APPENDIX E

AIR QUALITY AND GREENHOUSE GAS ASSESSMENT

CAROLAN AVENUE/ROLLINS ROAD AIR QUALITY AND GHG EMISSIONS ASSESSMENT

Burlingame, California

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Project 14-072

Introduction

The purpose of this report is to address air quality and greenhouse gas emission impacts associated with the proposed Carolan/Rollins Road residential project in Burlingame, California. The proposed project would develop new apartments and townhomes in central Burlingame near Caltrain and U.S. Highway 101.

The project site is located at 1008-1028 Carolan Avenue and 1007-1025 Rollin Road, consisting of four separate parcels that total 5.4 acres. Currently, the site is occupied by automotive repair, rental, and sales facilities in eight existing buildings, ranging from 3,480 to 53,140 square feet (sf). These uses would be demolished. The project proposes 22 two-story townhome condominiums in four buildings, 268 apartments (one-, two- and three bedroom apartments) in two 5-story buildings, semi-subterranean parking, amenities, landscaping, and a public pedestrian paseo.

The project will offer the following transportation amenities for residents and guests that include:

- Electric vehicle charging stations
- Provision for two car-sharing vehicle spaces (e.g., Zipcar)
- Secure bicycle parking spaces for apartment residents
- Guest bicycle parking spaces
- Bike repair station
- Tenant web portal for carpooling
- Business center and conference room for telecommuting

The project will provide a range of sustainability measures, such as electric vehicle charging stations, convenient bicycle amenities, an on-site business center to support telecommuting, and water-conserving landscaping and irrigation systems. The project will install "purple" irrigation lines to connect to recycled water should public recycled water service become available in the future. In addition, the project is located within walking distance of shopping, parks, restaurants, Caltrain, and other public transit.

The project would be constructed in compliance with the new 2013 California Green Building Standards Code (Title 24). The new Title 24 standards are 10-25 % more energy efficient than the 2008 Title 24 standards for residential construction, including even more efficient windows, insulation, lighting, ventilation systems, and other features that reduce water and energy consumption.

Air quality impacts due to temporary construction emissions and as a result of direct and indirect air pollutant and greenhouse gas (GHG) emissions from users of the proposed residences were analyzed. Impacts of toxic air contaminants (TACs) on future residences were also evaluated. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD).

Setting

The project is located in San Mateo County that is part of the San Francisco Bay Area Air Basin. Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

High ozone levels are caused by the cumulative emissions of reactive organic gases (ROG) and nitrogen oxides (NOx). These precursor pollutants react under certain meteorological conditions to form high ozone levels. Controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce ozone levels. The highest ozone levels in the Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. High ozone levels aggravate respiratory and cardiovascular diseases, reduced lung function, and increase coughing and chest discomfort.

Particulate matter is another problematic air pollutant of the Bay Area. Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 micrometers or less (PM_{10}) and fine particulate matter where particles have a diameter of 2.5 micrometers or less ($PM_{2.5}$). Elevated concentrations of PM_{10} and $PM_{2.5}$ are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function growth in children.

Toxic air contaminants (TACs) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter [DPM] near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and Federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the state's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of DPM. Several of these regulatory programs affect medium and heavy duty diesel trucks that represent the bulk of DPM emissions from California highways. These regulations include the solid waste collection vehicle (SWCV) rule, in-use public and utility fleets, and the heavy-duty diesel truck and bus regulations. In 2008, CARB approved a new regulation to reduce emissions of DPM and nitrogen oxides from existing on-road heavy-duty

diesel fueled vehicles.[1] The regulation requires affected vehicles to meet specific performance requirements between 2014 and 2023, with all affected diesel vehicles required to have 2010 model-year engines or equivalent by 2023. These requirements are phased in over the compliance period and depend on the model year of the vehicle.

The BAAQMD is the regional agency tasked with managing air quality in the region. At the State level, the CARB (a part of the California Environmental Protection Agency [EPA]) oversees regional air district activities and regulates air quality at the State level. The BAAQMD has published the California Environmental Quality Act (CEQA) Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.[2]

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. Thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were posted on BAAQMD's website and included in the Air District's updated CEQA Guidelines (updated May 2011). The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 1.

BAAQMD's adoption of significance thresholds contained in the 2011 CEQA Air Quality Guidelines was called into question by an order issued March 5, 2012, in California Building Industry Association (CBIA) v. BAAQMD (Alameda Superior Court Case No. RGI0548693). The order requires BAAQMD to set aside its approval of the thresholds until it has conducted environmental review under CEQA. The ruling made in the case concerned the environmental impacts of adopting the thresholds and how the thresholds would indirectly affect land use development patterns. In August 2013, the Appellate Court struck down the lower court's order to set aside the thresholds. However, this litigation remains pending as the California Supreme Court recently accepted a portion of CBIA's petition to review the appellate court's decision to uphold BAAQMD's adoption of the thresholds. The specific portion of the argument to be considered is in regard to whether CEQA requires consideration of the effects of the environment on a project (as contrasted to the effects of a proposed project on the environment). Therefore, the significance thresholds contained in the 2011 CEQA Air Quality Guidelines are applied to this project.

[1] Available online: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm. Accessed: April 30, 2014.
[2] Bay Area Air Quality Management District. 2011. BAAQMD CEQA Air Quality Guidelines. May.

Table 1. Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
Criteria Air Pollutants			
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards for New Sources			
Excess Cancer Risk	10 per one million	10 per one million	
Chronic or Acute Hazard Index	1.0	1.0	
Incremental annual average $PM_{2.5}$	0.3 $\mu g/m^3$	0.3 $\mu g/m^3$	
Health Risks and Hazards for Sensitive Receptors (Cumulative from all sources within 1,000 foot zone of influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	100 per one million		
Chronic Hazard Index	10.0		
Annual Average $PM_{2.5}$	0.8 $\mu g/m^3$		
Greenhouse Gas Emissions			
GHG Annual Emissions	1,100 metric tons or 4.6 metric tons per capita		

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less; and GHG = greenhouse gas.

Impacts and Mitigation Measures

Impact 1: Conflict with or obstruct implementation of the applicable air quality plan? ***Less than significant.***

The most recent clean air plan is the *Bay Area 2010 Clean Air Plan* that was adopted by BAAQMD in September 2010. The proposed project would not conflict with the latest Clean Air planning efforts since (1) the project would have emissions well below the BAAQMD thresholds (see Impact 2), (2) development of the project site would be considered urban "infill", (3) development would occur near employment centers and shopping, and (4) development would be near existing transit with regional connections. The project, at 268 apartment units and 22 townhomes is too small to exceed any of the significance thresholds and, thus, not required to incorporate project-specific transportation control measures listed in the latest Clean Air Plan.

Impact 2: 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)? ***Less than significant with construction period mitigation.***

The Bay Area is considered a non-attainment area for ground-level ozone and fine particulate matter ($PM_{2.5}$) under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for respirable particulates or particulate matter with a diameter of less than 10 micrometers (PM_{10}) under the California Clean Air Act, but not the Federal act. The area has attained both State and Federal ambient air quality standards for carbon monoxide. As part of an effort to attain and maintain ambient air quality standards for ozone and PM_{10}, the BAAQMD has established thresholds of significance for these air pollutants and their precursors. These thresholds are for ozone precursor pollutants (ROG and NOx), PM_{10} and $PM_{2.5}$, and apply to both construction period and operational period impacts.

The California Emission Estimator Model (CalEEMod), version 2013.2.2 was used to model construction and operational period emissions. The model basis the emissions from each land use on the type and size. Users have the ability to override most defaults with project specific information. Project land use inputs included:

268 "Apartments Mid Rise,"
22 "Condo/Townhouse,"
462-space "Enclosed Parking with Elevator," and
10-space "Parking Lot"

The project lot acreage of 5.4 acres was assigned to the largest land use, which was the "Apartments Mid Rise." Model defaults for San Mateo County were used.

Construction Period Emissions

Construction emissions would occur as exhaust emissions from construction equipment, truck travel and worker traffic and from fugitive dust emissions associated with demolition and ground disturbance. These two types of emissions are addressed separately.

Construction Exhaust Emissions

Construction of the project is anticipated to begin in 2017 and last through 2018 for a total of 516 workdays. Construction phases include: Demolition of 34,436 sf of existing uses, Site Preparation, Grading/Excavation, Trenching, Building-Exterior, Building-Interior/Architectural Coating, and Paving. A schedule of construction activities, by phase, along with a list of the equipment to be used was provided. The type, size, number of hours per day and number of days for each piece of equipment were provided. The average number of hours per day that the equipment would operate was computed for each phase. The construction equipment list and schedule are provided in *Attachment 1*.

The project is anticipated to involve the export of 27,000 cubic yards of material during grading. The model default number of truck trips and trip lengths were used, based on the amount of soil

exported. Approximately 12,771 cubic yards (cy) of cement are anticipated to be used during the building phase. This was computed to involve 2,838 truck trips, assuming each truck would carry 9 cy of cement. Vendor trip distances of 7.3 miles were assigned to cement hauling trips. The project would also involve the import of 2,000 cy of asphalt that was computed to involve 444 truck trips. Vendor trip lengths were also assigned to these trips. Otherwise, model default worker and vendor trip generation and trip lengths were used.

ROG emissions from architectural coatings were adjusted from 250 grams per liter of VOC[3] to 150 grams per liter to account for BAAQMD's Regulation 8, Rule 3 that applies to the volatile organic compound content of paints and solvents sold and used in the region.

Table 2 reports the annual and average daily emissions. Average daily emissions were computed by dividing the total construction period emissions by the number of anticipated construction days. Much of the emissions were anticipated to occur over about 516 work days using CalEEMod defaults. A shown in Table 2, construction exhaust emissions would not exceed BAAQMD thresholds for average daily emissions.

Table 2. Project Average Daily Construction Emissions

Description	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
2017 Emissions in tons	0.31	2.30	0.08	0.08
2018 Emissions in tons	4.15	0.97	0.04	0.04
Average Daily Emissions (pounds per day)*	17.3	12.7	0.5	0.5
BAAQMD Thresholds (pounds per day)	*54*	*54*	*82*	*54*
Exceed Threshold?	No	No	No	No

*Assuming 516 construction workdays

Construction Fugitive Dust

Construction activities, particularly during site preparation and grading would temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soil. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local meteorological conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site. Typical winds during late spring through summer are from the northwest. Nearby receptors could be adversely affected by dust generated during construction activities. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are employed to reduce these emissions. *Mitigation Measure 1 would implement BAAQMD-recommended best management practices.*

[3] VOC = volatile organic gases, which mostly include ROG or reactive organic compounds,

Mitigation Measure AQ-1: Include measures to control dust emissions.

Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality and fugitive dust-related impacts associated with grading and new construction to a less than significant. The contractor shall implement the following Best Management Practices that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

4. All vehicle speeds on unpaved roads shall be limited to 15 mph.

5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible and feasible. Building pads shall be laid as soon as possible and feasible, as well, after grading unless seeding or soil binders are used.

6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

<u>Operational Emissions</u>

The CalEEMod model along with the project vehicle trip generation rates were used to predict operational period air pollutant emissions associated with operation of a fully developed site under the proposed project. The model uses mobile emission factors from the California Air Resources Board's EMFAC2011 model. The model includes the effects of regulations that increase fleet efficiency (reducing fuel consumption) and the low carbon fuel standard. This model is sensitive to the year selected, since vehicle emissions have and continue to be reduced due to more stringent exhaust controls, newer vehicle fleet, fuel efficiency standards and low

carbon fuels. Adjustments to the modeling are described below along with the methodology to predict emissions associated with the project fueling station. CalEEMod input and output worksheets are provided in *Attachment 1*.

Year of Analysis

Emissions associated with vehicle travel depend on the year of analysis. The earlier the year, the higher the emission rates as CalEEMod uses the California Air Resources Board's EMFAC2011 motor vehicle emissions model. This model assumes reduced emission rates as newer vehicles with lower emission rates replace older, more polluting vehicles through attrition of the overall vehicle fleet. The earliest full year the project could possibly be operational would be 2019. Full build out occurring later than 2019 would result in lower emissions.

Trip Generation Rates and Travel Distances

CalEEMod allows the user to enter specific trip generation rates. Hexagon Transportation Consultants provided the trip generation rate for the project in the Transportation Impact Assessment (TIA),[4] which was entered into the model. These trip rates were assumed to represent weekday trip generation.

Summary of Project Operational Emissions

Table 3 reports the predicted average daily operational emissions and Table 4 reports annual emissions. As shown in Tables 3 and 4, average daily and annual emissions associated with project operation would not exceed the BAAQMD significance thresholds. Therefore, this impact is considered *less than significant*.

Table 3. Daily Air Pollutant Emissions from Operation of the Project (pounds/day)

Scenario	ROG	NO_X	PM_{10}	$PM_{2.5}$
Proposed Project 2019	18.4	9.8	9.2	2.8
Daily Emission Thresholds	*54*	*54*	*82*	*54*
Exceed Threshold?	No	No	No	No

Table 4. Annual Air Pollutant Emissions from Operation of the Project (tons/year)

Scenario	ROG	NO_X	PM_{10}	$PM_{2.5}$
Proposed Project 2019	3.35	1.79	1.67	0.51
Annual Emission Thresholds	*10*	*10*	*15*	*10*
Exceed Threshold?	No	No	No	No

Impact 3: Violate any air quality standard or contribute substantially to an existing or projected air quality violation? ***Less than significant.***

[4] Hexagon Transportation Consultants. 2014. *Carolan Avenue And Rollins Road Residential Development Draft Traffic Impact Analysis Report.* August 21.

As discussed under Impact 2, the project would have emissions less than the significance thresholds adopted by BAAQMD for evaluating impacts related to ozone and particulate matter. Therefore, the project would not contribute substantially to existing or projected violations of those standards. Carbon monoxide emissions from traffic generated by the project would be the pollutant of greatest concern at the local level. Congested intersections with a large volume of traffic have the greatest potential to cause high-localized concentrations of carbon monoxide. Air pollutant monitoring data indicate that carbon monoxide levels have been at healthy levels (i.e., below State and federal standards) in the Bay Area since the early 1990s. As a result, the region has been designated as attainment for the standard. The highest measured level over any 8-hour averaging period during the last 3 years in the Bay Area is less than 3.0 parts per million (ppm), compared to the ambient air quality standard of 9.0 ppm. The project would generate a relatively small amount of traffic (100 trips during the busiest hour). Intersections affected by the project would have traffic volumes less than the BAAQMD screening criteria and, thus, would not cause a violation of an ambient air quality standard or have a considerable contribution to cumulative violations of these standards.[5]

> **Impact 4:** Expose sensitive receptors to substantial pollutant concentrations? ***Less than significant with construction and operational period mitigation.***

Sensitive receptors are locations where an identifiable subset of the general population (children, asthmatics, the elderly, and the chronically ill) that is at greater risk than the general population to the effects of air pollutants are likely to be exposed. These locations include residences, schools, playgrounds, childcare centers, retirement homes, hospitals, and medical clinics. Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. However, existing sources of TACs, such as U.S. Highway 101, the Caltrain railroad line, stationary sources, and surface streets, have the potential to impact proposed future residences of the project. Construction activity would generate dust and equipment exhausts on a temporary basis. Impacts from project construction and existing sources of air pollution are addressed.

Project Construction Activity

The California Emissions Estimator Model (CalEEMod) Version 2013.2.2 was used to predict annual emissions for construction. The CalEEMod modeling for construction is described under Impact AQ-2.

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. Diesel exhaust poses both a health and nuisance impact to nearby receptors. A health risk assessment of the project construction activities was conducted that evaluated potential health effects of sensitive receptors from construction emissions of DPM.[6] A dispersion model was used to predict the off-site DPM concentrations resulting from project construction at sensitive receptors so that lifetime cancer risks could be predicted. The closest off-site sensitive receptors are residences adjacent to the eastern and western project site

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

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

boundaries. Figure 1 shows the project site and sensitive receptor locations (residences) used in the air quality dispersion modeling analysis where potential health impacts were evaluated.

Construction Emissions

Construction of the project is anticipated to occur over about a two year period starting in January 2017. The CalEEMod model provided total annual $PM_{2.5}$ exhaust emissions (assumed to be diesel particulate matter) for the off-road construction equipment and for exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles), with total emissions of 0.0967 tons (193 pounds) for the entire construction period. The on-road emissions are a result of haul trucks, vendor deliveries, and worker travel and during the various phases of construction. A trip length of 0.3 miles was assumed to represent vehicle travel while at or near the construction site and would occur at the construction site. Fugitive $PM_{2.5}$ dust emissions were calculated by CalEEMod as 0.0371 tons (74 pounds) for the overall construction period. The project emission calculations are provided in *Attachment 1*.

Dispersion Modeling

The U.S. EPA ISCST3 dispersion model was used to predict concentrations of DPM and $PM_{2.5}$ concentrations at existing sensitive receptors (residences) in the vicinity of the project construction area. The ISCST3 dispersion model is one of several BAAQMD-recommended model for use in modeling analysis of these types of emission activities for CEQA projects.[7] Emission sources for the construction site were grouped into two categories, exhaust emissions of DPM and fugitive $PM_{2.5}$ dust emissions. The ISCST3 modeling utilized two area sources to represent the on-site construction emissions, one for DPM exhaust emissions and the other for fugitive $PM_{2.5}$ dust emissions. For the exhaust emissions from construction equipment an emission release height of six meters was used for the area source. The 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 plume rise of the exhaust gases.[8] For modeling fugitive $PM_{2.5}$ emissions, a near-ground level release height of two meters was used for the area source. Emissions from vehicle travel around the project site were included in the modeled area sources. Construction emissions were modeled as occurring daily between 7 a.m. and 4 p.m.

The modeling used a four-year set of hourly meteorological data (2002 - 2005) for the San Mateo Sewage Treatment Plant (STP) prepared by BAAQMD for use with the ISCST3 model. The STP is about 3.6 miles south-southeast of the project site. Annual DPM and $PM_{2.5}$ concentrations from construction activities in 2017 and 2018 were calculated using the model. DPM and $PM_{2.5}$ concentrations were calculated at nearby sensitive receptors at a receptor height of 1.5 meters (4.9 feet) and 4.5 meters (14.8 feet) were used to represent the breathing heights of residents of single family homes and second level residents in apartments, respectively. Figure 1 shows the construction area modeled and locations of nearby sensitive receptors.

[7] Bay Area Air Quality Management District (BAAQMD), 2012, *Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 3.0.* May.

[8] California Air Resources Board (CARB), 2007. *Technical Support Document: Proposed Regulation for In-use Off-Road Diesel Vehicles, Appendix D Health Risk Assessment Methodology*. April 2007.

Predicted Cancer Risk and Hazards

The maximum modeled DPM and $PM_{2.5}$ concentrations occurred at a residence on adjacent to the eastern boundary of the project site on Toyon Drive. The location of this receptor is identified on Figure 1. Increased cancer risks were calculated using the modeled concentrations and BAAQMD recommended risk assessment methods for both a child exposure (3rd trimester through 2 years of age) and adult exposure.[9] The cancer risk calculations were based on applying the BAAQMD recommended age sensitivity factors to the DPM exposures. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing TACs. BAAQMD recommended exposure parameters were used for the cancer risk calculations.[10] Infant and child exposures were assumed to occur at all residences during the entire construction period.

Results of this assessment indicate that for project construction the incremental residential child cancer risk at the maximally exposed individual (MEI) receptor would be 15.4 in one million and the incremental residential adult cancer risk would be 0.8 in one million. The increased cancer risk for a child would be greater than the BAAQMD significance threshold of a cancer risk of 10 in one million or greater and would be considered a *significant impact*.

The maximum modeled annual $PM_{2.5}$ concentration was 0.20 micrograms per cubic meter ($\mu g/m^3$) occurring at the same location as the maximum cancer risk. This $PM_{2.5}$ concentration is lower than the BAAQMD significance threshold of 0.3 $\mu g/m^3$ used to judge the significance of health impacts from $PM_{2.5}$. This would be considered a *less-than-significant* impact.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. Non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). California's Office of Environmental Health and Hazards (OEHHA) has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The chronic inhalation REL for DPM is 5 $\mu g/m^3$. The maximum modeled annual residential DPM concentration was 0.12 $\mu g/m^3$, which is much lower than the REL. The maximum computed hazard index based on this DPM concentration is 0.02 which is much lower than the BAAQMD significance criterion of a hazard index greater than 1.0. This would be considered a *less-than-significant* impact.

Attachment 2 includes the emission calculations used for the area source modeling and the cancer risk calculations.

The project would have a *significant impact* with respect to community risk caused by construction activities. Implementation of Mitigation Measures AQ-1 and AQ-2 would reduce this impact to a level of less than significant.

[9] Bay Area Air Quality Management District (BAAQMD), 2012, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May.

[10] Bay Area Air Quality Management District (BAAQMD), 2010, *Air Toxics NSR Program Health Risk Screening Analysis Guidelines*, January.

Mitigation Measure AQ-2: Diesel Construction Equipment Selection

Implement the following measures to minimize emissions from diesel equipment:

1. All diesel-powered off-road equipment larger than 50 horsepower and operating at the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 2 engines or equivalent;

2. All portable pieces of construction equipment (i.e., air compressors, cement mixers, concrete/industrial saws, generators, and welders) meet U.S. EPA particulate matter emissions standards for Tier 4 engines or equivalent; and

3. Avoid staging equipment within 100 feet of adjacent residences.

Implementation of Mitigation Measure AQ-1 is considered to reduce exhaust emissions and corresponding risk by at five percent. Implementation of Mitigation Measure AQ-2 would substantially reduce on-site diesel exhaust emissions. The computed maximum excess child cancer risk with implementation of Mitigation Measures AQ-1 and AQ-2 would be 4.0 per million. As a result, the project with mitigation measures would have a *less-than-significant* impact with respect to community risk caused by construction activities.

