564997.04	4146100.86	UCART1	204.42
306	565047.04	4146100.86	UCART1	175.91
307	565097.04	4146100.86	UCART1	178.77
308	565147.04	4146100.86	UCART1	171.36
309	565197.04	4146100.86	UCART1	163.25
310	565247.04	4146100.86	UCART1	156.00
311	565297.04	4146100.86	UCART1	149.42
312	565347.04	4146100.86	UCART1	146.17
313	565397.04	4146100.86	UCART1	144.80
314	565447.04	4146100.86	UCART1	143.60
315	565497.04	4146100.86	UCART1	141.10
316	564497.04	4146150.86	UCART1	218.22
317	564547.04	4146150.86	UCART1	216.46
318	564597.04	4146150.86	UCART1	217.25
319	564647.04	4146150.86	UCART1	217.00
320	564697.04	4146150.86	UCART1	215.69
321	564747.04	4146150.86	UCART1	211.19
322	564797.04	4146150.86	UCART1	209.12
323	564847.04	4146150.86	UCART1	207.86
324	564897.04	4146150.86	UCART1	210.07
325	564947.04	4146150.86	UCART1	217.17
326	564997.04	4146150.86	UCART1	177.13
327	565047.04	4146150.86	UCART1	168.50
328	565097.04	4146150.86	UCART1	176.11
329	565147.04	4146150.86	UCART1	169.60
330	565197.04	4146150.86	UCART1	162.29
331	565247.04	4146150.86	UCART1	155.50
332	565297.04	4146150.86	UCART1	148.87
333	565347.04	4146150.86	UCART1	145.84
334	565397.04	4146150.86	UCART1	144.11

335	565447.04	4146150.86	UCART1	142.76
336	565497.04	4146150.86	UCART1	140.39
337	564497.04	4146200.86	UCART1	223.17
338	564547.04	4146200.86	UCART1	224.87
339	564597.04	4146200.86	UCART1	225.04
340	564647.04	4146200.86	UCART1	221.84
341	564697.04	4146200.86	UCART1	214.21
342	564747.04	4146200.86	UCART1	211.99
343	564797.04	4146200.86	UCART1	215.10
344	564847.04	4146200.86	UCART1	217.55
345	564897.04	4146200.86	UCART1	209.62
346	564947.04	4146200.86	UCART1	201.75
347	564997.04	4146200.86	UCART1	194.05
348	565047.04	4146200.86	UCART1	176.15
349	565097.04	4146200.86	UCART1	168.07
350	565147.04	4146200.86	UCART1	164.16
351	565197.04	4146200.86	UCART1	157.14
352	565247.04	4146200.86	UCART1	151.25
353	565297.04	4146200.86	UCART1	148.35
354	565347.04	4146200.86	UCART1	145.56
355	565397.04	4146200.86	UCART1	143.47
356	565447.04	4146200.86	UCART1	142.10
357	565497.04	4146200.86	UCART1	140.09
358	564497.04	4146250.86	UCART1	228.71
359	564547.04	4146250.86	UCART1	226.28
360	564597.04	4146250.86	UCART1	223.19
361	564647.04	4146250.86	UCART1	217.71
362	564697.04	4146250.86	UCART1	213.13
363	564747.04	4146250.86	UCART1	215.43
364	564797.04	4146250.86	UCART1	224.96
365	564847.04	4146250.86	UCART1	220.04
366	564897.04	4146250.86	UCART1	202.13
367	564947.04	4146250.86	UCART1	189.23
368	564997.04	4146250.86	UCART1	196.66
369	565047.04	4146250.86	UCART1	179.55
370	565097.04	4146250.86	UCART1	169.93
371	565147.04	4146250.86	UCART1	162.74
372	565197.04	4146250.86	UCART1	157.06