Figure 1. Project Construction Site and Locations of Sensitive Receptors and Maximum Cancer Risks

Project Operation

Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. However, the proposed project would locate new residences near sources of TAC emissions, such as U.S. Highway 101, Caltrain rail line, and several stationary sources that emit TACs. Proximity to busy surface streets is also associated with exposure to source of TACs or $PM_{2.5}$, predominantly from diesel exhaust emissions. The BAAQMD has identified significance thresholds for exposure to TACs and $PM_{2.5}$ as part of its CEQA Air Quality Guidelines. The BAAQMD Guidelines include thresholds to evaluate single source and cumulative source impacts of TACs and $PM_{2.5}$ on proposed sensitive receptors.

U.S. Highway 101 Roadway Community Risk Impacts

Traffic on high volume roadways is a source of TAC emissions that may adversely affect sensitive receptors that reside in close proximity. For roadways, BAAQMD has published screening tables and data to determine if roadways with traffic volumes of over 10,000 vehicles per day may have a significant effect on a proposed project. In the vicinity of the project area U.S. Highway 101 has 240,000 average daily trips (ADT), as reported by Caltrans.[11] A refined analysis of the impacts of TACs and fine particulate matter ($PM_{2.5}$) is necessary to evaluate potential cancer risks and $PM_{2.5}$ concentrations from U.S. Highway 101. A review of the traffic information reported by Caltrans indicates that U.S. Highway 101 traffic includes about 4.4 percent trucks, of which 1.7 percent are considered heavy duty trucks and 2.7 percent are medium duty trucks.

This analysis involved the development of DPM, organic TACs, and $PM_{2.5}$ emissions for traffic on U.S. Highway 101 using the CARB EMFAC2011 emission factor model and the vehicle mix developed from Caltrans data. EMFAC2011 is the most recent version of the CARB motor vehicle emission factor model. DPM emissions are projected to decrease in the future and are reflected in the EMFAC2011 emissions data.

CARB regulations require on-road diesel trucks to be retrofitted with particulate matter controls or replaced to meet new 2010 engine standards that have require low DPM and $PM_{2.5}$ emissions. This regulation will substantially reduce these emissions between 2013 and 2023, with the greatest reductions occurring in 2013 through 2015. While new trucks and buses will meet strict federal standards, this measure is intended to accelerate the rate at which the fleet either turns over so there are more cleaner vehicles on the road, or retrofitted to meet similar standards. With this regulation, older, more polluting trucks would be removed from the roads much quicker. CARB anticipates a 68 percent reduction in $PM_{2.5}$ (including DPM) emission from trucks in 2014 with this regulation.

Emission factors are highly dependent on the year of analysis, with earlier years having higher emission rates, particularly those years prior to 2025. The project would not be occupied until 2019; therefore, the earliest occupancy was assumed to be 2019. Emission factors were developed for the years 2019, 2020, and 2025 using the calculated mix of cars and trucks on

[11] California Department of Transportation, 2013. *2012 Traffic Volumes on the California State Highway System.*

U.S. Highway 101. Default EMFAC2011 vehicle model fleet age distributions for San Mateo County were assumed. Average daily traffic volumes truck percentages were based on Caltrans data for U.S. Highway 101 for 2012.[1,12] Traffic volumes were assumed to increase 1% per year. Average hourly traffic distributions for San Mateo County roadways were developed using the EMFAC model,[13] which were then applied to the average daily traffic volumes to obtain estimated hourly traffic volumes and emissions for U.S. Highway 101.

For all hours of the day, other than during peak A.M. and P.M. periods, an average speed of 65 mph was assumed for all vehicles other than trucks which were assumed to travel at a speed of 60 mph. For 2-hour periods during the peak A.M. and peak P.M. periods, average travel speeds of 25 mph were used for northbound and southbound traffic. The hourly traffic distributions and emission rates used in the analysis are shown in *Attachment 3*.

In addition to evaluating health risks from DPM, the BAAQMD recommends evaluating health effects from total organic gas (TOG) exhaust emissions from tailpipes and from evaporative running losses from non-diesel vehicles.[14] Emissions of TOG were calculated for 2019, 2020, and 2025 using the EMFAC2011 model. These TOG emissions were then used in modeling organic TACs. TOG emissions from both exhaust and running evaporative loses from gasoline vehicles were calculated using EMFAC2011 default model values for San Mateo County along with the traffic volumes and vehicle mixes for U.S. Highway 101. The DPM and TOG emission calculations and emission factors are provided in *Attachment 3*.

Dispersion Modeling

Dispersion modeling of TAC emissions was conducted using the CAL3QHCR model, which is recommended by the BAAQMD for this type of analysis. A four-year set of hourly meteorological data (2002 - 2005) for the San Mateo STP obtained from BAAQMD was used in the modeling. The STP is about 3.6 miles southeast of the project site. Other inputs to the model included road geometry, hourly traffic volumes, and emission factors. North and south bound traffic on U.S. Highway 101 within about 1,000 feet of the project site were evaluated with the model. TAC and $PM_{2.5}$ concentrations were calculated at receptor locations within the project site where apartment units and town homes would be developed. Receptor heights of 1.5 meters (4.9 feet) and 4.8 meters (15.7 feet) were used to represent the breathing heights of residents of ground floor and first floor levels of apartment units and town homes. Concentrations at higher floor levels would be lower than those of the ground and first floor level units. Figure 2 shows the roadway links and residential receptor locations used in the modeling.

[12] Caltrans, 2013. *2012 Annual Average Daily Truck Traffic on the California State Highways.* Available: www.dot.ca.gov/hq/traffops/saferesr/trafdata/

[13] The Burden output from EMFAC2007, CARB's previous version of the EMFAC model, was used for this since the current web-based version of EMFAC2011 does not include Burden type output with hour by hour traffic volume information.

[14] BAAQMD, 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards.* May.

Computed Cancer Risk

Using the modeled long-term average DPM and TOG concentrations, the individual cancer risks were computed using the most recent methods recommended by BAAQMD.[15] The factors used to compute cancer risk are highly dependent on modeled concentrations, exposure period or duration, and the type of receptor. The exposure level is determined by the modeled concentration; however, it has to be averaged over a representative exposure period. The averaging period is dependent on many factors, but mostly the type of sensitive receptor that would reside at a site. This assessment conservatively assumed long-term residential exposures. BAAQMD has developed exposure assumptions for typical types of sensitive receptors. These include nearly continuous exposures of 70 years for residences. The cancer risk calculations for 70-year residential exposures reflect use of BAAQMD's most recent cancer risk calculation method that uses age sensitivity factors in calculating cancer risks. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing TACs. The cancer risk calculations applied age sensitivity weighting factors for each emissions period modeled.

Increased cancer risks were calculated at the ground floor and first floor (Podium) levels for the project apartment units and at the ground level and first floor for the town home units. The maximum increased cancer risks were modeled at the ground-level residential receptor locations closest to Highway 101. Cancer risks are greatest closest to Highway 101 and decrease with distance from the highway. Figures 3 and 4 show the cancer risks for receptors at the ground and first floor levels the project site, respectively.

The maximum increased cancer risk was computed as 23.4 in one million at a town home unit in the northeast corner of the project site (see Figure 3). The maximum increased cancer risks for ground-level and first floor (Podium) level receptors in the apartment units were 22.7 and 20.9 in one million, respectively. Increased cancer risks at the project site would range from 4.6 to 23.4 in one million at ground-level residential locations and from 4.5 to 20.9 in one million at podium level apartment units. As mentioned earlier, cancer risks at higher floor levels of the apartment units would be lower than those at ground level or the podium level. Cancer risks above 10 per million would be considered a significant impact by the BAAQMD. This would be considered a *significant* impact.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. Non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). California's Office of Environmental Health and Hazards (OEHHA) has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The chronic inhalation REL for DPM is 5 $\mu g/m^3$. The maximum modeled annual residential DPM concentration was 0.05 $\mu g/m^3$, which is much lower than the REL. The maximum computed hazard index based on this DPM concentration is 0.01 which is much lower than the BAAQMD significance criterion of a hazard index greater than 1.0. This would be considered a *less than significant* impact.

[15] BAAQMD, 2010. *Air Toxics NSR Program Health Risk Screening Analysis (HSRA) Guidelines*. January.

$PM_{2.5}$ Concentrations from U.S. Highway 101 Traffic

In addition to evaluating the health risks from TACs, potential impacts from $PM_{2.5}$ emissions from vehicles traveling on U.S. Highway 101 were evaluated. $PM_{2.5}$ concentrations were modeled to evaluate the potential exposure of new project residents to $PM_{2.5}$. To evaluate potential non-cancer health effects due to $PM_{2.5}$, the BAAQMD adopted a significance threshold of an annual average $PM_{2.5}$ concentration greater than 0.3 $\mu g/m^3$.

The same basic modeling approach that was used for assessing TAC impacts was used in the modeling of $PM_{2.5}$ concentrations. $PM_{2.5}$ emissions from all vehicles were used, rather than just the diesel powered vehicles, because all vehicle types (i.e., gasoline and diesel powered) produce $PM_{2.5}$. Additionally, $PM_{2.5}$ emissions from vehicle tire and brake wear were included in these emissions. The assessment involved, first, calculating $PM_{2.5}$ emission rates from traffic traveling on U.S. Highway 101. Then, dispersion modeling using emission factors and traffic volumes was conducted. The dispersion model provides estimated annual $PM_{2.5}$ concentrations. $PM_{2.5}$ emissions were calculated using the EMFAC2011 model for the years 2019, 2020, and 2025. Average hourly traffic volumes were calculated in the same manner as discussed earlier for the TAC modeling. The emission rate calculations and traffic volumes are shown in Attachment 1. The dispersion modeling of traffic using the CAL3QHCR model was conducted in the same manner as the TAC modeling.

Maximum annual average $PM_{2.5}$ concentrations occurred at the same location that had maximum cancer risks, receptors located closest to Highway 101. Figures 5 and 6 show the maximum annual average $PM_{2.5}$ concentrations for the ground and first floor level residential receptor locations at the project site, respectively. The maximum average annual concentration at a town home unit was 0.75 $\mu g/m^3$ (see Figure 5). The maximum annual $PM_{2.5}$ concentrations for ground-level and podium-level receptors in the apartment units were 0.72 and 0.67 $\mu g/m^3$, respectively. Increased $PM_{2.5}$ concentrations at the project site would range from 0.14 to 0.75 $\mu g/m^3$ at ground-level residential locations and from 0.14 to 0.67 $\mu g/m^3$ at podium level apartment units. $PM_{2.5}$ concentrations greater than 0.3 $\mu g/m^3$are considered significant. This would be considered a *significant* impact.

Figure 2. Project Site, Roadway Links, and Project Residential Receptor Locations

Figure 3. Increased Cancer Risks (per million) From Highway 101 Traffic – Ground-Level Apartment and Town Home Residential Units

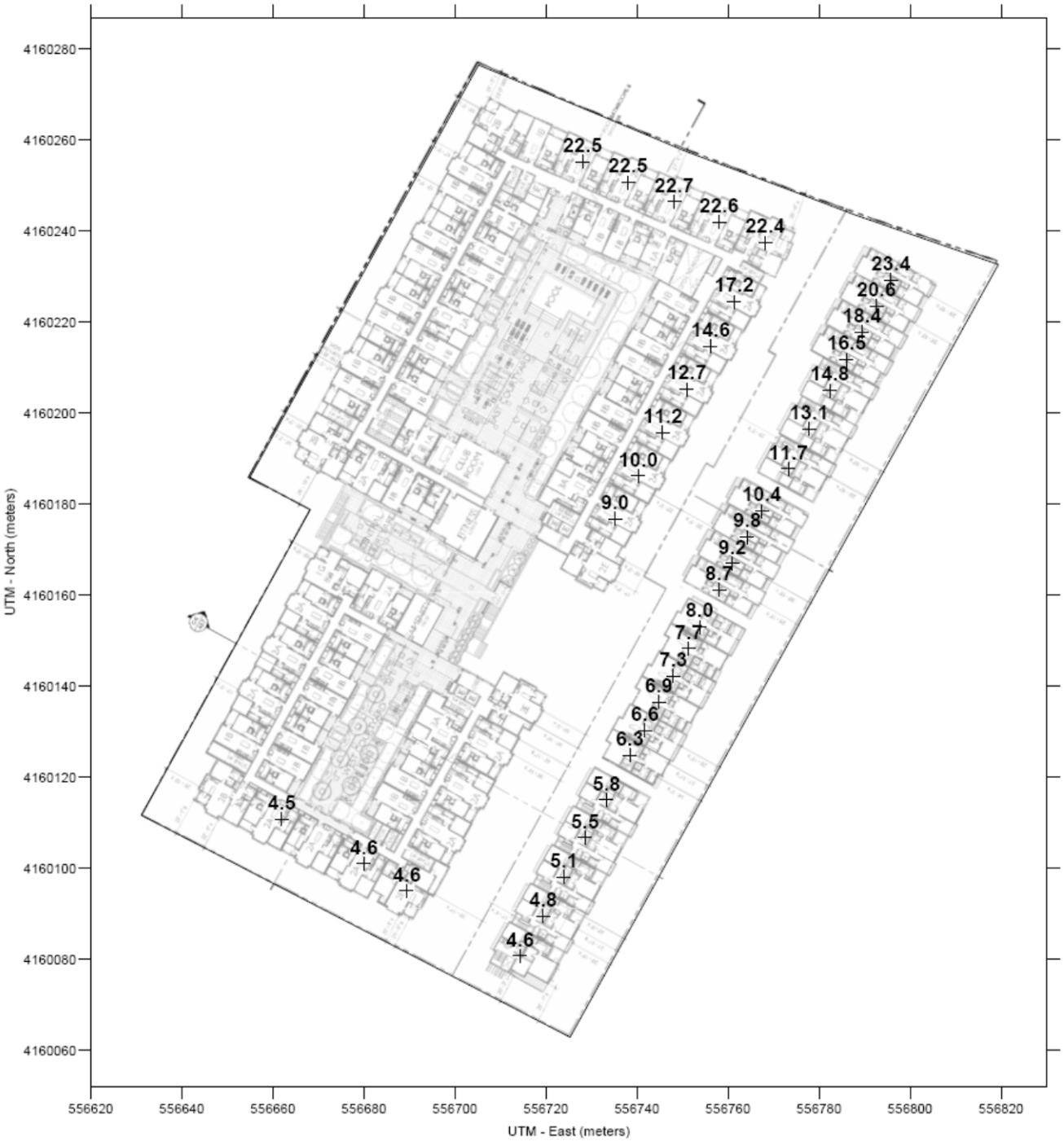


Figure 4. Increased Cancer Risks (per million) From Highway 101 Traffic – 1st Floor (Podium Level) Apartment and Town Home Residential Units

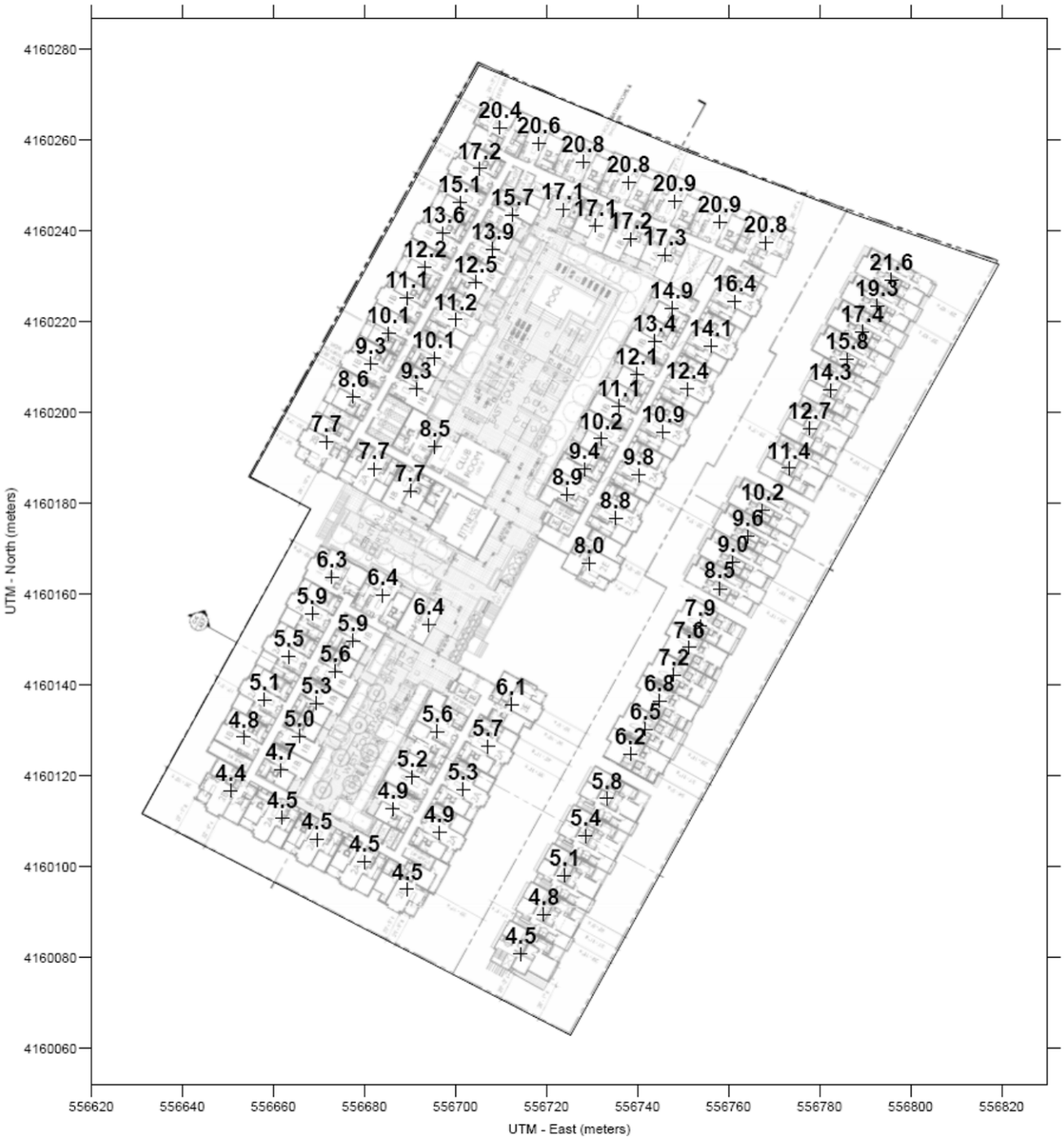


Figure 5. Max. Annual $PM_{2.5}$ Concentrations ($\mu g/m^3$) From Highway 101 Traffic – Ground-Level Apartment and Town Home Residential Units

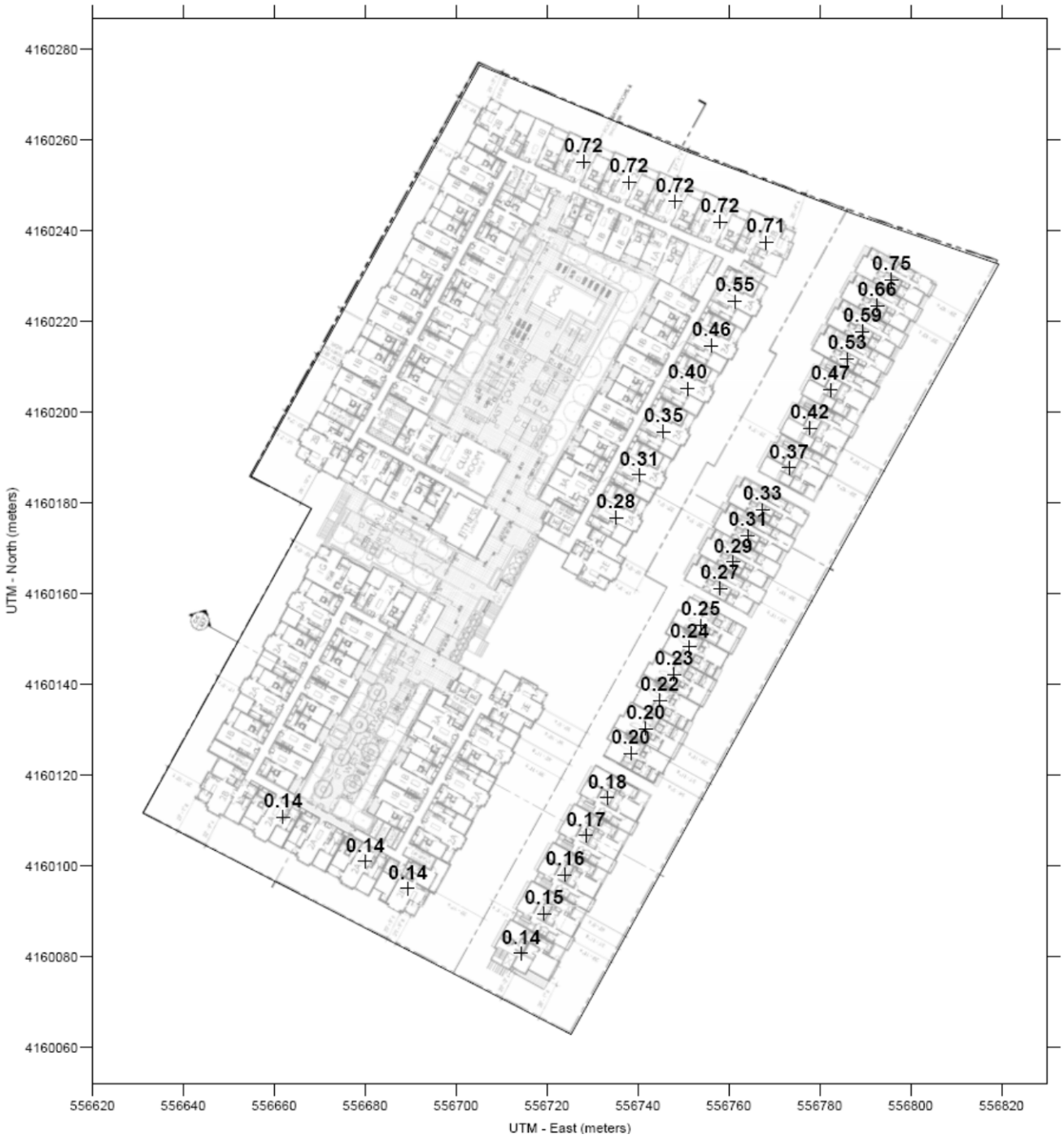
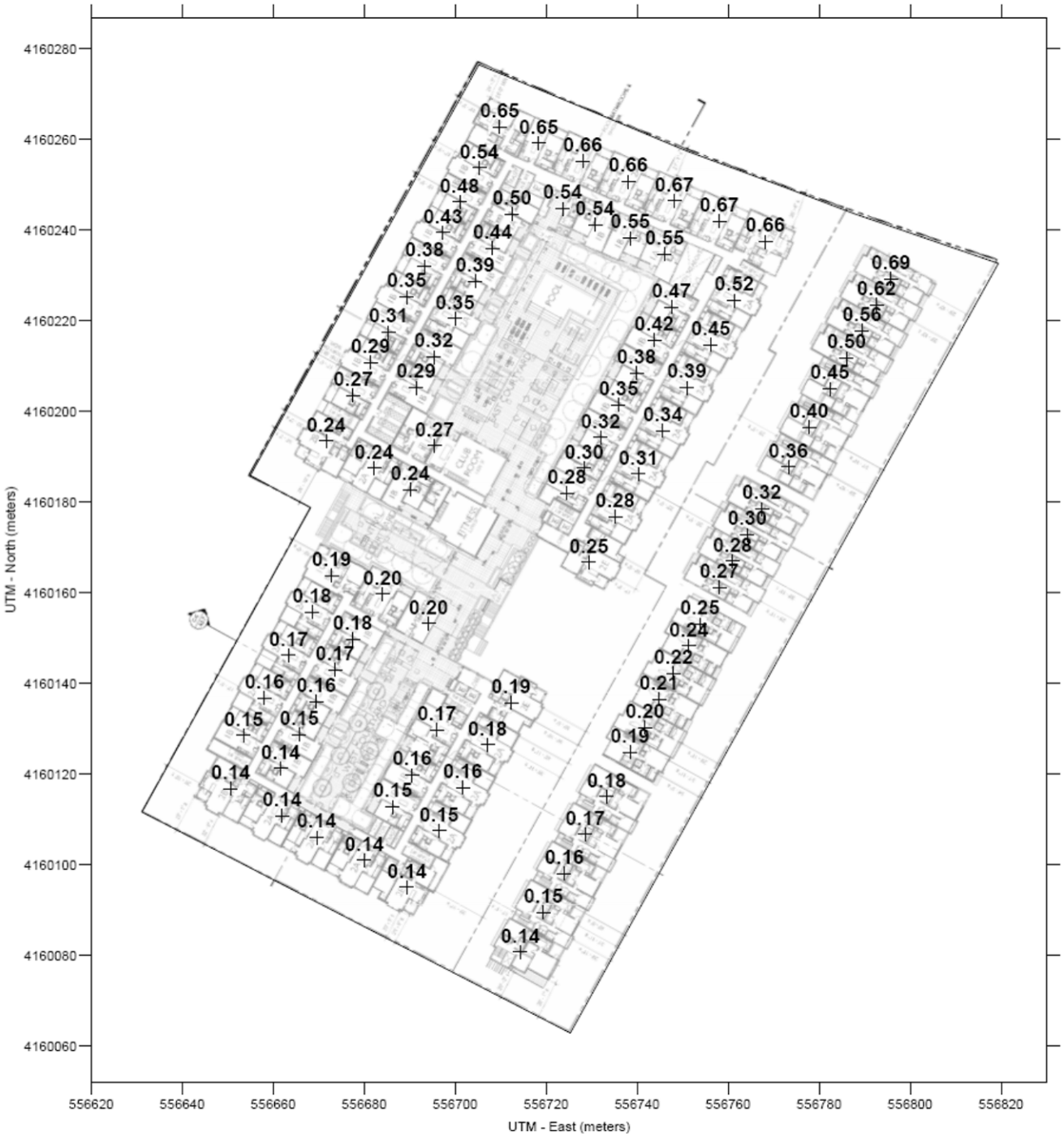


Figure 6. Max. Annual $PM_{2.5}$ Concentrations (µg/m^3) From Highway 101 Traffic – 1st Floor (Podium Level) Apartment and Town Home Residential Units



Railroad Community Risk Impacts

The southern property boundary of the project site is about 130 feet from the Caltrain rail lines. These rail lines are used for passenger and freight service by trains using diesel fueled locomotives. Due to the proximity of the rail line to the proposed project, potential health risks to future residents at the proposed project from DPM emissions from diesel locomotive engines were evaluated. Currently all of Caltrain's trains use diesel locomotives. As part of the program to modernize operation of the Caltrain rail corridor between San Jose and San Francisco Caltrain is planning to switch from diesel locomotives to use of electric trains in the near future.[16] Nearly all of the trains in the future are planned to be electric multiple unit (EMU) trains, which are self-propelled electric rail vehicles that can accelerate and decelerate at faster rates than diesel power trains, even with longer trains. This plan is currently under review and has not yet been formally adopted. Therefore, two scenarios were evaluated: (1) diesel-powered freight trains and transition of Caltrain to electrified trains and (2) continued use by diesel-powered freight trains and diesel-powered passenger trains.

Based on the current Caltrain schedule, there are 92 trains passing the project site during the weekdays, 32 trains during the weekend, and 4 trains that only run on Saturday. In addition to the Caltrain trains, there are about 4 freight trains that also use this rail line on a daily basis.[17]

Rail Road Emissions Modeling

Trains for the Caltrain system are planned to be electrified in the near future. This would eliminate DPM emissions from these trains. Caltrain plans that in 2019 service between San Jose and San Francisco would use a mixed fleet of EMUs and diesel locomotives, with approximately 75% of the service being electric and 25% being diesel. In 2019, some peak service trains would be diesel on weekdays. All other service, including off-peak periods, would be EMU-based. Off-peak periods include early morning, midday, and after 7:00 a.m. After 2019, diesel locomotives would be replaced with EMUs over time as they reach the end of their service life. Caltrain's diesel-powered locomotives would continue to be used to provide service between the San Jose Diridon Station and Gilroy. It is expected that 100 percent of the San Jose to San Francisco fleet would be EMUs by 2026 to 2029.[18]

For this evaluation it was assumed that in 2019 through 2025 there would be 19 daily trips, on an annual average basis, using diesel locomotives and that from 2026 on there would be two annual average daily trips with diesel locomotives. All trains used for freight service were assumed to use diesel powered locomotives.

DPM and $PM_{2.5}$ emissions from trains on the rail line were calculated using EPA emission factors for locomotives[19] and CARB adjustment factors to account for fuels used in California[20].

[16] Caltrain, 2014. *Peninsula Corridor Electrification Project. Draft Environmental Impact Report*. February 2014.
[17] *Bay Area Regional Rail Plan, Technical Memorandum 4a, Conditions, Configuration & Traffic on Existing System*, Metropolitan Transportation Commission, November 15, 2006.
[18] Ibid
[19] *Emission Factors for Locomotives*, USEPA 2009 (EPA-420-F-09-025)
[20] *Offroad Modeling, Change Technical Memo*, Changes to the Locomotive Inventory, CARB July 2006.

Caltrain's current locomotive fleet consists of twenty-three 3,200 horsepower (hp) locomotives of model year or overhaul date of 1999 or earlier and six 3,600 hp locomotives of model year 2003.[21] The current fleet average locomotive engine size is about 3,285 hp. In estimating diesel locomotive emissions for the case of electrification, the diesel locomotives that would still be operating were conservatively assumed to be the newer locomotives with the 3,600 hp engines. In estimating emissions for the case of continued use of all diesel locomotives, the fleet average locomotive engine size of 3,285 hp was used. Each passenger train was assumed to use one locomotive and would be operating at 60% engine load and traveling at an average speed of 30 mph in the vicinity of the project site. Emissions from the freight trains were calculated assuming they would use two locomotives with 2,300 hp engines (total of 4,600 hp) and would be traveling at about 40 mph with the engines operating at about 60% load. Since the exposure duration used in calculating cancer risks is 70 years (in this case the period from 2019 through 2088), the Caltrain and freight train average DPM emissions were calculated based on EPA emission factors for the periods 2019-2024, and 2025-2040, with the average emissions from 2025-2040 assumed to be representative of years 2025 through 2088. Details of the emission calculations are contained in Attachment 1.

Railroad Dispersion Modeling

Modeling of locomotive emissions was conducted using the EPA's ISCST3 dispersion model and four years (2002-2005) of hourly meteorological data from the San Mateo STP obtained from the BAAQMD. Locomotive emissions from train travel within about 1,000 feet of the project site were modeled as a line source comprised of a series of volume sources. Concentrations were calculated at receptor locations within the project site where residences would be located at a receptor heights of 1.5 meters (4.9 feet) and 4.8 meters (15.7 feet). Figure 2 shows the railroad line used for the modeling and the receptors where concentrations were calculated. The maximum modeled long-term DPM and $PM_{2.5}$ concentrations occurred at the project receptors closest to the rail lines near the southern boundary of the project site. Attachment 1 includes details on the assumptions used with the modeling and the DPM and $PM_{2.5}$ emission rates used.

Computed Cancer Risk

Using the maximum modeled long-term average DPM concentrations, the maximum individual cancer risk at the project site was computed using the most recent methods recommended by BAAQMD.[22] The factors used to compute cancer risk are highly dependent on modeled concentrations, exposure period or duration, and the type of receptor. The exposure level is determined by the modeled concentration; however, it has to be averaged over a representative exposure period. The averaging period is dependent on many factors, but mostly the type of sensitive receptor that would reside at a site. This assessment conservatively assumed long-term residential exposures. BAAQMD has developed exposure assumptions for typical types of sensitive receptors. These include nearly continuous exposures of 70 years for residences. It should be noted that the cancer risk calculations for 70-year residential exposures reflect use of BAAQMD's most recent cancer risk calculation method, adopted in January 2010.

[21] Caltrain *Commute Fleets*. Available at: http://www.caltrain.com/about/statsandreports.html. Accessed September 24, 2014.
[22] BAAQMD, *Air Toxics NSR Program Health Risk Screening Analysis (HSRA) Guidelines*, January 2010.

This method applies BAAQMD recommended Age Sensitivity Factors to the cancer risks for residential exposures, accounting for age sensitivity to toxic air contaminants. Age-sensitivity factors reflect the greater sensitivity of infants and children to cancer causing TACs. The cancer risk calculations are provided in Attachment 1.

The maximum increased cancer risk was computed as 3.6 in one million with electrification of Caltrain. If Caltrain is not electrified and diesel-powered passenger train locomotives continue to use the rail line, then the maximum cancer risk would be 12.4 in one million. This was modeled at a receptor in the southeast portion of the site closest to railroad lines at a height of 1.5 meters. The location of maximum cancer risk is shown on Figure 2. Cancer risks at other areas within the project site would be lower than the maximum cancer risk. Under the BAAQMD CEQA Air Quality Guidelines, an incremental risk of greater than 10.0 cases per million from a single source would be a significant impact. If Caltrain electrification does not occur, then residential units along the southern boundary of the site closest to the rail line would have significant cancer risks. These units are depicted in Figures 7 and 8 for receptors at the ground and first floor levels the project site, respectively.

Non-Cancer Health Effects

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. The chronic inhalation REL for DPM is 5 $\mu g/m^3$. The maximum predicted annual DPM concentration from locomotives is 0.019 $\mu g/m^3$ if Caltrain is electrified and 0.077 $\mu g/m^3$ in the event that electrification does not occur which is much lower than the REL. Thus, the Hazard Index would be 0.004 for electrification and 0.015 without electrification, which are much lower than the BAAQMD significance criterion of a HI greater than 1.0.

$PM_{2.5}$ Concentrations

In addition to evaluating the health risks from DPM, potential impacts from $PM_{2.5}$ emissions from the locomotives were evaluated. From the rail line modeling conducted for estimating cancer risks, the maximum $PM_{2.5}$ concentration was identified. The maximum average $PM_{2.5}$ concentrations of 0.019 $\mu g/m^3$ for electrification and 0.077 $\mu g/m^3$ without electrification occur at the same receptor that had the maximum cancer risk. These concentrations are well below the BAAQMD $PM_{2.5}$ threshold of greater than 0.3 $\mu g/m^3$.

Figure 7. Increased Cancer Risks (per million) at Ground-Level Apartment and Town Home Residential Units From Railroad Traffic (all diesel locomotives)

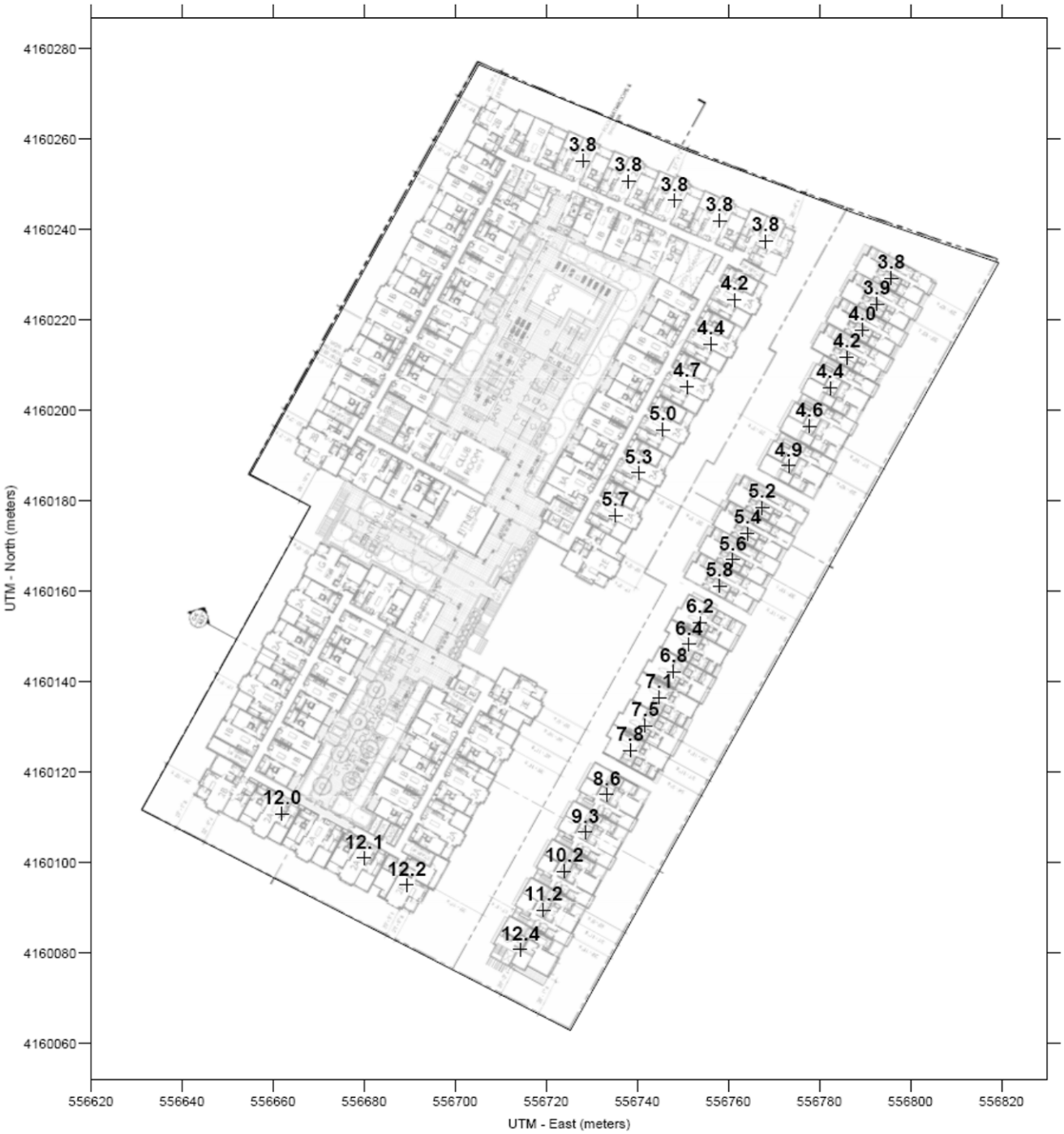
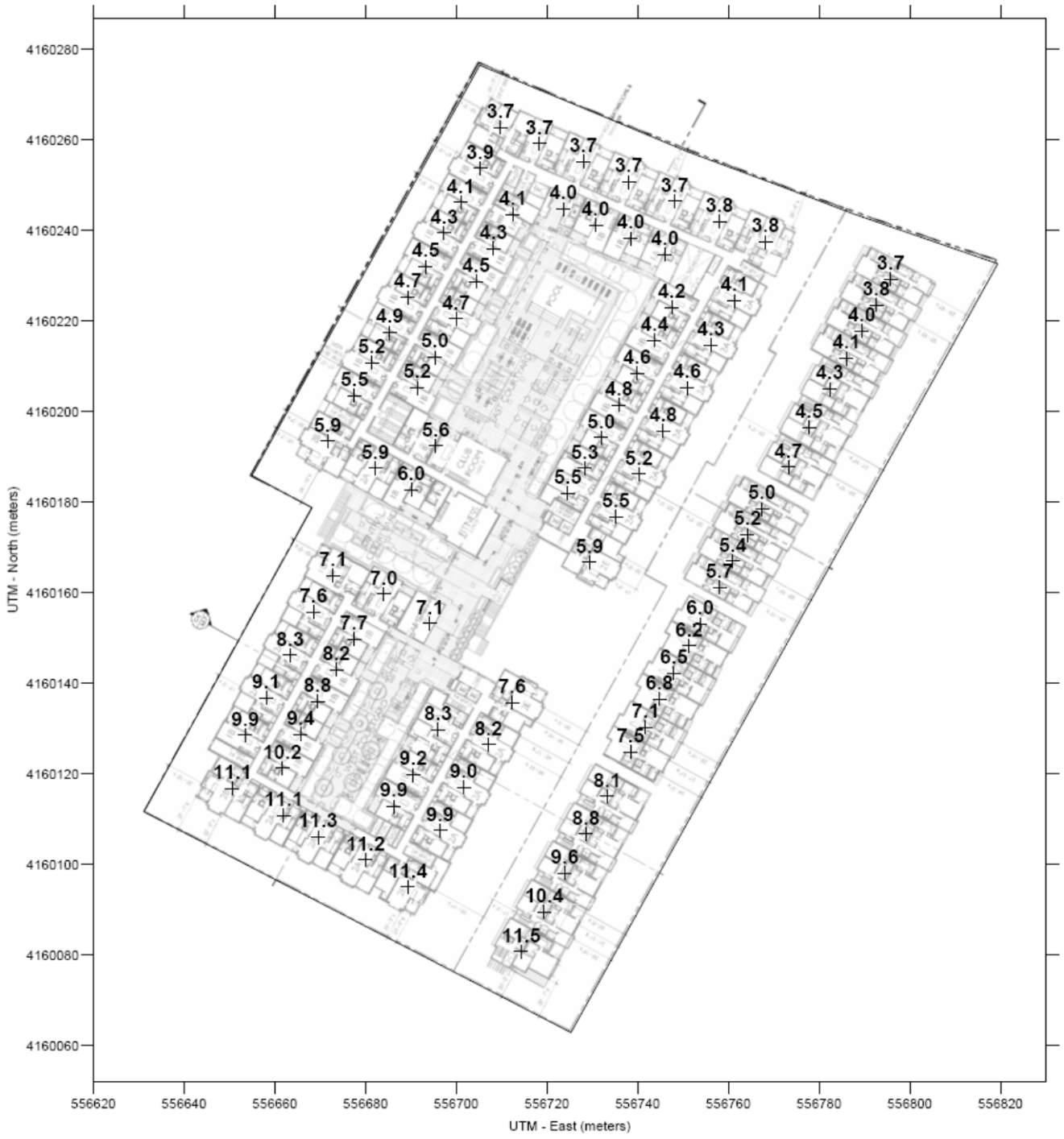


Figure 8. Increased Cancer Risks (per million) at 1st Floor (Podium Level) Apartment and Town Home Residential Units From Railroad Traffic (all diesel locomotives)



Local Roadway Community Risk Impacts

BAAQMD provides Roadway Screening Analysis Tables that can be used to assess potential excess cancer risk and annual $PM_{2.5}$ concentrations from surface streets for each Bay Area county. Rollins Road, Carolan Road and California Drive are the highest volume roadways within 1,000 feet of the project site. Traffic volumes for these roadways are not readily available, as the City has not updated traffic volume counts since 1995, according to the City Engineering Department. However, according to the BAAQMD screening tables, east-west roadways in San Mateo County that have average daily traffic volumes of less than 40,000 vehicles per day would pose less than significant excess cancer risk (i.e., less than 10 per million), hazard index (i.e., less than 1.0) and annual $PM_{2.5}$ concentrations (i.e., less than 0.3 $\mu g/m^3$). Based on a peak-hour volume of 922 vehicles per hour, Rollins Road appears to carry less than 10,000 vehicles per day, and therefore, would not contribute to the overall community risk impacts.