373	565247.04	4146250.86	UCART1	148.11
374	565297.04	4146250.86	UCART1	146.05
375	565347.04	4146250.86	UCART1	144.97
376	565397.04	4146250.86	UCART1	143.94
377	565447.04	4146250.86	UCART1	141.88
378	565497.04	4146250.86	UCART1	139.06
379	564497.04	4146300.86	UCART1	225.45
380	564547.04	4146300.86	UCART1	222.23
381	564597.04	4146300.86	UCART1	218.48
382	564647.04	4146300.86	UCART1	214.05
383	564697.04	4146300.86	UCART1	210.08
384	564747.04	4146300.86	UCART1	212.81
385	564797.04	4146300.86	UCART1	217.47
386	564847.04	4146300.86	UCART1	204.79
387	564897.04	4146300.86	UCART1	197.28
388	564947.04	4146300.86	UCART1	185.17
389	564997.04	4146300.86	UCART1	180.47
390	565047.04	4146300.86	UCART1	173.75
391	565097.04	4146300.86	UCART1	166.74
392	565147.04	4146300.86	UCART1	160.58
393	565197.04	4146300.86	UCART1	157.15
394	565247.04	4146300.86	UCART1	151.92
395	565297.04	4146300.86	UCART1	148.45
396	565347.04	4146300.86	UCART1	147.22
397	565397.04	4146300.86	UCART1	144.23
398	565447.04	4146300.86	UCART1	141.13
399	565497.04	4146300.86	UCART1	138.33
400	564497.04	4146350.86	UCART1	220.90
401	564547.04	4146350.86	UCART1	218.11
402	564597.04	4146350.86	UCART1	213.82
403	564647.04	4146350.86	UCART1	209.47
404	564697.04	4146350.86	UCART1	204.68
405	564747.04	4146350.86	UCART1	198.85
406	564797.04	4146350.86	UCART1	194.44
407	564847.04	4146350.86	UCART1	189.68
408	564897.04	4146350.86	UCART1	187.44
409	564947.04	4146350.86	UCART1	183.39
410	564997.04	4146350.86	UCART1	179.18

411	565047.04	4146350.86	UCART1	164.41
412	565097.04	4146350.86	UCART1	161.43
413	565147.04	4146350.86	UCART1	159.49
414	565197.04	4146350.86	UCART1	156.79
415	565247.04	4146350.86	UCART1	153.36
416	565297.04	4146350.86	UCART1	150.62
417	565347.04	4146350.86	UCART1	146.73
418	565397.04	4146350.86	UCART1	143.71
419	565447.04	4146350.86	UCART1	140.01
420	565497.04	4146350.86	UCART1	137.35
421	564497.04	4146400.86	UCART1	216.41
422	564547.04	4146400.86	UCART1	212.41
423	564597.04	4146400.86	UCART1	210.56
424	564647.04	4146400.86	UCART1	206.87
425	564697.04	4146400.86	UCART1	197.24
426	564747.04	4146400.86	UCART1	193.46
427	564797.04	4146400.86	UCART1	187.86
428	564847.04	4146400.86	UCART1	183.89
429	564897.04	4146400.86	UCART1	179.40
430	564947.04	4146400.86	UCART1	175.77
431	564997.04	4146400.86	UCART1	163.33
432	565047.04	4146400.86	UCART1	157.71
433	565097.04	4146400.86	UCART1	156.73
434	565147.04	4146400.86	UCART1	156.22
435	565197.04	4146400.86	UCART1	154.79
436	565247.04	4146400.86	UCART1	152.53
437	565297.04	4146400.86	UCART1	150.46
438	565347.04	4146400.86	UCART1	148.51
439	565397.04	4146400.86	UCART1	139.39
440	565447.04	4146400.86	UCART1	136.50
441	565497.04	4146400.86	UCART1	136.89
442	564894.21	4145910.71		191.86
443	565024.05	4145826.29		179.68
444	565060.92	4145808.92		176.09
445	565120.05	4145844.27		171.89
446	565151.75	4145830.56		172.08
447	565174.60	4145825.68		171.99
448	565156.01	4145882.98		174.91

449	565066.71	4145924.73	181.62
450	565081.04	4145914.06	181.05
451	565106.64	4145915.28	181.17
452	565079.35	4145801.99	174.47

Plant Boundary Receptors

Receptor Groups

Record Number	Group ID	Group Description
1	UCART1	Receptors generated from Uniform Cartesian Grid

Results Summary

C:\Lakes\JeffersonAve_HRA_20190725\JeffersonAve_HRA_20190725.isc

PM2.5 - Concentration - Source Group: Y1ALL

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
PERIOD		0.02661	ug/m^3	564997.04	4145850.86	181.64	1.80	281.85	

PM2.5 - Concentration - Source Group: Y1LOT10

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
PERIOD		0.00759	ug/m^3	565097.04	4145850.86	171.97	1.80	281.85	