Permitted Stationary Sources Community Risk Impacts

Permitted stationary sources of air pollution near the project site were identified using the BAAQMD's *Stationary Source Risk and Hazard Analysis Tool*. This mapping tool uses Google Earth to identify the location of stationary sources and their estimated risk and hazard impacts. Only gas stations and auto body shops that presented some measurable risk or hazard were identified within 1,000 feet of the site. At BAAQMD's direction, risk and hazard index from gasoline stations were adjusted for distance based on BAAQMD distance adjustment factors. All of the sources within 1,000 feet of the project sites were identified to have maximum reported risks or $PM_{2.5}$ concentrations below the BAAQMD thresholds. This tool identified the following sources that could affect the project sites:

- Source G2778 is a Chevron gas station at 1095 Carolan Road, approximately 1,000 feet from the site. When adjusting for distance, this facility poses a screening level excess cancer risk of less than 0.1 per million and Hazard Index of 0.01.

- Source G8355 is a Unocal gas station at 1147 Rollins Road, approximately 800 feet from the site. When adjusting for distance, this facility poses a screening level excess cancer risk of 0.5 per million and Hazard Index of less than 0.01.

- All other sources (Plant numbers 4140, 3226, 18500, 17768) had either 0 or very low risk, hazard index or $PM_{2.5}$ concentrations.

Project Mitigation

Pollutant emissions from U.S. Highway 101 traffic pose significant excess cancer risk and $PM_{2.5}$ impacts to residential areas of the project site within about 230 feet to 250 feet of the northern site boundary (see Figure 3 through 6 for excess cancer risk greater than 10 in one million and annual $PM_{2.5}$ concentrations greater than 0.3 $\mu g/m^3$). In addition, exposure to train activity in the event that Caltrain is not electrified would result in significant excess cancer risk for residential units along the southern site boundary (see Figures 7 and 8 for Caltrain excess cancer risk greater

than 10 in one million). Mitigation would have to be incorporated into the project that would reduce excess cancer risk to 10.0 per million or lower. Reducing excess cancer risk below 10 per million would also reduce annual $PM_{2.5}$ exposure to 0.3 $\mu g/m^3$ or less. When cancer risks are significant, the BAAQMD CEQA Air Quality Guidelines recommend as mitigation that projects install and maintain air filtration systems of fresh air supply. These systems should be installed on either an individual unit-by-unit basis, with individual air intake and exhaust ducts ventilating each unit separately, or through a centralized building ventilation system.

U.S. EPA reports particle size removal efficiency for filters rated MERV13 of 90 percent for particles in the size range of 1 to 3 µm and less than 75 percent for particles 0.3 to 1 µm[23,24]. Recent studies by the South Coast Air Quality Management District indicate that MERV13 filters could achieve reductions of about 60 percent for ultra-fine particles and about 35 percent for black carbon[25]. This same study found MERV16 filters reduced both ultrafine and black carbon particles by 85 percent or greater.

In 2012, CARB compiled a synthesis of the status of potential mitigation concepts to reduce exposure to nearby traffic air pollution.[26] Because mechanical ventilation has not been used in residential buildings until recently, there has been limited assessment of its impact on entry of particles and other pollutants into homes. CARB-reviewed studies of homes and schools have shown that high-efficiency filtration in mechanical ventilation systems can be effective in reducing levels of incoming outdoor particles. They noted that one study of residences in Northern California found that the homes with active filtration in a mechanical system had a notably lower portion of indoor particles from outdoors when the systems were on (filtration active) than when they were turned off (no filtration). In another study reviewed by CARB that included modeling study of Korean residential units with mechanical ventilation, filters rated lower than MERV7 were insufficient for reducing contaminants that enter through the ventilation filter; the study concluded that filters should exceed MERV11. The CARB review also notes that in a school pilot study, a combination of MERV16 filters used as a replacement for the normal panel filter in the ventilation system and in a separate filtration unit reduced indoor levels of outdoor-generated black carbon, ultrafine particles and $PM_{2.5}$ by 87 percent to 96 percent in three Southern California schools. Use of the MERV16 panel filter alone in the HVAC system achieved average particle reductions of nearly 90 percent. Another study reviewed by CARB found indoor submicron particle counts in a Utah school were reduced to just one-eighth of the outdoor levels in a building with a mechanical system using a MERV8 filter. Based on these studies, it is assumed that MERV13 filtration could reduce ambient indoor particulate levels by 60 percent and MERV16 filtration could achieve an 85 percent reduction when compared to outdoor levels. Time spent outdoors would have to be factored into the overall effectiveness of these filtration systems.

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[23] American Society of Heating, Refrigerating and Air-Conditioning Engineers. 2007. *Method of testing general ventilation air-cleaning devices for removal efficiency by particle size*. ANSI/ASHRAE Standard 52.2-2007. Inc.
[24] U.S. EPA. 2009. *Residential Air Cleaners (Second Edition): A Summary of Available Information*. EPA 402-F-09-002. Revised August 2009.
[25] SCAQMD. 2009. *Pilot Study of High Performance Air Filtration for Classrooms Applications.* Draft Report October 2009
[26] California Air Resources Board (CARB), 2012, Status of Research on Potential Mitigation Concepts to Reduce Exposure to Nearby Traffic Pollution, August.

Two air filtration cases were identified and modeled as possible mitigation scenarios. In order of increased DPM removal effectiveness, these are: use of a filtration system using MERV13 and use of a filtration system using MERV16. Studies indicate that the typical person spends approximately 87 percent of the time indoors, 8 percent outdoors, and 6 percent of the time in vehicles[27]. Assuming three hours of outdoor exposure to ambient DPM and 21 hours of indoor exposure to filtered air, the overall effective particulate control efficiency of filtration systems would be 53 percent for MERV13 and 74 percent for MERV16 filtration systems. These filtration system overall effectiveness levels were applied to the cancer risk computations at each receptor where cancer risks were calculated. Note that the MERV filtration systems are not assumed to provide any reduction in TOG TAC concentrations.

The projected cancer risks from Highway 101 traffic associated with use of these filtrations systems are shown on Figures 9 and 10 for use of MERV13 and MERV16, respectively. As shown on Figure 10 (MERV16), on-site cancer risks from Highway 101 with mitigation in place would be reduced to less than 10 in one million at all residences, or below the BAAQMD significance criterion and, thus, to a level of less than significant. For cancer risk from railroad traffic, if electrification of Caltrain does not occur, use of MERV13 air filtration at all residences shown on Figures 7 and 8 with a cancer risk greater than 10 in one million would reduce the cancer risk to less than 10 in one million. The maximum cancer risk of 12.4 in one million would be reduced to 5.9 in one million with the use of MERV13 air filtration.

With use of project-specified air filtration systems, exposure to $PM_{2.5}$ in the residential areas throughout the project site would be substantially reduced to levels below the BAAQMD significance threshold. Figures 11 and 12 show $PM_{2.5}$ concentrations with use of MERV13 and MERV16, respectively.

Summary

Single-source excess cancer risks from U.S. Highway 101 range from 4.4 to 23.4 in one million at the project site. The maximum predicted cancer risk from Caltrain and freight rail traffic is 3.6 in one million with electrification and 12.4 in one million without electrification. Cancer risk is considered significant if risk is greater than 10.0 per million. Annual $PM_{2.5}$ concentrations from U.S. 101 range from 0.14 to 0.75 $\mu g/m^3$. Annual $PM_{2.5}$ concentrations associated with the rail line would be less than 0.08 $\mu g/m^3$ with or without electrification of Caltrain. Annual $PM_{2.5}$ impacts are considered significant if concentrations exceed 0.3 $\mu g/m^3$. Excess cancer risk and annual $PM_{2.5}$ concentrations could be mitigated to less-than-significant levels through the use of ventilation systems with proper filtration (i.e., MERV13 through MERV16 filters). Note that mitigating excess cancer risk would also mitigate the effect of annual $PM_{2.5}$ concentrations to a level of less than significant.

An ongoing maintenance plan for the building's HVAC air filtration systems would be required to implement this measure. *Adherence to the Mitigation Measure AQ-3 would ensure that the proposed project reduces excess cancer risk and $PM_{2.5}$ impacts caused by U.S. Highway 101 traffic and the Caltrain rail line to a level of less than significant.*

[27] US Environmental Protection Agency (US EPA), 1996. The National Human Activity Pattern Survey. National Exposure Research Laboratory

Mitigation Measure AQ-3 (exposure of sensitive receptors to substantial pollutant concentrations). The project shall include the following measures to minimize long-term toxic air contaminant (TAC) exposure for new residences:

1. Ensure that no residential units would have a full year of occupancy prior to 2019.

2. Design the site to limit exposure from sources of TAC and fine particulate matter ($PM_{2.5}$) emissions. The site layout shall locate operable windows and air intakes as far as possible from U.S. Highway 101 traffic lanes. Any modifications to the site design shall incorporate buffers between residences and the freeway.

3. Install air filtration for residential units that have predicted cancer risks in excess of 10 in one million or $PM_{2.5}$ concentrations above 0.3 micrograms per cubic meter ($\mu g/m^3$) from either U.S. 101 or the Caltrain rail line. Air filtration devices shall be rated MERV13 or higher. To ensure adequate health protection to sensitive receptors, a ventilation system shall meet the following minimal design standards (Department of Public Health, City and County of San Francisco, 2008):
   - A MERV13 or higher rating;
   - At least one air exchange(s) per hour of fresh outside filtered air; and
   - At least four air exchange(s) per hour recirculation;

   Alternately, at the approval of the City, equivalent control technology may be used if it is shown by a qualified air quality consultant or heating, ventilation, and air conditioning (HVAC) engineer that it would reduce risk below significance thresholds.

3. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required. Recognizing that emissions from air pollution sources are decreasing, the maintenance period shall last as long as significant excess cancer risk or annual $PM_{2.5}$ exposures are predicted. Subsequent studies could be conducted by an air quality expert approved by the City to identify the ongoing need for the filtered ventilation systems as future information becomes available.

4. Ensure that the lease agreement and other property documents (1) require cleaning, maintenance, and monitoring of the affected units for air flow leaks; (2) include assurance that new owners and tenants are provided information on the ventilation system; and (3) include provisions that fees associated with owning or leasing a unit(s) in the building include funds for cleaning, maintenance, monitoring, and replacements of the filters, as needed.

5. Require that, prior to building occupancy, an authorized air pollutant consultant or HVAC engineer verify the installation of all necessary measures to reduce toxic air contaminant (TAC) exposure.

7. The type of MERV-rated filtration required to be installed as part of the ventilation system in the residential building shall be as follows:

1) A minimum of MERV13 shall be installed unless the increased cancer risk can be demonstrated to be less than 10 in one million.
2) MERV16 filtration shall be utilized for areas where the increased cancer risk is greater than 20.0 in one million as shown in Figures 3, 4, and 6 for unmitigated cancer risks.

9. $PM_{2.5}$ concentrations at all sensitive receptor locations across the site would also be reduced to a level of less than significant by using MERV13 and MERV16 filters necessary to mitigate excess cancer risk.

10. This mitigation measures applies to residential units along the southern boundary of the site near the Caltrain rail line only in the event that Caltrain does not adopt their modernization program that would electrify the passenger locomotives.

Figure 9. Increased Cancer Risks (per million) From Highway 101 Traffic – Ground-Level Apartment and Town Home Residential Units With MERV13 Filtration

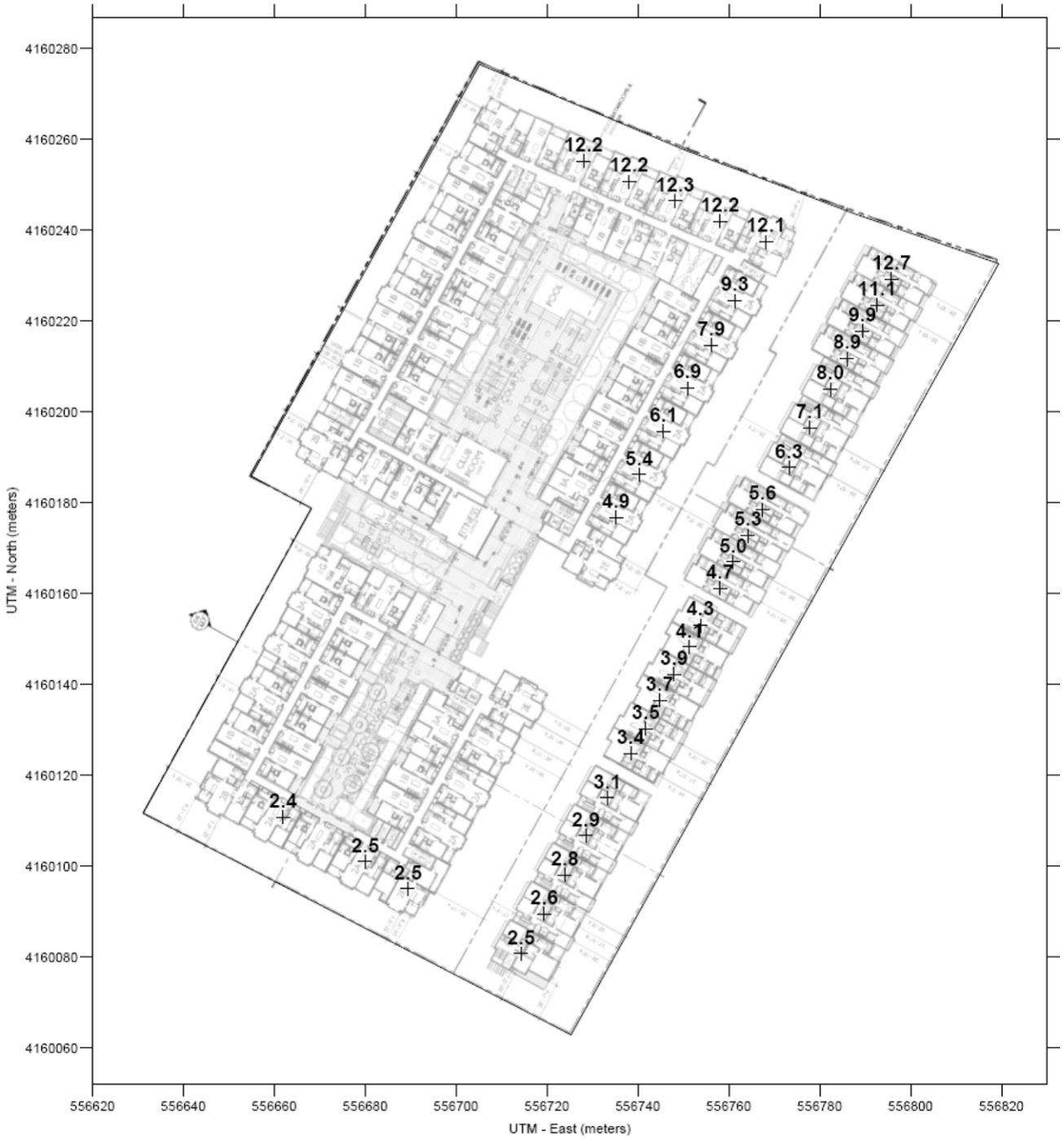


Figure 10. Increased Cancer Risks (per million) From Highway 101 Traffic – Ground-Level Apartment and Town Home Residential Units With MERV16 Filtration

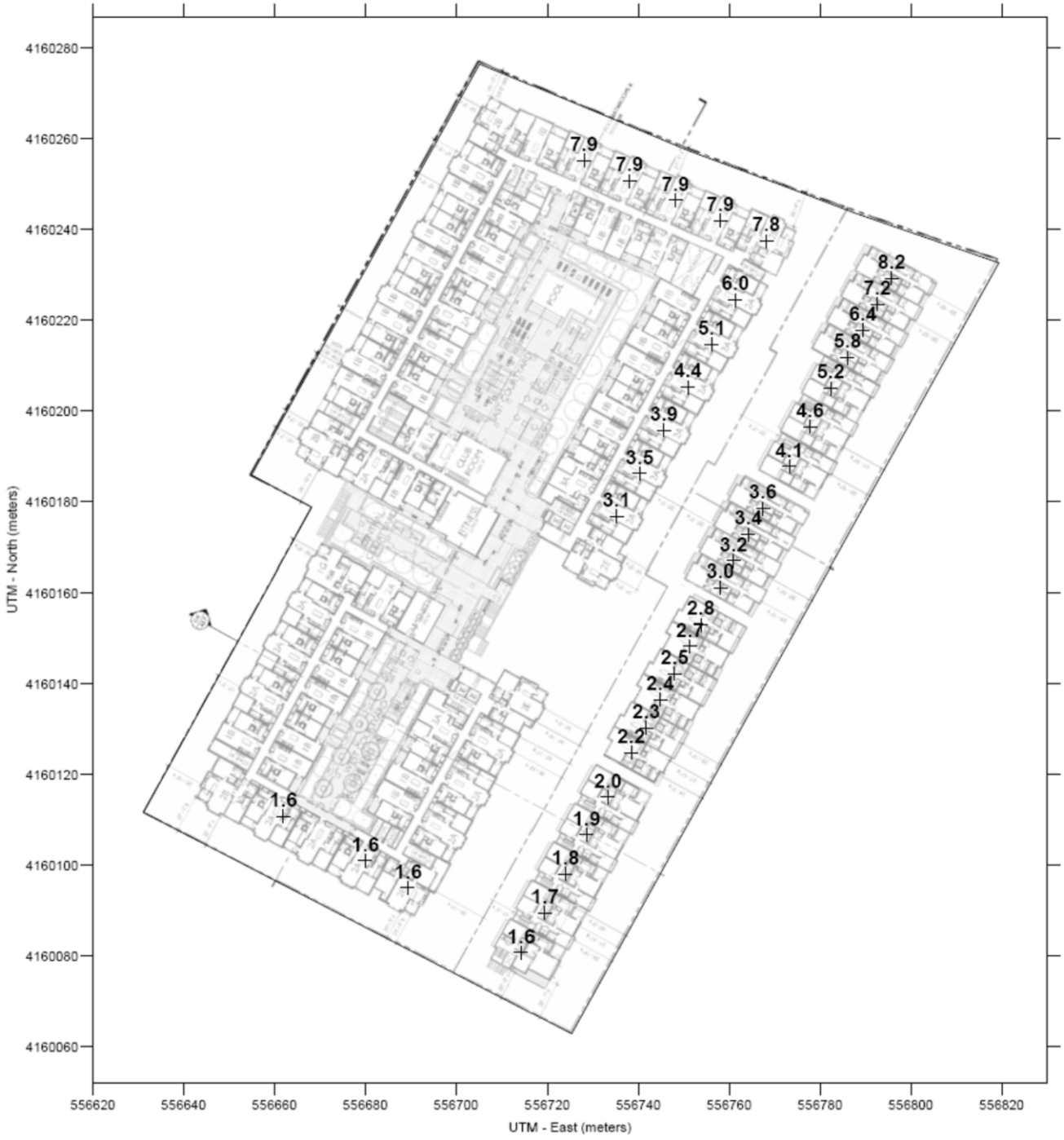


Figure 11. Max. Annual $PM_{2.5}$ Concentrations ($\mu g/m^3$) From Highway 101 Traffic – Ground-Level Apartment and Town Home Residential Units With MERV13 Filtration

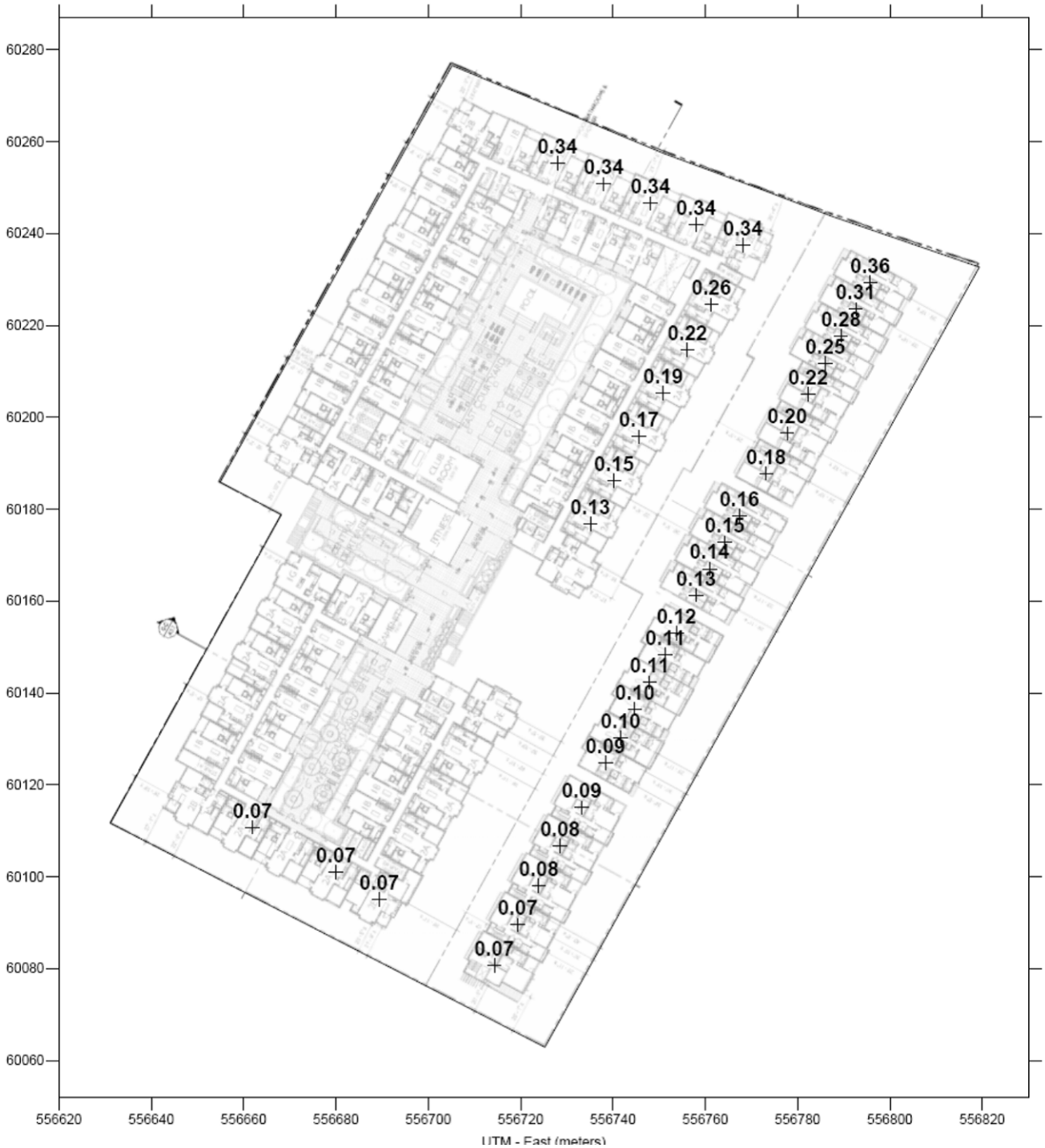
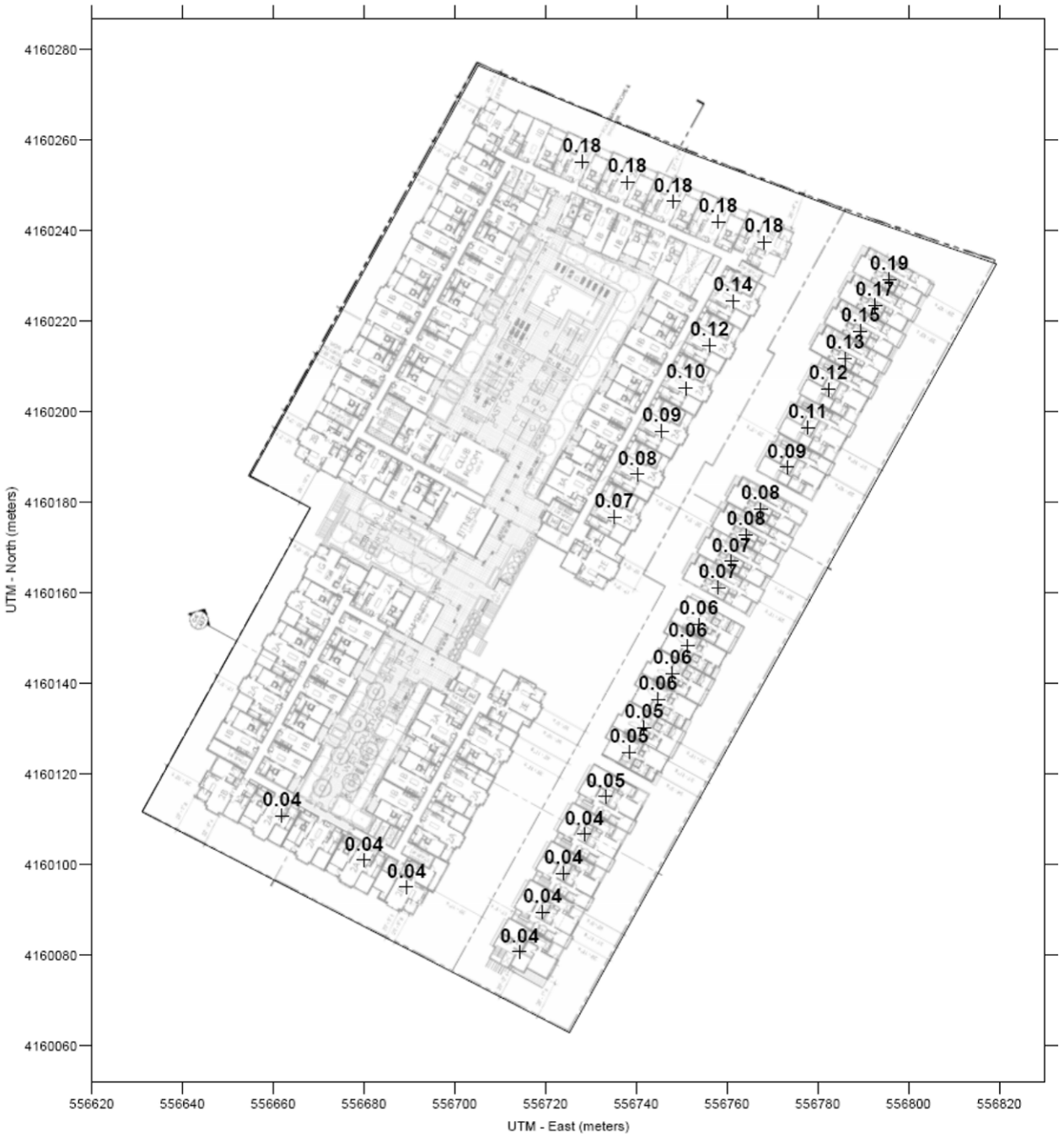


Figure 12. Max. Annual $PM_{2.5}$ Concentrations ($\mu g/m^3$) From Highway 101 Traffic – Ground-Level Apartment and Town Home Residential Units With MERV16 Filtration



Cumulative Community Risk Impacts

Cumulative TAC impacts to proposed sensitive receptors were evaluated by adding the cancer risk, Hazard Index, and $PM_{2.5}$ concentrations from each source and comparing those to the BAAQMD Community Risk significance thresholds for cumulative sources. Table 5 shows the community risk impacts from each source upon the maximum exposed receptor or the MEI. As discussed above, traffic volumes along local surface streets were not available, as the City has not updated traffic volume counts since 1995, according to the City Engineering Department. As shown in Table 5, cumulative $PM_{2.5}$ concentration would be potentially significant when the effects of local surface streets are added, as cumulative PM2.5 without surface streets is approaching the 0.8 µg/m^3 threshold. However, implementation of Mitigation Measure AQ-3, which would reduce $PM_{2.5}$ concentrations from U.S. Highway 101at the MEI to below 0.3 µg/m^3 would, in turn, be expected to reduce cumulative $PM_{2.5}$ concentrations well below the cumulative threshold of 0.8 µg/m^3.

Table 5. Cumulative Risk at Proposed Site Maximum Exposed Receptor

Distance from Receptor (feet)	Plant No.	Facility Name	Street Address	Cancer Risk (per million)	Hazard Index	$PM_{2.5}$ (µg/m^3)
~100	U.S. 101 [a]			23.4	0.01	0.75
	U.S. 101a with Mitigation			6.1	<0.01	0.20
~700	Caltrain [a]			<1.0	<0.01	0.01
~1,000	G2778	Chevron [b]	1095 Carolan Road	<0.1	0.01	--
~800	G8355	Unocal [b]	1147 Rollins Road	0.5	<0.01	--
Total				<25.0	<0.04	0.78 [c]
Total with Mitigation				7.1	<0.04	0.21
BAAQMD Thresholds				100	10.0	0.8
Significant?				No	No	No

Source:
[a] Refined modeling.
[b] BAAQMD *Stationary Source Risk and Hazard Analysis Tool*, 2012.
[c] Implementation of Mitigation Measure AQ-3, which would reduce $PM_{2.5}$ concentrations from U.S. Highway 101 at the MEI to below 0.3 µg/m^3 would, in turn, be expected to reduce cumulative $PM_{2.5}$ concentrations below the cumulative threshold of 0.8 µg/m^3

Impact 5: Create objectionable odors affecting a substantial number of people? ***Less than significant.***

The project would generate localized emissions of diesel exhaust during construction equipment operation and truck activity. These emissions may be noticeable from time to time by adjacent receptors. However, they would be localized and are not likely to adversely affect people off site by resulting in confirmed odor complaints. Operation of the project would not generate odors that would result in complaints. There were no identified odor sources that would affect the project in terms of generating frequent odor complaints.

Impact 6: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? ***Less than significant.***

The BAAQMD May 2011 CEQA Guidelines included GHG emissions-based significance thresholds. These thresholds include a "bright-line" emissions level of 1,100 metric tons per year for land-use type projects and 10,000 metric tons per year for stationary sources. Land use projects with emissions above the 1,100 metric ton per year threshold would then be subject to a GHG efficiency threshold of 4.6 metric tons per year per capita. Projects with emissions above the thresholds would be considered to have an impact, which, cumulatively, would be significant. The project size, 268 apartments and 22 condo units, exceeds the screening size listed in the 2011 BAAQMD CEQA Air Quality Guidelines as having less than significant GHG emissions. Therefore, a refined analysis that includes modeling of GHG emissions from the project was conducted.

The CalEEMod model was also used to predict GHG emissions from operation of the site assuming full build-out of the project. The project land use types and size, trip generation rate and other project-specific information were input to the model. The use of this model for evaluating emissions from land use projects is recommended by the BAAQMD. Unless otherwise noted below, the CalEEMod model defaults for San Mateo were used. CalEEMod provides emissions for transportation, areas sources, electricity consumption, natural gas combustion, electricity usage associated with water usage and wastewater discharge, and solid waste land filling and transport. CalEEMod output worksheets are included in *Attachment 1*.

Land Use Descriptions
The proposed project land uses were input into CalEEMod, which were:

268 "Apartments Mid Rise,"
22 "Condo/Townhouse,"
462-space "Enclosed Parking with Elevator," and
10-space "Parking Lot"

Trip Generation Rates
CalEEMod model default trip generation rates from the project Traffic Impact Assessment were input to the model.

Model Year
The model uses mobile emission factors from the California Air Resources Board's EMFAC2011 model. This model is sensitive to the year selected, since vehicle emissions have and continue to be reduced due to fuel efficiency standards and low carbon fuels. The Year 2019 was analyzed since it is the first year that the project could conceivably be occupied.

Energy
Default rates for energy consumption were assumed in the model. Emissions rates associated with electricity consumption were based on model the default Pacific Gas & Electric utility's (PG&E) rate of 641.35 pounds of CO_2 per megawatt of electricity produced.

Other Inputs
Default model assumptions for GHG emissions associated with area sources, solid waste generation and water/wastewater use were applied to the project. No wood burning from woodstoves or fireplaces was assumed in the modeling however, it was assumed that gas-powered fireplaces could be installed.

Service Population
Project service population is the sum of future residents and full-time employees. The number of future residences was estimated at 655 and was based on the latest US Census data for the City of Burlingame, which shows an average of 2.26 residents per household.[28]

Construction Emissions

GHG emissions associated with construction were computed to be 827 MT CO_2e. These are the emissions from on-site operation of construction equipment, hauling truck trips, vendor truck trips, and worker trips. The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions, though total construction period emissions would be less than the BAAQMD operational threshold of 1,100 MT CO_2e per year. The District recommends quantifying emissions and disclosing that GHG emissions would occur during construction. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices assumed to be incorporated into construction of the proposed project include, but are not limited to: using local building materials of at least 10 percent and recycling or reusing at least 50 percent of construction waste or demolition materials.

Operational Emissions

The CalEEMod model, along with the project vehicle trip generation rates, was used to predict daily emissions associated with operation of the fully-developed site under the proposed project. In 2019, annual emissions resulting from the proposed project are predicted to be 2,474 MT of CO_2e. These emissions would exceed the BAAQMD threshold of 1,100 MT of CO_2e/yr. As discussed above, land use projects with emissions above the 1,100 metric ton per year threshold would then be subject to a GHG efficiency threshold of 4.6 metric tons per year per capita to determine impact significance. Computed project per capita emissions are 3.8 MT of CO_2e/year/service population, which would not exceed the BAAQMD threshold of 4.6 MT of CO_2e/year/service population. Table 6 shows predicted project GHG emissions. GHG emissions are included in the CalEEMod output that is provided as *Attachment 1*.

[28] United States Census Bureau, 2014. *State & County QuickFacts: Burlingame (city), California*. Available online: http://quickfacts.census.gov/qfd/states/06/0609066.html. Accessed: September 25, 2014.

Table 6. Annual Project GHG Emissions in Metric Tons

Source Category	2016 Project Emissions
Area	16
Energy Consumption	831
Mobile	1,501
Solid Waste Generation	61
Water Usage	65
Total	2,474
GHG Per Capita Emissions[1]	3.8
BAAQMD Threshold	4.6 MT CO_2e/year/S.P.

Note: [1]Based on service population of 655

Impact 7: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? ***No Impact.***

The City of Burlingame adopted its Climate Action Plan in June of 2009,[29] and according to the City's website, serves as the City's roadmap to reaching energy-efficiency targets. The plan serves as non-binding guide to identify methods that the City and community can implement to reduce GHGs. The project would be subject to new requirements under rule making developed at the State and local level regarding greenhouse gas emissions and be subject to local policies that may affect emissions of greenhouse gases, such as the City Climate Action Plan.

[29] City of Burlingame, 2009. *City of Burlingame Climate Action Plan*. June.

Attachment 1: CalEEMod Output Worksheets

Project Name: Carolan / Rollins, Burlingame								
Qty	Description	HP	Load Factor	Hours/day	Total Work Days		Total Hours	Comments
	Demolition	**Start Date:**	**1/2/2018**					
		End Date:	**2/2/2018**		25			
1	Concrete/Industrial Saws	81	0.4891	6	6	1.4	36	**Demolition Volume**
1	Excavators	162	0.3819	8	20	6.4	160	Square footage of buildings to be demolished
2	Rubber-Tired Dozers	255	0.3953	8	10	3.2	160	(*or* total tons to be hauled)
0	*Other Equipment?*						0	**34,436** square feet *or*
								? Hauling volume (tons)
	Site Preparation	**Start Date:**	**2/3/2018**					Any pavement demolished and hauled? **2,500 tons**
		End Date:	**2/10/2018**		6			
1	Rubber Tired Dozers	255	0.3953	7	6	7.0	42	
2	Tractors/Loaders/Backhoes	97	0.3685	7	6	7.0	84	
0	*Other Equipment?*						0	none
	Grading / Excavation	**Start Date:**	**2/5/2018**					
		End Date:	**5/25/2018**		80			**Soil Hauling Volume**
1	Excavators	162	0.3819	8	8	0.8	64	Export volume = **27,000** cubic yards?
2	Graders	174	0.4087	8	14	1.4	224	Import volume = **0** cubic yards?
1	Rubber Tired Dozers	255	0.3953	7	15	1.3	105	
1	Tractors/Loaders/Backhoes	97	0.3685	7	15	1.3	105	
0	*Other Equipment?*						0	none
	Trenching	**Start Date:**	**5/28/2018**					
		End Date:	**6/29/2018**		25			
1	Tractor/Loader/Backhoe	97	0.3685	5	15	3.0	75	
0	*Other Equipment?*						0	none
								Cement
	Building - Exterior	**Start Date:**	**5/28/2018**					Cement Trucks? **?** Total Round-Trips
		End Date:	**6/3/2019**		266			or cement **12,771** cy
1	Cranes	226	0.2881	6	120	2.7	720	Electric? (Y/N) ___ Otherwise assumed diesel
2	Forklifts	89	0.201	5	120	2.3	1200	Liquid Propane (LPG)? (Y/N) ___ Otherwise Assumed diesel
2	Generator Sets	84	0.4958	6	180	4.1	2160	Or temporary line power? (Y/N) _Y__
1	Tractors/Loaders/Backhoes	97	0.3685	6	40	0.9	240	
2	Welders	46	0.3015	6	20	0.5	240	
0	*Other Equipment?*						0	none
Building - Interior/Architectural Coating		**Start Date:**	**6/3/2019**					
		End Date:	**12/20/2019**		145			
1	Air Compressors	78	0.32	6	40	1.7	240	
1	Aerial Lift	62	0.3	4	80	2.2	320	
0	*Other Equipment?*						0	none
	Paving	**Start Date:**	**8/1/2019**					
		Start Date:	**10/1/2019**		44			
1	Cement and Mortar Mixers	9	0.3752	4	20	1.8	80	
1	Pavers	125	0.4154	8	6	1.1	48	Asphalt? **2,000** cy or _____ round trips
1	Paving Equipment	130	0.3551	8	6	1.1	48	
1	Rollers	80	0.3752	4	6	0.5	24	
1	Tractors/Loaders/Backhoes	97	0.3685	4	6	0.5	24	
0	*Other Equipment?*						0	

Carolan Avenue/Rollins Road

San Mateo County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	462.00	Space	0.00	184,800.00	0
Parking Lot	10.00	Space	0.00	4,000.00	0
Apartments Mid Rise	268.00	Dwelling Unit	5.40	268,000.00	766
Condo/Townhouse	22.00	Dwelling Unit	0.00	22,000.00	63

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2019
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 -

Land Use - All acreage assinged to apartments

Construction Phase - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Trips and VMT - Includes cement and asphalt at 9cy/load and vendor travel distances

Demolition - Based on provided construction schedule and equipment list plus asphalt

Grading - Based on provided construction schedule and equipment list

Architectural Coating - Architectual coatings meeting BAAQMD Rules/Regs

Construction Off-road Equipment Mitigation - Tier 2 mobile, Tier 4 portable and BMPs

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	150.00
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	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
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tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	145.00
tblConstructionPhase	NumDays	230.00	266.00
tblConstructionPhase	NumDays	20.00	25.00
tblConstructionPhase	NumDays	20.00	80.00
tblConstructionPhase	NumDays	20.00	44.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	PhaseEndDate	12/21/2018	12/20/2018
tblConstructionPhase	PhaseEndDate	7/6/2018	6/3/2018
tblConstructionPhase	PhaseEndDate	2/3/2017	2/2/2017
tblConstructionPhase	PhaseEndDate	6/2/2017	5/25/2017
tblConstructionPhase	PhaseEndDate	2/20/2019	10/1/2018
tblConstructionPhase	PhaseEndDate	2/9/2017	2/10/2017
tblConstructionPhase	PhaseStartDate	6/4/2018	6/3/2018
tblConstructionPhase	PhaseStartDate	6/30/2017	5/28/2017
tblConstructionPhase	PhaseStartDate	2/11/2017	2/5/2017
tblConstructionPhase	PhaseStartDate	12/21/2018	8/1/2018
tblConstructionPhase	PhaseStartDate	5/26/2017	5/28/2017
tblGrading	AcresOfGrading	14.00	10.00
tblGrading	MaterialExported	0.00	27,500.00
tblLandUse	LotAcreage	4.16	0.00
tblLandUse	LotAcreage	0.09	0.00
tblLandUse	LotAcreage	7.05	5.40
tblLandUse	LotAcreage	1.38	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
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tblOffRoadEquipment	UsageHours	7.00	2.70
tblOffRoadEquipment	UsageHours	8.00	6.40
tblOffRoadEquipment	UsageHours	8.00	0.80
tblOffRoadEquipment	UsageHours	8.00	2.30
tblOffRoadEquipment	UsageHours	8.00	4.10
tblOffRoadEquipment	UsageHours	8.00	1.40
tblOffRoadEquipment	UsageHours	8.00	1.10
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tblOffRoadEquipment	UsageHours	8.00	3.20
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tblOffRoadEquipment	UsageHours	8.00	1.30
tblOffRoadEquipment	UsageHours	8.00	7.00
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tblTripsAndVMT	HaulingTripLength	20.00	7.30
tblTripsAndVMT	HaulingTripLength	20.00	7.30
tblTripsAndVMT	HaulingTripNumber	0.00	2,838.00
tblTripsAndVMT	HaulingTripNumber	0.00	444.00

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					
2017	0.3144	2.3010	3.5096	6.2600e-003	0.3549	0.0832	0.4381	0.1078	0.0786	0.1863	0.0000	522.4865	522.4865	0.0328	0.0000	523.1761
2018	4.1474	0.9734	1.9962	3.8600e-003	0.2140	0.0373	0.2513	0.0574	0.0358	0.0931	0.0000	303.5572	303.5572	0.0182	0.0000	303.9394
Total	**4.4618**	**3.2744**	**5.5058**	**0.0101**	**0.5690**	**0.1204**	**0.6894**	**0.1651**	**0.1144**	**0.2795**	**0.0000**	**826.0436**	**826.0436**	**0.0510**	**0.0000**	**827.1154**