PM2.5 - Concentration - Source Group: Y1OFF

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
PERIOD		0.00003	ug/m^3	564797.04	4145850.86	196.12	1.80	281.85	

PM2.5 - Concentration - Source Group: Y1ON

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
PERIOD		0.02648	ug/m^3	564997.04	4145850.86	181.64	1.80	281.85	

Source Pathway - Source Inputs

Polygon Area Sources

Source Type: AREA POLY
Source: PAREA2 (LOT10)

Base Elevation (Optional)	Release Height [m]	Emission Rate [g/ (s-m^2)]	Initial Vertical Dim. [m]	Number of Vertices (or sides)	X Coordinate for Vertices [m]	Y Coordinate for Vertices [m]
175.82	5.00	1.00E-7		4	565083.34	4145883.18
		1.00E-7			565074.75	4145867.77
		1.00E-7			565094.79	4145857.64
		1.00E-7			565103.15	4145876.36

Source Type: AREA POLY
Source: PAREA1 (LOT1-9)

Base Elevation (Optional)	Release Height [m]	Emission Rate [g/ (s-m^2)]	Initial Vertical Dim. [m]	Number of Vertices (or sides)	X Coordinate for Vertices [m]	Y Coordinate for Vertices [m]
194.29	5.00	4.59E-8		10	564912.48	4145945.94
		4.59E-8			564967.52	4145987.55
		4.59E-8			564993.68	4145967.02
		4.59E-8			565009.03	4145938.56
		4.59E-8			565068.15	4145888.25
		4.59E-8			565059.56	4145879.22
		4.59E-8			565041.72	4145890.45
		4.59E-8			565006.72	4145870.85
		4.59E-8			564964.22	4145887.81
		4.59E-8			564949.25	4145917.09

Source Pathway - Source Inputs

Line Area Sources

Source Type: LINE AREA

Source: ARLN1

Length of Side [m]	Emission Rate [g/ s]	Initial Vertical Dimension [m]	X Coordinate for Points [m]	Y Coordinate for points [m]	Base Elevation [m]	Release Height [m]
8.53	1.44E-10		565079.36	4145898.31	177.60	4.15
			565062.23	4145904.80	178.64	4.15
			565041.11	4145928.39	180.74	4.15
			565024.05	4145964.35	185.20	4.15
			565004.24	4145985.38	191.46	4.15
			564972.23	4146002.75	189.54	4.15
			564951.51	4145996.96	190.39	4.15
			564899.09	4145963.13	195.38	4.15
			564876.96	4145949.10	194.87	4.15
			564832.05	4145941.78	195.82	4.15
			564763.95	4145842.37	197.88	4.15
			564736.76	4145791.58	200.38	4.15
			564733.61	4145767.48	200.12	4.15

Source Pathway - Source Inputs

Area Sources Generated from Line Sources

Line Source ID	Area Source ID	X Coordinate [m]	Y Coordinate [m]	Release Height [m]	Length of Side [m]	Angle [deg]	Base Elevation [m]	Initial Sigma Z [m]
ARLN1	A0000001	565080.87	4145902.30	4.15	18.32	200.73	178.12	
	A0000002	565065.41	4145907.64	4.15	31.66	228.17	179.69	
	A0000003	565044.97	4145930.22	4.15	39.81	244.61	182.97	
	A0000004	565027.15	4145967.28	4.15	28.89	226.71	188.33	
	A0000005	565006.27	4145989.13	4.15	36.41	208.50	190.50	
	A0000006	564971.09	4146006.86	4.15	21.52	164.39	189.97	
	A0000007	564949.20	4146000.55	4.15	62.39	147.16	192.89	
	A0000008	564896.80	4145966.74	4.15	26.20	147.61	195.13	
	A0000009	564876.27	4145953.31	4.15	45.51	170.74	195.35	
	A0000010	564828.53	4145944.19	4.15	60.25	124.41	196.34	
	A0000011	564794.48	4145894.49	4.15	60.25	124.41	197.37	
	A0000012	564760.19	4145844.38	4.15	57.61	118.16	199.13	
	A0000013	564732.53	4145792.14	4.15	24.31	97.45	200.25	

Source Pathway

Building Downwash Information

Option not in use

Emission Rate Units for Output

For Concentration

Unit Factor:	1E6
Emission Unit Label:	GRAMS/SEC
Concentration Unit Label:	MICROGRAMS/M**3