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					
2017	0.2149	1.7013	3.4370	6.2600e-003	0.3117	0.0306	0.3424	0.0819	0.0295	0.1114	0.0000	522.4864	522.4864	0.0328	0.0000	523.1759
2018	4.1019	0.7000	2.0248	3.8600e-003	0.2140	0.0137	0.2277	0.0574	0.0132	0.0706	0.0000	303.5571	303.5571	0.0182	0.0000	303.9393

Total	**4.3169**	**2.4013**	**5.4618**	**0.0101**	**0.5258**	**0.0444**	**0.5701**	**0.1393**	**0.0427**	**0.1820**	**0.0000**	**826.0434**	**826.0434**	**0.0510**	**0.0000**	**827.1152**

	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	**3.25**	**26.67**	**0.80**	**0.00**	**7.59**	**63.18**	**17.30**	**15.66**	**62.67**	**34.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	2.4621	0.0289	2.4901	3.9000e-004		0.0587	0.0587		0.0587	0.0587	4.7466	11.1938	15.9404	0.0123	4.0000e-004	16.3211
Energy	0.0157	0.1340	0.0570	8.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	827.6554	827.6554	0.0334	9.1400e-003	831.1885
Mobile	0.8751	1.6307	8.5274	0.0209	1.5778	0.0235	1.6013	0.4232	0.0217	0.4449	0.0000	1,499.3023	1,499.3023	0.0609	0.0000	1,500.5804
Waste						0.0000	0.0000		0.0000	0.0000	27.0790	0.0000	27.0790	1.6003	0.0000	60.6858
Water						0.0000	0.0000		0.0000	0.0000	5.9944	41.8710	47.8655	0.6176	0.0149	65.4626
Total	**3.3529**	**1.7936**	**11.0746**	**0.0222**	**1.5778**	**0.0931**	**1.6709**	**0.4232**	**0.0912**	**0.5144**	**37.8200**	**2,380.0225**	**2,417.8425**	**2.3244**	**0.0245**	**2,474.2384**

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	2.4621	0.0289	2.4901	3.9000e-004		0.0587	0.0587		0.0587	0.0587	4.7466	11.1938	15.9404	0.0123	4.0000e-004	16.3211
Energy	0.0157	0.1340	0.0570	8.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	827.6554	827.6554	0.0334	9.1400e-003	831.1885
Mobile	0.8751	1.6307	8.5274	0.0209	1.5778	0.0235	1.6013	0.4232	0.0217	0.4449	0.0000	1,499.3023	1,499.3023	0.0609	0.0000	1,500.5804
Waste						0.0000	0.0000		0.0000	0.0000	27.0790	0.0000	27.0790	1.6003	0.0000	60.6858
Water						0.0000	0.0000		0.0000	0.0000	5.9944	41.8710	47.8655	0.6175	0.0149	65.4531
Total	**3.3529**	**1.7936**	**11.0746**	**0.0222**	**1.5778**	**0.0931**	**1.6709**	**0.4232**	**0.0912**	**0.5144**	**37.8200**	**2,380.0225**	**2,417.8425**	**2.3243**	**0.0245**	**2,474.2289**

	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**	**0.01**	**0.08**	**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	1/1/2017	2/2/2017	5	25	
2	Site Preparation	Site Preparation	2/3/2017	2/10/2017	5	5	
3	Grading	Grading	2/5/2017	5/25/2017	5	80	
4	Trenching	Trenching	5/28/2017	6/29/2017	5	25	

5	Building Construction	Building Construction	5/28/2017	6/3/2018	5	266	
6	Interior Construction	Architectural Coating	6/3/2018	12/20/2018	5	145	
7	Paving	Paving	8/1/2018	10/1/2018	5	44	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 587,250; Residential Outdoor: 195,750; Non-Residential Indoor: 277,380; Non-Residential Outdoor: 92,460

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	1.40	81	0.73
Demolition	Excavators	1	6.40	162	0.38
Demolition	Rubber Tired Dozers	2	3.20	255	0.40
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Grading	Excavators	1	0.80	162	0.38
Grading	Graders	2	1.40	174	0.41
Grading	Rubber Tired Dozers	1	1.30	255	0.40
Grading	Tractors/Loaders/Backhoes	1	1.30	97	0.37
Trenching	Tractors/Loaders/Backhoes	1	3.00	97	0.37
Building Construction	Cranes	1	2.70	226	0.29
Building Construction	Forklifts	2	2.30	89	0.20
Building Construction	Generator Sets	2	4.10	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	0.90	97	0.37
Building Construction	Welders	2	0.50	46	0.45
Interior Construction	Aerial Lifts	1	2.20	62	0.31
Interior Construction	Air Compressors	1	1.70	78	0.48
Paving	Cement and Mortar Mixers	1	1.80	9	0.56
Paving	Pavers	1	1.10	125	0.42
Paving	Paving Equipment	1	1.10	130	0.36
Paving	Rollers	1	0.50	80	0.38
Paving	Tractors/Loaders/Backhoes	1	0.50	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	4	10.00	0.00	166.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	13.00	0.00	3,438.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	1	3.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	288.00	62.00	2,838.00	12.40	7.30	7.30	LD_Mix	HDT_Mix	HHDT
Interior Construction	2	58.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	444.00	12.40	7.30	7.30	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2017

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					0.0173	0.0000	0.0173	2.6200e-003	0.0000	2.6200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0161	0.1742	0.1361	1.5000e-004		8.4200e-003	8.4200e-003		7.8000e-003	7.8000e-003	0.0000	13.7682	13.7682	3.9700e-003	0.0000	13.8516
Total	**0.0161**	**0.1742**	**0.1361**	**1.5000e-004**	**0.0173**	**8.4200e-003**	**0.0257**	**2.6200e-003**	**7.8000e-003**	**0.0104**	**0.0000**	**13.7682**	**13.7682**	**3.9700e-003**	**0.0000**	**13.8516**

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	1.9400e-003	0.0216	0.0273	6.0000e-005	1.3700e-003	2.6000e-004	1.6300e-003	3.8000e-004	2.4000e-004	6.2000e-004	0.0000	5.2067	5.2067	4.0000e-005	0.0000	5.2075
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	3.8000e-004	6.0000e-004	5.6700e-003	1.0000e-005	1.0800e-003	1.0000e-005	1.0900e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.9419	0.9419	5.0000e-005	0.0000	0.9429
Total	**2.3200e-003**	**0.0222**	**0.0330**	**7.0000e-005**	**2.4500e-003**	**2.7000e-004**	**2.7200e-003**	**6.7000e-004**	**2.5000e-004**	**9.2000e-004**	**0.0000**	**6.1486**	**6.1486**	**9.0000e-005**	**0.0000**	**6.1504**

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					7.7800e-003	0.0000	7.7800e-003	5.9000e-004	0.0000	5.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1800e-003	0.1157	0.0916	1.5000e-004		2.8700e-003	2.8700e-003		2.8700e-003	2.8700e-003	0.0000	13.7681	13.7681	3.9700e-003	0.0000	13.8516
Total	**4.1800e-003**	**0.1157**	**0.0916**	**1.5000e-004**	**7.7800e-003**	**2.8700e-003**	**0.0107**	**5.9000e-004**	**2.8700e-003**	**3.4600e-003**	**0.0000**	**13.7681**	**13.7681**	**3.9700e-003**	**0.0000**	**13.8516**

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	1.9400e-003	0.0216	0.0273	6.0000e-005	1.3700e-003	2.6000e-004	1.6300e-003	3.8000e-004	2.4000e-004	6.2000e-004	0.0000	5.2067	5.2067	4.0000e-005	0.0000	5.2075
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	3.8000e-004	6.0000e-004	5.6700e-003	1.0000e-005	1.0800e-003	1.0000e-005	1.0900e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.9419	0.9419	5.0000e-005	0.0000	0.9429

Total	**2.3200e-003**	**0.0222**	**0.0330**	**7.0000e-005**	**2.4500e-003**	**2.7000e-004**	**2.7200e-003**	**6.7000e-004**	**2.5000e-004**	**9.2000e-004**	**0.0000**	**6.1486**	**6.1486**	**9.0000e-005**	**0.0000**	**6.1504**

3.3 Site Preparation - 2017

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					0.0158	0.0000	0.0158	8.6900e-003	0.0000	8.6900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7900e-003	0.0506	0.0387	4.0000e-005		2.8100e-003	2.8100e-003		2.5900e-003	2.5900e-003	0.0000	3.6829	3.6829	1.1300e-003	0.0000	3.7066
Total	**4.7900e-003**	**0.0506**	**0.0387**	**4.0000e-005**	**0.0158**	**2.8100e-003**	**0.0186**	**8.6900e-003**	**2.5900e-003**	**0.0113**	**0.0000**	**3.6829**	**3.6829**	**1.1300e-003**	**0.0000**	**3.7066**

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	8.0000e-005	1.2000e-004	1.1300e-003	0.0000	2.2000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1884	0.1884	1.0000e-005	0.0000	0.1886
Total	**8.0000e-005**	**1.2000e-004**	**1.1300e-003**	**0.0000**	**2.2000e-004**	**0.0000**	**2.2000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.1884**	**0.1884**	**1.0000e-005**	**0.0000**	**0.1886**

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					7.1100e-003	0.0000	7.1100e-003	1.9600e-003	0.0000	1.9600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3300e-003	0.0354	0.0246	4.0000e-005		1.0500e-003	1.0500e-003		1.0500e-003	1.0500e-003	0.0000	3.6829	3.6829	1.1300e-003	0.0000	3.7066
Total	**1.3300e-003**	**0.0354**	**0.0246**	**4.0000e-005**	**7.1100e-003**	**1.0500e-003**	**8.1600e-003**	**1.9600e-003**	**1.0500e-003**	**3.0100e-003**	**0.0000**	**3.6829**	**3.6829**	**1.1300e-003**	**0.0000**	**3.7066**

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	8.0000e-005	1.2000e-004	1.1300e-003	0.0000	2.2000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1884	0.1884	1.0000e-005	0.0000	0.1886

Total	**8.0000e-005**	**1.2000e-004**	**1.1300e-003**	**0.0000**	**2.2000e-004**	**0.0000**	**2.2000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.1884**	**0.1884**	**1.0000e-005**	**0.0000**	**0.1886**

3.4 Grading - 2017

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					0.0454	0.0000	0.0454	0.0221	0.0000	0.0221	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0243	0.2534	0.1596	1.8000e-004		0.0137	0.0137		0.0126	0.0126	0.0000	17.0885	17.0885	5.2400e-003	0.0000	17.1984
Total	**0.0243**	**0.2534**	**0.1596**	**1.8000e-004**	**0.0454**	**0.0137**	**0.0591**	**0.0221**	**0.0126**	**0.0346**	**0.0000**	**17.0885**	**17.0885**	**5.2400e-003**	**0.0000**	**17.1984**

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	0.0413	0.4605	0.5813	1.2400e-003	0.0286	5.5600e-003	0.0342	7.8400e-003	5.1100e-003	0.0130	0.0000	110.9239	110.9239	8.0000e-004	0.0000	110.9406
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	1.6300e-003	2.5700e-003	0.0243	5.0000e-005	4.6400e-003	4.0000e-005	4.6800e-003	1.2300e-003	3.0000e-005	1.2700e-003	0.0000	4.0304	4.0304	2.1000e-004	0.0000	4.0348
Total	**0.0429**	**0.4630**	**0.6055**	**1.2900e-003**	**0.0332**	**5.6000e-003**	**0.0388**	**9.0700e-003**	**5.1400e-003**	**0.0142**	**0.0000**	**114.9543**	**114.9543**	**1.0100e-003**	**0.0000**	**114.9754**

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					0.0204	0.0000	0.0204	4.9600e-003	0.0000	4.9600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.4400e-003	0.1576	0.1253	1.8000e-004		4.5700e-003	4.5700e-003		4.5700e-003	4.5700e-003	0.0000	17.0884	17.0884	5.2400e-003	0.0000	17.1984
Total	**6.4400e-003**	**0.1576**	**0.1253**	**1.8000e-004**	**0.0204**	**4.5700e-003**	**0.0250**	**4.9600e-003**	**4.5700e-003**	**9.5300e-003**	**0.0000**	**17.0884**	**17.0884**	**5.2400e-003**	**0.0000**	**17.1984**

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	0.0413	0.4605	0.5813	1.2400e-003	0.0286	5.5600e-003	0.0342	7.8400e-003	5.1100e-003	0.0130	0.0000	110.9239	110.9239	8.0000e-004	0.0000	110.9406
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	1.6300e-003	2.5700e-003	0.0243	5.0000e-005	4.6400e-003	4.0000e-005	4.6800e-003	1.2300e-003	3.0000e-005	1.2700e-003	0.0000	4.0304	4.0304	2.1000e-004	0.0000	4.0348

Total	**0.0429**	**0.4630**	**0.6055**	**1.2900e-003**	**0.0332**	**5.6000e-003**	**0.0388**	**9.0700e-003**	**5.1400e-003**	**0.0142**	**0.0000**	**114.9543**	**114.9543**	**1.0100e-003**	**0.0000**	**114.9754**

3.5 Trenching - 2017

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	1.4300e-003	0.0137	0.0108	1.0000e-005		1.0300e-003	1.0300e-003		9.5000e-004	9.5000e-004	0.0000	1.2993	1.2993	4.0000e-004	0.0000	1.3076
Total	**1.4300e-003**	**0.0137**	**0.0108**	**1.0000e-005**		**1.0300e-003**	**1.0300e-003**		**9.5000e-004**	**9.5000e-004**	**0.0000**	**1.2993**	**1.2993**	**4.0000e-004**	**0.0000**	**1.3076**

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	1.1000e-004	1.8000e-004	1.7000e-003	0.0000	3.3000e-004	0.0000	3.3000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2826	0.2826	1.0000e-005	0.0000	0.2829
Total	**1.1000e-004**	**1.8000e-004**	**1.7000e-003**	**0.0000**	**3.3000e-004**	**0.0000**	**3.3000e-004**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2826**	**0.2826**	**1.0000e-005**	**0.0000**	**0.2829**

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	6.6000e-004	0.0135	0.0105	1.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004	0.0000	1.2993	1.2993	4.0000e-004	0.0000	1.3076
Total	**6.6000e-004**	**0.0135**	**0.0105**	**1.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.5000e-004**	**5.5000e-004**	**0.0000**	**1.2993**	**1.2993**	**4.0000e-004**	**0.0000**	**1.3076**

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	1.1000e-004	1.8000e-004	1.7000e-003	0.0000	3.3000e-004	0.0000	3.3000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2826	0.2826	1.0000e-005	0.0000	0.2829

Total	**1.1000e-004**	**1.8000e-004**	**1.7000e-003**	**0.0000**	**3.3000e-004**	**0.0000**	**3.3000e-004**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2826**	**0.2826**	**1.0000e-005**	**0.0000**	**0.2829**

3.6 Building Construction - 2017

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	0.0793	0.6806	0.4669	7.9000e-004		0.0428	0.0428		0.0414	0.0414	0.0000	69.2532	69.2532	0.0109	0.0000	69.4828
Total	**0.0793**	**0.6806**	**0.4669**	**7.9000e-004**		**0.0428**	**0.0428**		**0.0414**	**0.0414**	**0.0000**	**69.2532**	**69.2532**	**0.0109**	**0.0000**	**69.4828**

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	0.0134	0.0937	0.2066	2.3000e-004	7.7700e-003	1.0200e-003	8.7800e-003	2.0500e-003	9.3000e-004	2.9900e-003	0.0000	20.5407	20.5407	1.7000e-004	0.0000	20.5442
Vendor	0.0589	0.4378	0.7958	1.1200e-003	0.0307	6.0300e-003	0.0367	8.8000e-003	5.5400e-003	0.0143	0.0000	100.0933	100.0933	7.7000e-004	0.0000	100.1095
Worker	0.0708	0.1116	1.0539	2.3600e-003	0.2017	1.5500e-003	0.2033	0.0537	1.4300e-003	0.0551	0.0000	175.1868	175.1868	9.1200e-003	0.0000	175.3782
Total	**0.1431**	**0.6430**	**2.0562**	**3.7100e-003**	**0.2402**	**8.6000e-003**	**0.2488**	**0.0645**	**7.9000e-003**	**0.0724**	**0.0000**	**295.8208**	**295.8208**	**0.0101**	**0.0000**	**296.0319**

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	0.0138	0.2505	0.4875	7.9000e-004		7.1300e-003	7.1300e-003		7.1300e-003	7.1300e-003	0.0000	69.2531	69.2531	0.0109	0.0000	69.4827
Total	**0.0138**	**0.2505**	**0.4875**	**7.9000e-004**		**7.1300e-003**	**7.1300e-003**		**7.1300e-003**	**7.1300e-003**	**0.0000**	**69.2531**	**69.2531**	**0.0109**	**0.0000**	**69.4827**

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	0.0134	0.0937	0.2066	2.3000e-004	7.7700e-003	1.0200e-003	8.7800e-003	2.0500e-003	9.3000e-004	2.9900e-003	0.0000	20.5407	20.5407	1.7000e-004	0.0000	20.5442
Vendor	0.0589	0.4378	0.7958	1.1200e-003	0.0307	6.0300e-003	0.0367	8.8000e-003	5.5400e-003	0.0143	0.0000	100.0933	100.0933	7.7000e-004	0.0000	100.1095
Worker	0.0708	0.1116	1.0539	2.3600e-003	0.2017	1.5500e-003	0.2033	0.0537	1.4300e-003	0.0551	0.0000	175.1868	175.1868	9.1200e-003	0.0000	175.3782

Total	**0.1431**	**0.6430**	**2.0562**	**3.7100e-003**	**0.2402**	**8.6000e-003**	**0.2488**	**0.0645**	**7.9000e-003**	**0.0724**	**0.0000**	**295.8208**	**295.8208**	**0.0101**	**0.0000**	**296.0319**

3.6 Building Construction - 2018

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	0.0492	0.4334	0.3226	5.6000e-004		0.0260	0.0260		0.0252	0.0252	0.0000	48.8908	48.8908	7.4400e-003	0.0000	49.0472
Total	**0.0492**	**0.4334**	**0.3226**	**5.6000e-004**		**0.0260**	**0.0260**		**0.0252**	**0.0252**	**0.0000**	**48.8908**	**48.8908**	**7.4400e-003**	**0.0000**	**49.0472**

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	8.9300e-003	0.0610	0.1409	1.6000e-004	7.4100e-003	7.1000e-004	8.1200e-003	1.9200e-003	6.6000e-004	2.5800e-003	0.0000	14.3379	14.3379	1.2000e-004	0.0000	14.3405
Vendor	0.0389	0.2821	0.5372	8.0000e-004	0.0218	3.9600e-003	0.0257	6.2400e-003	3.6400e-003	9.8900e-003	0.0000	69.8448	69.8448	5.4000e-004	0.0000	69.8560
Worker	0.0448	0.0715	0.6707	1.6700e-003	0.1432	1.0600e-003	0.1442	0.0381	9.8000e-004	0.0391	0.0000	119.8115	119.8115	5.9700e-003	0.0000	119.9368
Total	**0.0927**	**0.4147**	**1.3488**	**2.6300e-003**	**0.1723**	**5.7300e-003**	**0.1781**	**0.0463**	**5.2800e-003**	**0.0515**	**0.0000**	**203.9942**	**203.9942**	**6.6300e-003**	**0.0000**	**204.1333**

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	9.7700e-003	0.1778	0.3460	5.6000e-004		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	48.8908	48.8908	7.4400e-003	0.0000	49.0471
Total	**9.7700e-003**	**0.1778**	**0.3460**	**5.6000e-004**		**5.0600e-003**	**5.0600e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**48.8908**	**48.8908**	**7.4400e-003**	**0.0000**	**49.0471**

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	8.9300e-003	0.0610	0.1409	1.6000e-004	7.4100e-003	7.1000e-004	8.1200e-003	1.9200e-003	6.6000e-004	2.5800e-003	0.0000	14.3379	14.3379	1.2000e-004	0.0000	14.3405
Vendor	0.0389	0.2821	0.5372	8.0000e-004	0.0218	3.9600e-003	0.0257	6.2400e-003	3.6400e-003	9.8900e-003	0.0000	69.8448	69.8448	5.4000e-004	0.0000	69.8560
Worker	0.0448	0.0715	0.6707	1.6700e-003	0.1432	1.0600e-003	0.1442	0.0381	9.8000e-004	0.0391	0.0000	119.8115	119.8115	5.9700e-003	0.0000	119.9368

Total	**0.0927**	**0.4147**	**1.3488**	**2.6300e-003**	**0.1723**	**5.7300e-003**	**0.1781**	**0.0463**	**5.2800e-003**	**0.0515**	**0.0000**	**203.9942**	**203.9942**	**6.6300e-003**	**0.0000**	**204.1333**

3.7 Interior Construction - 2018

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	3.9799					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.9100e-003	0.0548	0.0591	9.0000e-005		3.4500e-003	3.4500e-003		3.4200e-003	3.4200e-003	0.0000	8.1951	8.1951	1.4200e-003	0.0000	8.2250
Total	**3.9868**	**0.0548**	**0.0591**	**9.0000e-005**		**3.4500e-003**	**3.4500e-003**		**3.4200e-003**	**3.4200e-003**	**0.0000**	**8.1951**	**8.1951**	**1.4200e-003**	**0.0000**	**8.2250**