Source Groups

Source Group ID:	List of Sources in Group (Source Range or Single Sources)
Y1ON	PAREA1
Y1OFF	ARLN1
Y1LOT10	PAREA2
Y1ALL	PAREA1 PAREA2 ARLN1

Variable Emissions

Hour / Day-of-Week Emission Rate Variation

Scenario: Scenario 2

Source ID: PAREA1

Hour	Mon	Tues	Wed	Thr	Fri	Sat	Sun
1:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
9:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
10:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
11:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
12:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
13:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
14:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
15:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
16:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
17:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
18:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
19:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source ID: PAREA2

Hour	Mon	Tues	Wed	Thr	Fri	Sat	Sun
1:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
9:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
10:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
11:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
12:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
13:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
14:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
15:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
16:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
17:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
18:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
19:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source Pathway

Scenario: Scenario 2

Source ID: **ARLN1**

Hour	Mon	Tues	Wed	Thr	Fri	Sat	Sun
1:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
9:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
10:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
11:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
12:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
13:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
14:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
15:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
16:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
17:00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
18:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
19:00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX C: HRA Calculations

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Appendix C: Construction Health Risk Assessment Calculations (DPM)
4057 Jefferson Ave HRA
Unmitigated Health Risk Calculations - Residential

METHODOLOGY

Dose (Air) = Cair x DBR x A x EF x CF

Where:
- Cair: Chemical concentration in air (µg/m^3)
- DBR: Daily breathing rate (L/kg-day)
- A: Inhalation adsorption factor (unitless)
- EF: Exposure Frequency, days at home / days in year (unitless)
- CF: 10^-6 Conversion Factor (m^3/L and mg/µg)

Cancer Risk (per million) = Dose (Air) x CPF x ASF x (ED/AT) x FAH x 1,000,000

Where:
- Dose: Dose of chemical in the air (µg/m3)
- CPF: Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$
- ASF: Age Sensitivity Factor
- ED: Exposure Duration (years)
- AT: Averaging Time for lifetime cancer risks
- FAH: Fraction of daily time spent at home / school

Risk Parameter Values by Age Bin

Variable	Residential Age Bin				
	3rd Trimester	0-2 Years	2-16 Years	16-30 Years	16-70 Years
DBR	361	1090	572	261	233
A	1	1	1	1	1
EF	0.96	0.96	0.96	0.96	0.96
CF	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06
CPF	1.1	1.1	1.1	1.1	1.1
ASF	10	10	3	1	1
ED	0.25	2	14	14	54
AT	70	70	70	70	70
FAH	1	1	0.72	0.73	0.73

AERMOD Modeled DPM Concentrations (PMI/MEIR)

	PMI			MEIR		
	Conc.	X	Y	Conc.	X	Y
Year 1	0.02649	564997.04	1415850.86	0.01928	565024.05	4145826.29

Risk Assessment Year 1 MEIR

Scenario	AERMOD DPM Conc.	Chronic Hazard Quotient
Year 1	0.01928	0.003856

Year 1 Dose @ Year 1 and 2 MEIR

Age Group	Cair x	BR	A	EF	CF		Dose
3rd Trimester	0.01928	361	1	0.96	1.00E-06	=	6.67E-06
0-2 Years	0.01928	1090	1	0.96	1.00E-06	=	2.02E-05
2-16 Years	0.01928	572	1	0.96	1.00E-06	=	1.06E-05
16-30 Years	0.01928	261	1	0.96	1.00E-06	=	4.83E-06
30-70 Years	0.01928	233	1	0.96	1.00E-06	=	4.31E-06

Year 1 Excess Risk at Year 1 and 2 MEIR

Age Group	Dose	CPF	ASF	ED	AT	FAH	Conversion	Risk
3rd Trimester	6.67E-06	1.1	10	0.25	70	1	1,000,000	0.26
0-2 Years	2.02E-05	1.1	10	0.75	70	1	1,000,000	2.38
0-2 Years	2.02E-05	1.1	10	1.00	70	1	1,000,000	3.17
2-16 Years	1.06E-05	1.1	3	1.00	70	0.72	1,000,000	0.36
16-30 Years	4.83E-06	1.1	1	1.00	70	0.73	1,000,000	0.06
30-70 Years	4.31E-06	1.1	1	1.00	70	0.73	1,000,000	0.05

Total Excess Risk at Year 1 and 2 MEIR

	Infant	Child < 2	Child 2<x<16	Adult 16<x<30	Adult 30<x<70
Year 1	2.64	3.17	0.36	0.06	0.05
Total	2.64	3.17	0.36	0.06	0.05

Note: Infant exposure includes infant and child (0.75 years exposure) in Year 1

Appendix C: Construction Health Risk Assessment Calculations (DPM)
4057 Jefferson Ave HRA
Unmitigated Health Risk Calculations - Residential (Cumulative)

METHODOLOGY

Dose (Air) = Cair x DBR x A x EF x CF

Where:
- Cair: Chemical concentration in air (µg/m^3)
- DBR: Daily breathing rate (L/kg-day)
- A: Inhalation adsorption factor (unitless)
- EF: Exposure Frequency, days at home / days in year (unitless)
- CF: 10^{-6} Conversion Factor (m^3/L and mg/µg)

Cancer Risk (per million) = Dose (Air) x CPF x ASF x (ED/AT) x FAH x 1,000,000

Where:
- Dose: Dose of chemical in the air (µg/m3)
- CPF: Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$
- ASF: Age Sensitivity Factor
- ED: Exposure Duration (years)
- AT: Averaging Time for lifetime cancer risks
- FAH: Fraction of daily time spent at home / school

Risk Parameter Values by Age Bin

Variable	Residential Age Bin				
	3rd Trimester	0-2 Years	2-16 Years	16-30 Years	16-70 Years
DBR	361	1090	572	261	233
A	1	1	1	1	1
EF	0.96	0.96	0.96	0.96	0.96
CF	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06
CPF	1.1	1.1	1.1	1.1	1.1
ASF	10	10	3	1	1
ED	0.25	2	14	14	54
AT	70	70	70	70	70
FAH	1	1	0.72	0.73	0.73

AERMOD Modeled DPM Concentrations (PMI/MEIR)

	PMI			MEIR		
	Conc.	X	Y	Conc.	X	Y
Year 1	0.02661	564997.04	1415850.86	0.01954	565024.05	4145826.29

Risk Assessment Year 1 MEIR

Scenario	AERMOD DPM Conc.	Chronic Hazard Quotient
Year 1	0.01954	0.003908

Year 1 Dose @ Year 1 and 2 MEIR

Age Group	Cair x	BR	A	EF	CF		Dose
3rd Trimester	0.01954	361	1	0.96	1.00E-06	=	6.76E-06
0-2 Years	0.01954	1090	1	0.96	1.00E-06	=	2.04E-05
2-16 Years	0.01954	572	1	0.96	1.00E-06	=	1.07E-05
16-30 Years	0.01954	261	1	0.96	1.00E-06	=	4.89E-06
30-70 Years	0.01954	233	1	0.96	1.00E-06	=	4.37E-06

Year 1 Excess Risk at Year 1 and 2 MEIR

Age Group	Dose	CPF	ASF	ED	AT	FAH	Conversion	Risk
3rd Trimester	6.76E-06	1.1	10	0.25	70	1	1,000,000	0.27
0-2 Years	2.04E-05	1.1	10	0.75	70	1	1,000,000	2.41
0-2 Years	2.04E-05	1.1	10	1.00	70	1	1,000,000	3.21
2-16 Years	1.07E-05	1.1	3	1.00	70	0.72	1,000,000	0.36
16-30 Years	4.89E-06	1.1	1	1.00	70	0.73	1,000,000	0.06
30-70 Years	4.37E-06	1.1	1	1.00	70	0.73	1,000,000	0.05

Total Excess Risk at Year 1 and 2 MEIR

	Infant	Child < 2	Child 2<x<16	Adult 16<x<30	Adult 30<x<70
Year 1	2.67	3.21	0.36	0.06	0.05
Total	2.67	3.21	0.36	0.06	0.05

Note: Infant exposure includes infant and child (0.75 years exposure) in Year 1

Appendix C: Construction Health Risk Assessment Calculations (DPM)
4057 Jefferson Ave HRA
Unmitigated Health Risk Calculations - Student

Dose (Air) = Cair x (BR/BW) x A x EF x CF

Where:
- Cair: Chemical concentration in air (µg/m^3)
- DBR: Daily breathing rate (L/kg-day)
- A: Inhalation adsorption factor (unitless)
- EF: Exposure Frequency, days at school / days in year (unitless)
- CF: 10^{-6} Conversion Factor (m^3/L and mg/µg)