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	0.0118	0.0189	0.1768	4.4000e-004	0.0377	2.8000e-004	0.0380	0.0100	2.6000e-004	0.0103	0.0000	31.5867	31.5867	1.5700e-003	0.0000	31.6197
Total	**0.0118**	**0.0189**	**0.1768**	**4.4000e-004**	**0.0377**	**2.8000e-004**	**0.0380**	**0.0100**	**2.6000e-004**	**0.0103**	**0.0000**	**31.5867**	**31.5867**	**1.5700e-003**	**0.0000**	**31.6197**

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	3.9799					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1500e-003	0.0345	0.0622	9.0000e-005		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	8.1951	8.1951	1.4200e-003	0.0000	8.2250
Total	**3.9821**	**0.0345**	**0.0622**	**9.0000e-005**		**1.3700e-003**	**1.3700e-003**		**1.3700e-003**	**1.3700e-003**	**0.0000**	**8.1951**	**8.1951**	**1.4200e-003**	**0.0000**	**8.2250**

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	0.0118	0.0189	0.1768	4.4000e-004	0.0377	2.8000e-004	0.0380	0.0100	2.6000e-004	0.0103	0.0000	31.5867	31.5867	1.5700e-003	0.0000	31.6197

Total	**0.0118**	**0.0189**	**0.1768**	**4.4000e-004**	**0.0377**	**2.8000e-004**	**0.0380**	**0.0100**	**2.6000e-004**	**0.0103**	**0.0000**	**31.5867**	**31.5867**	**1.5700e-003**	**0.0000**	**31.6197**

3.8 Paving - 2018

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	2.6700e-003	0.0273	0.0235	4.0000e-005		1.4600e-003	1.4600e-003		1.3500e-003	1.3500e-003	0.0000	3.3027	3.3027	9.8000e-004	0.0000	3.3233
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.6700e-003**	**0.0273**	**0.0235**	**4.0000e-005**		**1.4600e-003**	**1.4600e-003**		**1.3500e-003**	**1.3500e-003**	**0.0000**	**3.3027**	**3.3027**	**9.8000e-004**	**0.0000**	**3.3233**

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	3.3800e-003	0.0231	0.0533	6.0000e-005	1.3600e-003	2.7000e-004	1.6200e-003	3.7000e-004	2.5000e-004	6.2000e-004	0.0000	5.4243	5.4243	5.0000e-005	0.0000	5.4253
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	8.1000e-004	1.2900e-003	0.0121	3.0000e-005	2.5800e-003	2.0000e-005	2.6000e-003	6.9000e-004	2.0000e-005	7.1000e-004	0.0000	2.1633	2.1633	1.1000e-004	0.0000	2.1655
Total	**4.1900e-003**	**0.0244**	**0.0654**	**9.0000e-005**	**3.9400e-003**	**2.9000e-004**	**4.2200e-003**	**1.0600e-003**	**2.7000e-004**	**1.3300e-003**	**0.0000**	**7.5876**	**7.5876**	**1.6000e-004**	**0.0000**	**7.5908**

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	1.3800e-003	0.0297	0.0256	4.0000e-005		9.9000e-004	9.9000e-004		9.9000e-004	9.9000e-004	0.0000	3.3027	3.3027	9.8000e-004	0.0000	3.3233
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.3800e-003**	**0.0297**	**0.0256**	**4.0000e-005**		**9.9000e-004**	**9.9000e-004**		**9.9000e-004**	**9.9000e-004**	**0.0000**	**3.3027**	**3.3027**	**9.8000e-004**	**0.0000**	**3.3233**

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	3.3800e-003	0.0231	0.0533	6.0000e-005	1.3600e-003	2.7000e-004	1.6200e-003	3.7000e-004	2.5000e-004	6.2000e-004	0.0000	5.4243	5.4243	5.0000e-005	0.0000	5.4253
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	8.1000e-004	1.2900e-003	0.0121	3.0000e-005	2.5800e-003	2.0000e-005	2.6000e-003	6.9000e-004	2.0000e-005	7.1000e-004	0.0000	2.1633	2.1633	1.1000e-004	0.0000	2.1655

Total	**4.1900e-003**	**0.0244**	**0.0654**	**9.0000e-005**	**3.9400e-003**	**2.9000e-004**	**4.2200e-003**	**1.0600e-003**	**2.7000e-004**	**1.3300e-003**	**0.0000**	**7.5876**	**7.5876**	**1.6000e-004**	**0.0000**	**7.5908**

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	0.8751	1.6307	8.5274	0.0209	1.5778	0.0235	1.6013	0.4232	0.0217	0.4449	0.0000	1,499.3023	1,499.3023	0.0609	0.0000	1,500.5804
Unmitigated	0.8751	1.6307	8.5274	0.0209	1.5778	0.0235	1.6013	0.4232	0.0217	0.4449	0.0000	1,499.3023	1,499.3023	0.0609	0.0000	1,500.5804

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,766.12	1,918.88	1626.76	3,946,900	3,946,900
Condo/Townhouse	144.98	157.52	133.54	323,999	323,999
Enclosed Parking with Elevator	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,911.10	2,076.40	1,760.30	4,270,899	4,270,899

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-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Condo/Townhouse	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.579581	0.062616	0.176505	0.113545	0.029546	0.004152	0.015698	0.004192	0.002652	0.003672	0.006635	0.000224	0.000983

5.0 Energy Detail

4.4 Fleet Mix

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	672.5189	672.5189	0.0304	6.2900e-003	675.1079
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	672.5189	672.5189	0.0304	6.2900e-003	675.1079
NaturalGas Mitigated	0.0157	0.1340	0.0570	8.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	155.1364	155.1364	2.9700e-003	2.8400e-003	156.0806
NaturalGas Unmitigated	0.0157	0.1340	0.0570	8.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	155.1364	155.1364	2.9700e-003	2.8400e-003	156.0806

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					
Apartments Mid Rise	2.37278e+006	0.0128	0.1093	0.0465	7.0000e-004		8.8400e-003	8.8400e-003		8.8400e-003	8.8400e-003	0.0000	126.6208	126.6208	2.4300e-003	2.3200e-003	127.3914
Condo/Townhouse	534363	2.8800e-003	0.0246	0.0105	1.6000e-004		1.9900e-003	1.9900e-003		1.9900e-003	1.9900e-003	0.0000	28.5157	28.5157	5.5000e-004	5.2000e-004	28.6892
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0157**	**0.1340**	**0.0570**	**8.6000e-004**		**0.0108**	**0.0108**		**0.0108**	**0.0108**	**0.0000**	**155.1364**	**155.1364**	**2.9800e-003**	**2.8400e-003**	**156.0806**

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					
Apartments Mid Rise	2.37278e+006	0.0128	0.1093	0.0465	7.0000e-004		8.8400e-003	8.8400e-003		8.8400e-003	8.8400e-003	0.0000	126.6208	126.6208	2.4300e-003	2.3200e-003	127.3914
Condo/Townhouse	534363	2.8800e-003	0.0246	0.0105	1.6000e-004		1.9900e-003	1.9900e-003		1.9900e-003	1.9900e-003	0.0000	28.5157	28.5157	5.5000e-004	5.2000e-004	28.6892
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0157**	**0.1340**	**0.0570**	**8.6000e-004**		**0.0108**	**0.0108**		**0.0108**	**0.0108**	**0.0000**	**155.1364**	**155.1364**	**2.9800e-003**	**2.8400e-003**	**156.0806**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	968914	281.8681	0.0128	2.6400e-003	282.9532
Condo/Townhouse	93779.2	27.2814	1.2300e-003	2.6000e-004	27.3865
Enclosed Parking with Elevator	1.24555e+006	362.3454	0.0164	3.3900e-003	363.7403
Parking Lot	3520	1.0240	5.0000e-005	1.0000e-005	1.0280
Total		**672.5189**	**0.0304**	**6.3000e-003**	**675.1079**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e

Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	968914	281.8681	0.0128	2.6400e-003	282.9532
Condo/Townhouse	93779.2	27.2814	1.2300e-003	2.6000e-004	27.3865
Enclosed Parking with Elevator	1.24555e+006	362.3454	0.0164	3.3900e-003	363.7403
Parking Lot	3520	1.0240	5.0000e-005	1.0000e-005	1.0280
Total		**672.5189**	**0.0304**	**6.3000e-003**	**675.1079**

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	2.4621	0.0289	2.4901	3.9000e-004		0.0587	0.0587		0.0587	0.0587	4.7466	11.1938	15.9404	0.0123	4.0000e-004	16.3211
Unmitigated	2.4621	0.0289	2.4901	3.9000e-004		0.0587	0.0587		0.0587	0.0587	4.7466	11.1938	15.9404	0.0123	4.0000e-004	16.3211

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	0.3006					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.8700					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.2249	3.8200e-003	0.3218	2.8000e-004		0.0468	0.0468		0.0468	0.0468	4.7466	7.6680	12.4146	8.8100e-003	4.0000e-004	12.7224
Landscaping	0.0667	0.0251	2.1683	1.1000e-004		0.0119	0.0119		0.0119	0.0119	0.0000	3.5258	3.5258	3.4800e-003	0.0000	3.5988
Total	**2.4621**	**0.0289**	**2.4901**	**3.9000e-004**		**0.0587**	**0.0587**		**0.0587**	**0.0587**	**4.7466**	**11.1938**	**15.9404**	**0.0123**	**4.0000e-004**	**16.3212**

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	0.3006					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.8700					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.2249	3.8200e-003	0.3218	2.8000e-004		0.0468	0.0468		0.0468	0.0468	4.7466	7.6680	12.4146	8.8100e-003	4.0000e-004	12.7224
Landscaping	0.0667	0.0251	2.1683	1.1000e-004		0.0119	0.0119		0.0119	0.0119	0.0000	3.5258	3.5258	3.4800e-003	0.0000	3.5988
Total	**2.4621**	**0.0289**	**2.4901**	**3.9000e-004**		**0.0587**	**0.0587**		**0.0587**	**0.0587**	**4.7466**	**11.1938**	**15.9404**	**0.0123**	**4.0000e-004**	**16.3212**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	47.8655	0.6175	0.0149	65.4531
Unmitigated	47.8655	0.6176	0.0149	65.4626

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	17.4613 / 11.0082	44.2343	0.5707	0.0138	60.4965
Condo/Townhouse	1.43339 / 0.903658	3.6312	0.0469	1.1300e-003	4.9661
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**47.8655**	**0.6176**	**0.0149**	**65.4626**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	17.4613 / 11.0082	44.2343	0.5706	0.0138	60.4877
Condo/Townhouse	1.43339 / 0.903658	3.6312	0.0468	1.1300e-003	4.9654
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**47.8655**	**0.6175**	**0.0149**	**65.4531**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e

	MT/yr			
Mitigated	27.0790	1.6003	0.0000	60.6858
Unmitigated	27.0790	1.6003	0.0000	60.6858

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	123.28	25.0247	1.4789	0.0000	56.0820
Condo/Townhouse	10.12	2.0543	0.1214	0.0000	4.6038
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**27.0790**	**1.6003**	**0.0000**	**60.6858**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	123.28	25.0247	1.4789	0.0000	56.0820
Condo/Townhouse	10.12	2.0543	0.1214	0.0000	4.6038
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**27.0790**	**1.6003**	**0.0000**	**60.6858**

9.0 Operational Offroad

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

10.0 Vegetation

Carolan Avenue/Rollins Road

San Mateo County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	462.00	Space	0.00	184,800.00	0
Parking Lot	10.00	Space	0.00	4,000.00	0
Apartments Mid Rise	268.00	Dwelling Unit	5.40	268,000.00	766
Condo/Townhouse	22.00	Dwelling Unit	0.00	22,000.00	63

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2019
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 -

Land Use - All acreage assinged to apartments

Construction Phase - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Off-road Equipment - Based on provided construction schedule and equipment list

Trips and VMT - Includes cement and asphalt at 9cy/load. travel distance 0.3 mi for on-site and local travel for TAC analysis

Demolition - Based on provided construction schedule and equipment list plus asphalt

Grading - Based on provided construction schedule and equipment list

Architectural Coating - Architectual coatings meeting BAAQMD Rules/Regs

Construction Off-road Equipment Mitigation - Tier 2 mobile, Tier 4 portable and BMPs

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	150.00
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	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	145.00
tblConstructionPhase	NumDays	230.00	266.00
tblConstructionPhase	NumDays	20.00	25.00
tblConstructionPhase	NumDays	20.00	80.00
tblConstructionPhase	NumDays	20.00	44.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	PhaseEndDate	12/21/2018	12/20/2018
tblConstructionPhase	PhaseEndDate	7/6/2018	6/3/2018
tblConstructionPhase	PhaseEndDate	2/3/2017	2/2/2017
tblConstructionPhase	PhaseEndDate	6/2/2017	5/25/2017
tblConstructionPhase	PhaseEndDate	2/20/2019	10/1/2018
tblConstructionPhase	PhaseEndDate	2/9/2017	2/10/2017
tblConstructionPhase	PhaseStartDate	6/4/2018	6/3/2018
tblConstructionPhase	PhaseStartDate	6/30/2017	5/28/2017
tblConstructionPhase	PhaseStartDate	2/11/2017	2/5/2017
tblConstructionPhase	PhaseStartDate	12/21/2018	8/1/2018
tblConstructionPhase	PhaseStartDate	5/26/2017	5/28/2017
tblGrading	AcresOfGrading	14.00	10.00
tblGrading	MaterialExported	0.00	27,500.00
tblLandUse	LotAcreage	4.16	0.00
tblLandUse	LotAcreage	0.09	0.00
tblLandUse	LotAcreage	7.05	5.40
tblLandUse	LotAcreage	1.38	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	6.00	1.70
tblOffRoadEquipment	UsageHours	8.00	1.40
tblOffRoadEquipment	UsageHours	7.00	2.70
tblOffRoadEquipment	UsageHours	8.00	6.40
tblOffRoadEquipment	UsageHours	8.00	0.80
tblOffRoadEquipment	UsageHours	8.00	2.30
tblOffRoadEquipment	UsageHours	8.00	4.10
tblOffRoadEquipment	UsageHours	8.00	1.40
tblOffRoadEquipment	UsageHours	8.00	1.10
tblOffRoadEquipment	UsageHours	8.00	1.10
tblOffRoadEquipment	UsageHours	8.00	0.50
tblOffRoadEquipment	UsageHours	8.00	3.20
tblOffRoadEquipment	UsageHours	8.00	1.30
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	7.00	0.90
tblOffRoadEquipment	UsageHours	8.00	1.30
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	0.50
tblProjectCharacteristics	OperationalYear	2014	2019
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
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tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripNumber	0.00	2,838.00
tblTripsAndVMT	HaulingTripNumber	0.00	444.00
tblTripsAndVMT	VendorTripLength	7.30	0.30
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tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30

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					
2017	0.2480	1.3682	2.1492	1.5100e-003	0.0860	0.0697	0.1557	0.0354	0.0662	0.1016	0.0000	131.7108	131.7108	0.0229	0.0000	132.1912
2018	4.1157	0.6227	1.1388	9.2000e-004	5.9800e-003	0.0316	0.0376	1.6500e-003	0.0305	0.0322	0.0000	77.7368	77.7368	0.0107	0.0000	77.9621
Total	**4.3638**	**1.9909**	**3.2879**	**2.4300e-003**	**0.0920**	**0.1013**	**0.1932**	**0.0371**	**0.0967**	**0.1338**	**0.0000**	**209.4476**	**209.4476**	**0.0336**	**0.0000**	**210.1533**

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					
2017	0.1485	0.7684	2.0766	1.5100e-003	0.0428	0.0172	0.0600	9.5600e-003	0.0171	0.0267	0.0000	131.7107	131.7107	0.0229	0.0000	132.1911
2018	4.0703	0.3493	1.1674	9.2000e-004	5.9800e-003	8.0200e-003	0.0140	1.6500e-003	7.9700e-003	9.6200e-003	0.0000	77.7367	77.7367	0.0107	0.0000	77.9620
Total	**4.2188**	**1.1177**	**3.2439**	**2.4300e-003**	**0.0488**	**0.0252**	**0.0740**	**0.0112**	**0.0251**	**0.0363**	**0.0000**	**209.4474**	**209.4474**	**0.0336**	**0.0000**	**210.1531**

	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	**3.32**	**43.86**	**1.34**	**0.00**	**46.97**	**75.13**	**61.73**	**69.75**	**74.10**	**72.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	2.4621	0.0289	2.4901	3.9000e-004		0.0587	0.0587		0.0587	0.0587	4.7466	11.1938	15.9404	0.0123	4.0000e-004	16.3211
Energy	0.0157	0.1340	0.0570	8.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	827.6554	827.6554	0.0334	9.1400e-003	831.1885
Mobile	0.8751	1.6307	8.5274	0.0209	1.5778	0.0235	1.6013	0.4232	0.0217	0.4449	0.0000	1,499.3023	1,499.3023	0.0609	0.0000	1,500.5804
Waste						0.0000	0.0000		0.0000	0.0000	27.0790	0.0000	27.0790	1.6003	0.0000	60.6858
Water						0.0000	0.0000		0.0000	0.0000	5.9944	41.8710	47.8655	0.6176	0.0149	65.4626
Total	**3.3529**	**1.7936**	**11.0746**	**0.0222**	**1.5778**	**0.0931**	**1.6709**	**0.4232**	**0.0912**	**0.5144**	**37.8200**	**2,380.0225**	**2,417.8425**	**2.3244**	**0.0245**	**2,474.2384**

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	2.4621	0.0289	2.4901	3.9000e-004		0.0587	0.0587		0.0587	0.0587	4.7466	11.1938	15.9404	0.0123	4.0000e-004	16.3211
Energy	0.0157	0.1340	0.0570	8.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	827.6554	827.6554	0.0334	9.1400e-003	831.1885

Mobile	0.8751	1.6307	8.5274	0.0209	1.5778	0.0235	1.6013	0.4232	0.0217	0.4449	0.0000	1,499.3023	1,499.3023	0.0609	0.0000	1,500.5804
Waste						0.0000	0.0000		0.0000	0.0000	27.0790	0.0000	27.0790	1.6003	0.0000	60.6858
Water						0.0000	0.0000		0.0000	0.0000	5.9944	41.8710	47.8655	0.6175	0.0149	65.4531
Total	**3.3529**	**1.7936**	**11.0746**	**0.0222**	**1.5778**	**0.0931**	**1.6709**	**0.4232**	**0.0912**	**0.5144**	**37.8200**	**2,380.0225**	**2,417.8425**	**2.3243**	**0.0245**	**2,474.2289**

	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**	**0.01**	**0.08**	**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	1/1/2017	2/2/2017	5	25	
2	Site Preparation	Site Preparation	2/3/2017	2/10/2017	5	5	
3	Grading	Grading	2/5/2017	5/25/2017	5	80	
4	Trenching	Trenching	5/28/2017	6/29/2017	5	25	
5	Building Construction	Building Construction	5/28/2017	6/3/2018	5	266	
6	Interior Construction	Architectural Coating	6/3/2018	12/20/2018	5	145	
7	Paving	Paving	8/1/2018	10/1/2018	5	44	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 587,250; Residential Outdoor: 195,750; Non-Residential Indoor: 277,380; Non-Residential Outdoor: 92,460

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	1.40	81	0.73
Demolition	Excavators	1	6.40	162	0.38
Demolition	Rubber Tired Dozers	2	3.20	255	0.40
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Grading	Excavators	1	0.80	162	0.38
Grading	Graders	2	1.40	174	0.41
Grading	Rubber Tired Dozers	1	1.30	255	0.40
Grading	Tractors/Loaders/Backhoes	1	1.30	97	0.37
Trenching	Tractors/Loaders/Backhoes	1	3.00	97	0.37
Building Construction	Cranes	1	2.70	226	0.29
Building Construction	Forklifts	2	2.30	89	0.20
Building Construction	Generator Sets	2	4.10	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	0.90	97	0.37
Building Construction	Welders	2	0.50	46	0.45
Interior Construction	Aerial Lifts	1	2.20	62	0.31
Interior Construction	Air Compressors	1	1.70	78	0.48
Paving	Cement and Mortar Mixers	1	1.80	9	0.56
Paving	Pavers	1	1.10	125	0.42
Paving	Paving Equipment	1	1.10	130	0.36
Paving	Rollers	1	0.50	80	0.38

Paving	Tractors/Loaders/Backhoes	1	0.50	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	4	10.00	0.00	166.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Grading	5	13.00	0.00	3,438.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Trenching	1	3.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Building Construction	8	288.00	62.00	2,838.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Interior Construction	2	58.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	444.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2017

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					0.0173	0.0000	0.0173	2.6200e-003	0.0000	2.6200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0161	0.1742	0.1361	1.5000e-004		8.4200e-003	8.4200e-003		7.8000e-003	7.8000e-003	0.0000	13.7682	13.7682	3.9700e-003	0.0000	13.8516
Total	**0.0161**	**0.1742**	**0.1361**	**1.5000e-004**	**0.0173**	**8.4200e-003**	**0.0257**	**2.6200e-003**	**7.8000e-003**	**0.0104**	**0.0000**	**13.7682**	**13.7682**	**3.9700e-003**	**0.0000**	**13.8516**