Cancer Risk (per million) = Dose (Air) x CPF x ASF x (ED/AT) x FAH x 1,000,000

Where:
- Dose: Dose of chemical in the air (µg/m3)
- CPF: Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$
- ASF: Age Sensitivity Factor
- ED: Exposure Duration (years)
- AT: Averaging Time for lifetime cancer risks
- FAH: Fraction of daily time spent at school

General Calculation Values

A	1	
EF (0-2)	0.28	(Assumes receptor would be at site 2 days per week; 104 days at school out of 365 days/year)
EF (2-16)	0.57	(Assumes receptor would be at site 4 days per week; 208 days at school out of 365 days/year)
CPF	1.1	Factor is for diesel particulate matter
AT	70	Years

Risk Calculation Values by Age Bin (Daycare / Preschool - 8 Hour Period)

Variable	Residential Age Bin					
	3rd Trimester	0-2 Years	2-9 Years	2-16 Years	16-30 Years	16-70 Years
DBR	N/A	1200	640	520	240	230
ASF	N/A	10	3	3	1	1
ED	N/A	2	7	14	14	54
FAH	N/A	0.17	0.17	0.17	0.17	0.17

Receptor Location

X	Y
565156.01	4145882.98

Construction Risk Calculations: Child (School inhalataion based on 1 year of exposure)

Age Group	Cair x	BR	A	EF	CF		Dose
0-2 Years	0.00185	1200	1	0.28	1.00E-06	=	6.33E-07
2-9 Years	0.00185	640	1	0.57	1.00E-06	=	6.75E-07

Age Group	Dose	CPF	ASF	ED	AT	FAH	Conversion	Risk
0-2 Years	6.33E-07	1.1	10	1	70	0.17	1,000,000	0.02
2-9 Years	6.75E-07	1.1	3	1	70	0.17	1,000,000	0.01

Chronic Hazard Quotient ---> 0.000

Appendix C: Construction Health Risk Assessment Calculations (DPM)
4057 Jefferson Ave HRA
Unmitigated Health Risk Calculations - Student (Cumulative)

Dose (Air) = Cair x (BR/BW) x A x EF x CF

Where:
- Cair: Chemical concentration in air (µg/m^3)
- DBR: Daily breathing rate (L/kg-day)
- A: Inhalation adsorption factor (unitless)
- EF: Exposure Frequency, days at school / days in year (unitless)
- CF: 10^-6 Conversion Factor (m^3/L and mg/µg)

Cancer Risk (per million) = Dose (Air) x CPF x ASF x (ED/AT) x FAH x 1,000,000

Where:
- Dose: Dose of chemical in the air (µg/m3)
- CPF: Cancer Potency Factor (mg/kg-day)$^{-1}$
- ASF: Age Sensitivity Factor
- ED: Exposure Duration (years)
- AT: Averaging Time for lifetime cancer risks
- FAH: Fraction of daily time spent at school

General Calculation Values

A	1	
EF (0-2)	0.28	(Assumes receptor would be at site 2 days per week; 104 days at school out of 365 days/year)
EF (2-16)	0.57	(Assumes receptor would be at site 4 days per week; 208 days at school out of 365 days/year)
CPF	1.1	Factor is for diesel particulate matter
AT	70	Years

Risk Calculation Values by Age Bin (Daycare / Preschool - 8 Hour Period)

Variable	Residential Age Bin					
	3rd Trimester	0-2 Years	2-9 Years	2-16 Years	16-30 Years	16-70 Years
DBR	N/A	1200	640	520	240	230
ASF	N/A	10	3	3	1	1
ED	N/A	2	7	14	14	54
FAH	N/A	0.17	0.17	0.17	0.17	0.17

Receptor Location

X	Y
565156.01	4145882.98

Construction Risk Calculations: Child (School inhalataion based on 1 year of exposure)

Age Group	Cair x	BR	A	EF	CF		Dose
0-2 Years	0.00256	1200	1	0.28	1.00E-06	=	8.75E-07
2-9 Years	0.00256	640	1	0.57	1.00E-06	=	9.34E-07

Age Group	Dose	CPF	ASF	ED	AT	FAH	Conversion	Risk
0-2 Years	8.75E-07	1.1	10	1	70	0.17	1,000,000	0.02
2-9 Years	9.34E-07	1.1	3	1	70	0.17	1,000,000	0.01

Chronic Hazard Quotient ---> 0.001