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	9.4000e-004	2.0900e-003	0.0158	0.0000	2.0000e-005	1.0000e-005	3.0000e-005	1.0000e-005	1.0000e-005	1.0000e-005	0.0000	0.2006	0.2006	0.0000	0.0000	0.2007
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	2.6000e-004	7.0000e-005	1.0000e-003	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0462	0.0462	0.0000	0.0000	0.0463
Total	**1.2000e-003**	**2.1600e-003**	**0.0168**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**6.0000e-005**	**2.0000e-005**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**0.2468**	**0.2468**	**0.0000**	**0.0000**	**0.2470**

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					7.7800e-003	0.0000	7.7800e-003	5.9000e-004	0.0000	5.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1800e-003	0.1157	0.0916	1.5000e-004		2.8700e-003	2.8700e-003		2.8700e-003	2.8700e-003	0.0000	13.7681	13.7681	3.9700e-003	0.0000	13.8516
Total	**4.1800e-003**	**0.1157**	**0.0916**	**1.5000e-004**	**7.7800e-003**	**2.8700e-003**	**0.0107**	**5.9000e-004**	**2.8700e-003**	**3.4600e-003**	**0.0000**	**13.7681**	**13.7681**	**3.9700e-003**	**0.0000**	**13.8516**

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	9.4000e-004	2.0900e-003	0.0158	0.0000	2.0000e-005	1.0000e-005	3.0000e-005	1.0000e-005	1.0000e-005	1.0000e-005	0.0000	0.2006	0.2006	0.0000	0.0000	0.2007
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	2.6000e-004	7.0000e-005	1.0000e-003	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0462	0.0462	0.0000	0.0000	0.0463
Total	**1.2000e-003**	**2.1600e-003**	**0.0168**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**6.0000e-005**	**2.0000e-005**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**0.2468**	**0.2468**	**0.0000**	**0.0000**	**0.2470**

3.3 Site Preparation - 2017

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					0.0158	0.0000	0.0158	8.6900e-003	0.0000	8.6900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7900e-003	0.0506	0.0387	4.0000e-005		2.8100e-003	2.8100e-003		2.5900e-003	2.5900e-003	0.0000	3.6829	3.6829	1.1300e-003	0.0000	3.7066
Total	**4.7900e-003**	**0.0506**	**0.0387**	**4.0000e-005**	**0.0158**	**2.8100e-003**	**0.0186**	**8.6900e-003**	**2.5900e-003**	**0.0113**	**0.0000**	**3.6829**	**3.6829**	**1.1300e-003**	**0.0000**	**3.7066**

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	5.0000e-005	1.0000e-005	2.0000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	9.2400e-003	9.2400e-003	0.0000	0.0000	9.2600e-003
Total	**5.0000e-005**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.2400e-003**	**9.2400e-003**	**0.0000**	**0.0000**	**9.2600e-003**

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					7.1100e-003	0.0000	7.1100e-003	1.9600e-003	0.0000	1.9600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3300e-003	0.0354	0.0246	4.0000e-005		1.0500e-003	1.0500e-003		1.0500e-003	1.0500e-003	0.0000	3.6829	3.6829	1.1300e-003	0.0000	3.7066
Total	**1.3300e-003**	**0.0354**	**0.0246**	**4.0000e-005**	**7.1100e-003**	**1.0500e-003**	**8.1600e-003**	**1.9600e-003**	**1.0500e-003**	**3.0100e-003**	**0.0000**	**3.6829**	**3.6829**	**1.1300e-003**	**0.0000**	**3.7066**

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	5.0000e-005	1.0000e-005	2.0000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	9.2400e-003	9.2400e-003	0.0000	0.0000	9.2600e-003
Total	**5.0000e-005**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.2400e-003**	**9.2400e-003**	**0.0000**	**0.0000**	**9.2600e-003**

3.4 Grading - 2017

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					0.0454	0.0000	0.0454	0.0221	0.0000	0.0221	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0243	0.2534	0.1596	1.8000e-004		0.0137	0.0137		0.0126	0.0126	0.0000	17.0885	17.0885	5.2400e-003	0.0000	17.1984
Total	**0.0243**	**0.2534**	**0.1596**	**1.8000e-004**	**0.0454**	**0.0137**	**0.0591**	**0.0221**	**0.0126**	**0.0346**	**0.0000**	**17.0885**	**17.0885**	**5.2400e-003**	**0.0000**	**17.1984**

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	0.0199	0.0445	0.3376	5.0000e-005	4.6000e-004	1.7000e-004	6.3000e-004	1.3000e-004	1.5000e-004	2.8000e-004	0.0000	4.2730	4.2730	9.0000e-005	0.0000	4.2750
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	1.1300e-003	3.0000e-004	4.2700e-003	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	4.0000e-005	0.0000	0.1978	0.1978	2.0000e-005	0.0000	0.1982
Total	**0.0211**	**0.0448**	**0.3418**	**5.0000e-005**	**5.8000e-004**	**1.7000e-004**	**7.5000e-004**	**1.6000e-004**	**1.5000e-004**	**3.2000e-004**	**0.0000**	**4.4708**	**4.4708**	**1.1000e-004**	**0.0000**	**4.4732**

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					0.0204	0.0000	0.0204	4.9600e-003	0.0000	4.9600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.4400e-003	0.1576	0.1253	1.8000e-004		4.5700e-003	4.5700e-003		4.5700e-003	4.5700e-003	0.0000	17.0884	17.0884	5.2400e-003	0.0000	17.1984
Total	**6.4400e-003**	**0.1576**	**0.1253**	**1.8000e-004**	**0.0204**	**4.5700e-003**	**0.0250**	**4.9600e-003**	**4.5700e-003**	**9.5300e-003**	**0.0000**	**17.0884**	**17.0884**	**5.2400e-003**	**0.0000**	**17.1984**

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	0.0199	0.0445	0.3376	5.0000e-005	4.6000e-004	1.7000e-004	6.3000e-004	1.3000e-004	1.5000e-004	2.8000e-004	0.0000	4.2730	4.2730	9.0000e-005	0.0000	4.2750
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	1.1300e-003	3.0000e-004	4.2700e-003	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	4.0000e-005	0.0000	0.1978	0.1978	2.0000e-005	0.0000	0.1982
Total	**0.0211**	**0.0448**	**0.3418**	**5.0000e-005**	**5.8000e-004**	**1.7000e-004**	**7.5000e-004**	**1.6000e-004**	**1.5000e-004**	**3.2000e-004**	**0.0000**	**4.4708**	**4.4708**	**1.1000e-004**	**0.0000**	**4.4732**

3.5 Trenching - 2017

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	1.4300e-003	0.0137	0.0108	1.0000e-005		1.0300e-003	1.0300e-003		9.5000e-004	9.5000e-004	0.0000	1.2993	1.2993	4.0000e-004	0.0000	1.3076
Total	**1.4300e-003**	**0.0137**	**0.0108**	**1.0000e-005**		**1.0300e-003**	**1.0300e-003**		**9.5000e-004**	**9.5000e-004**	**0.0000**	**1.2993**	**1.2993**	**4.0000e-004**	**0.0000**	**1.3076**

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	8.0000e-005	2.0000e-005	3.0000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0139	0.0139	0.0000	0.0000	0.0139
Total	**8.0000e-005**	**2.0000e-005**	**3.0000e-004**	**0.0000**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0139**	**0.0139**	**0.0000**	**0.0000**	**0.0139**

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	6.6000e-004	0.0135	0.0105	1.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004	0.0000	1.2993	1.2993	4.0000e-004	0.0000	1.3076
Total	**6.6000e-004**	**0.0135**	**0.0105**	**1.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.5000e-004**	**5.5000e-004**	**0.0000**	**1.2993**	**1.2993**	**4.0000e-004**	**0.0000**	**1.3076**

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	8.0000e-005	2.0000e-005	3.0000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0139	0.0139	0.0000	0.0000	0.0139
Total	**8.0000e-005**	**2.0000e-005**	**3.0000e-004**	**0.0000**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0139**	**0.0139**	**0.0000**	**0.0000**	**0.0139**

3.6 Building Construction - 2017

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	0.0793	0.6806	0.4669	7.9000e-004		0.0428	0.0428		0.0414	0.0414	0.0000	69.2532	69.2532	0.0109	0.0000	69.4828
Total	**0.0793**	**0.6806**	**0.4669**	**7.9000e-004**		**0.0428**	**0.0428**		**0.0414**	**0.0414**	**0.0000**	**69.2532**	**69.2532**	**0.0109**	**0.0000**	**69.4828**

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	9.7100e-003	0.0217	0.1644	3.0000e-005	3.4000e-004	8.0000e-005	4.2000e-004	9.0000e-005	7.0000e-005	1.6000e-004	0.0000	2.0814	2.0814	5.0000e-005	0.0000	2.0824
Vendor	0.0411	0.1139	0.6277	1.3000e-004	1.3700e-003	5.2000e-004	1.8900e-003	4.1000e-004	4.8000e-004	8.8000e-004	0.0000	11.2012	11.2012	1.8000e-004	0.0000	11.2050
Worker	0.0490	0.0131	0.1858	1.2000e-004	5.1000e-003	2.1000e-004	5.3000e-003	1.3800e-003	1.9000e-004	1.5700e-003	0.0000	8.5956	8.5956	8.5000e-004	0.0000	8.6135
Total	**0.0998**	**0.1487**	**0.9779**	**2.8000e-004**	**6.8100e-003**	**8.1000e-004**	**7.6100e-003**	**1.8800e-003**	**7.4000e-004**	**2.6100e-003**	**0.0000**	**21.8782**	**21.8782**	**1.0800e-003**	**0.0000**	**21.9009**

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	0.0138	0.2505	0.4875	7.9000e-004		7.1300e-003	7.1300e-003		7.1300e-003	7.1300e-003	0.0000	69.2531	69.2531	0.0109	0.0000	69.4827
Total	**0.0138**	**0.2505**	**0.4875**	**7.9000e-004**		**7.1300e-003**	**7.1300e-003**		**7.1300e-003**	**7.1300e-003**	**0.0000**	**69.2531**	**69.2531**	**0.0109**	**0.0000**	**69.4827**

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	9.7100e-003	0.0217	0.1644	3.0000e-005	3.4000e-004	8.0000e-005	4.2000e-004	9.0000e-005	7.0000e-005	1.6000e-004	0.0000	2.0814	2.0814	5.0000e-005	0.0000	2.0824
Vendor	0.0411	0.1139	0.6277	1.3000e-004	1.3700e-003	5.2000e-004	1.8900e-003	4.1000e-004	4.8000e-004	8.8000e-004	0.0000	11.2012	11.2012	1.8000e-004	0.0000	11.2050
Worker	0.0490	0.0131	0.1858	1.2000e-004	5.1000e-003	2.1000e-004	5.3000e-003	1.3800e-003	1.9000e-004	1.5700e-003	0.0000	8.5956	8.5956	8.5000e-004	0.0000	8.6135
Total	**0.0998**	**0.1487**	**0.9779**	**2.8000e-004**	**6.8100e-003**	**8.1000e-004**	**7.6100e-003**	**1.8800e-003**	**7.4000e-004**	**2.6100e-003**	**0.0000**	**21.8782**	**21.8782**	**1.0800e-003**	**0.0000**	**21.9009**

3.6 Building Construction - 2018

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	0.0492	0.4334	0.3226	5.6000e-004		0.0260	0.0260		0.0252	0.0252	0.0000	48.8908	48.8908	7.4400e-003	0.0000	49.0472
Total	**0.0492**	**0.4334**	**0.3226**	**5.6000e-004**		**0.0260**	**0.0260**		**0.0252**	**0.0252**	**0.0000**	**48.8908**	**48.8908**	**7.4400e-003**	**0.0000**	**49.0472**

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	6.3600e-003	0.0147	0.1124	2.0000e-005	3.2000e-004	6.0000e-005	3.7000e-004	8.0000e-005	5.0000e-005	1.3000e-004	0.0000	1.4503	1.4503	3.0000e-005	0.0000	1.4510
Vendor	0.0269	0.0763	0.4256	1.0000e-004	9.7000e-004	3.4000e-004	1.3100e-003	2.9000e-004	3.1000e-004	6.0000e-004	0.0000	7.8135	7.8135	1.3000e-004	0.0000	7.8163
Worker	0.0323	8.3700e-003	0.1195	8.0000e-005	3.6200e-003	1.5000e-004	3.7600e-003	9.8000e-004	1.4000e-004	1.1200e-003	0.0000	5.8795	5.8795	5.4000e-004	0.0000	5.8909
Total	**0.0656**	**0.0994**	**0.6575**	**2.0000e-004**	**4.9100e-003**	**5.5000e-004**	**5.4400e-003**	**1.3500e-003**	**5.0000e-004**	**1.8500e-003**	**0.0000**	**15.1433**	**15.1433**	**7.0000e-004**	**0.0000**	**15.1582**

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	9.7700e-003	0.1778	0.3460	5.6000e-004		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	48.8908	48.8908	7.4400e-003	0.0000	49.0471
Total	**9.7700e-003**	**0.1778**	**0.3460**	**5.6000e-004**		**5.0600e-003**	**5.0600e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**48.8908**	**48.8908**	**7.4400e-003**	**0.0000**	**49.0471**

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	6.3600e-003	0.0147	0.1124	2.0000e-005	3.2000e-004	6.0000e-005	3.7000e-004	8.0000e-005	5.0000e-005	1.3000e-004	0.0000	1.4503	1.4503	3.0000e-005	0.0000	1.4510
Vendor	0.0269	0.0763	0.4256	1.0000e-004	9.7000e-004	3.4000e-004	1.3100e-003	2.9000e-004	3.1000e-004	6.0000e-004	0.0000	7.8135	7.8135	1.3000e-004	0.0000	7.8163
Worker	0.0323	8.3700e-003	0.1195	8.0000e-005	3.6200e-003	1.5000e-004	3.7600e-003	9.8000e-004	1.4000e-004	1.1200e-003	0.0000	5.8795	5.8795	5.4000e-004	0.0000	5.8909
Total	**0.0656**	**0.0994**	**0.6575**	**2.0000e-004**	**4.9100e-003**	**5.5000e-004**	**5.4400e-003**	**1.3500e-003**	**5.0000e-004**	**1.8500e-003**	**0.0000**	**15.1433**	**15.1433**	**7.0000e-004**	**0.0000**	**15.1582**

3.7 Interior Construction - 2018

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	3.9799					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.9100e-003	0.0548	0.0591	9.0000e-005		3.4500e-003	3.4500e-003		3.4200e-003	3.4200e-003	0.0000	8.1951	8.1951	1.4200e-003	0.0000	8.2250
Total	**3.9868**	**0.0548**	**0.0591**	**9.0000e-005**		**3.4500e-003**	**3.4500e-003**		**3.4200e-003**	**3.4200e-003**	**0.0000**	**8.1951**	**8.1951**	**1.4200e-003**	**0.0000**	**8.2250**

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	8.5000e-003	2.2100e-003	0.0315	2.0000e-005	9.5000e-004	4.0000e-005	9.9000e-004	2.6000e-004	4.0000e-005	3.0000e-004	0.0000	1.5500	1.5500	1.4000e-004	0.0000	1.5531
Total	**8.5000e-003**	**2.2100e-003**	**0.0315**	**2.0000e-005**	**9.5000e-004**	**4.0000e-005**	**9.9000e-004**	**2.6000e-004**	**4.0000e-005**	**3.0000e-004**	**0.0000**	**1.5500**	**1.5500**	**1.4000e-004**	**0.0000**	**1.5531**

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	3.9799					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1500e-003	0.0345	0.0622	9.0000e-005		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	8.1951	8.1951	1.4200e-003	0.0000	8.2250
Total	**3.9821**	**0.0345**	**0.0622**	**9.0000e-005**		**1.3700e-003**	**1.3700e-003**		**1.3700e-003**	**1.3700e-003**	**0.0000**	**8.1951**	**8.1951**	**1.4200e-003**	**0.0000**	**8.2250**

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	8.5000e-003	2.2100e-003	0.0315	2.0000e-005	9.5000e-004	4.0000e-005	9.9000e-004	2.6000e-004	4.0000e-005	3.0000e-004	0.0000	1.5500	1.5500	1.4000e-004	0.0000	1.5531
Total	**8.5000e-003**	**2.2100e-003**	**0.0315**	**2.0000e-005**	**9.5000e-004**	**4.0000e-005**	**9.9000e-004**	**2.6000e-004**	**4.0000e-005**	**3.0000e-004**	**0.0000**	**1.5500**	**1.5500**	**1.4000e-004**	**0.0000**	**1.5531**

3.8 Paving - 2018

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	2.6700e-003	0.0273	0.0235	4.0000e-005		1.4600e-003	1.4600e-003		1.3500e-003	1.3500e-003	0.0000	3.3027	3.3027	9.8000e-004	0.0000	3.3233
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.6700e-003**	**0.0273**	**0.0235**	**4.0000e-005**		**1.4600e-003**	**1.4600e-003**		**1.3500e-003**	**1.3500e-003**	**0.0000**	**3.3027**	**3.3027**	**9.8000e-004**	**0.0000**	**3.3233**

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	2.4100e-003	5.5500e-003	0.0425	1.0000e-005	6.0000e-005	2.0000e-005	8.0000e-005	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.5487	0.5487	1.0000e-005	0.0000	0.5490
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	5.8000e-004	1.5000e-004	2.1600e-003	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1062	0.1062	1.0000e-005	0.0000	0.1064
Total	**2.9900e-003**	**5.7000e-003**	**0.0447**	**1.0000e-005**	**1.3000e-004**	**2.0000e-005**	**1.5000e-004**	**4.0000e-005**	**2.0000e-005**	**6.0000e-005**	**0.0000**	**0.6548**	**0.6548**	**2.0000e-005**	**0.0000**	**0.6553**

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	1.3800e-003	0.0297	0.0256	4.0000e-005		9.9000e-004	9.9000e-004		9.9000e-004	9.9000e-004	0.0000	3.3027	3.3027	9.8000e-004	0.0000	3.3233
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.3800e-003**	**0.0297**	**0.0256**	**4.0000e-005**		**9.9000e-004**	**9.9000e-004**		**9.9000e-004**	**9.9000e-004**	**0.0000**	**3.3027**	**3.3027**	**9.8000e-004**	**0.0000**	**3.3233**

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	2.4100e-003	5.5500e-003	0.0425	1.0000e-005	6.0000e-005	2.0000e-005	8.0000e-005	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.5487	0.5487	1.0000e-005	0.0000	0.5490
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	5.8000e-004	1.5000e-004	2.1600e-003	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1062	0.1062	1.0000e-005	0.0000	0.1064
Total	**2.9900e-003**	**5.7000e-003**	**0.0447**	**1.0000e-005**	**1.3000e-004**	**2.0000e-005**	**1.5000e-004**	**4.0000e-005**	**2.0000e-005**	**6.0000e-005**	**0.0000**	**0.6548**	**0.6548**	**2.0000e-005**	**0.0000**	**0.6553**

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	0.8751	1.6307	8.5274	0.0209	1.5778	0.0235	1.6013	0.4232	0.0217	0.4449	0.0000	1,499.3023	1,499.3023	0.0609	0.0000	1,500.5804
Unmitigated	0.8751	1.6307	8.5274	0.0209	1.5778	0.0235	1.6013	0.4232	0.0217	0.4449	0.0000	1,499.3023	1,499.3023	0.0609	0.0000	1,500.5804

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,766.12	1,918.88	1626.76	3,946,900	3,946,900
Condo/Townhouse	144.98	157.52	133.54	323,999	323,999
Enclosed Parking with Elevator	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,911.10	2,076.40	1,760.30	4,270,899	4,270,899

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-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Condo/Townhouse	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.579581	0.062616	0.176505	0.113545	0.029546	0.004152	0.015698	0.004192	0.002652	0.003672	0.006635	0.000224	0.000983

5.0 Energy Detail

4.4 Fleet Mix

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	672.5189	672.5189	0.0304	6.2900e-003	675.1079
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	672.5189	672.5189	0.0304	6.2900e-003	675.1079
NaturalGas Mitigated	0.0157	0.1340	0.0570	8.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	155.1364	155.1364	2.9700e-003	2.8400e-003	156.0806
NaturalGas Unmitigated	0.0157	0.1340	0.0570	8.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	155.1364	155.1364	2.9700e-003	2.8400e-003	156.0806

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					
Apartments Mid Rise	2.37278e+006	0.0128	0.1093	0.0465	7.0000e-004		8.8400e-003	8.8400e-003		8.8400e-003	8.8400e-003	0.0000	126.6208	126.6208	2.4300e-003	2.3200e-003	127.3914
Condo/Townhouse	534363	2.8800e-003	0.0246	0.0105	1.6000e-004		1.9900e-003	1.9900e-003		1.9900e-003	1.9900e-003	0.0000	28.5157	28.5157	5.5000e-004	5.2000e-004	28.6892
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0157**	**0.1340**	**0.0570**	**8.6000e-004**		**0.0108**	**0.0108**		**0.0108**	**0.0108**	**0.0000**	**155.1364**	**155.1364**	**2.9800e-003**	**2.8400e-003**	**156.0806**

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					
Apartments Mid Rise	2.37278e+006	0.0128	0.1093	0.0465	7.0000e-004		8.8400e-003	8.8400e-003		8.8400e-003	8.8400e-003	0.0000	126.6208	126.6208	2.4300e-003	2.3200e-003	127.3914
Condo/Townhouse	534363	2.8800e-003	0.0246	0.0105	1.6000e-004		1.9900e-003	1.9900e-003		1.9900e-003	1.9900e-003	0.0000	28.5157	28.5157	5.5000e-004	5.2000e-004	28.6892
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0157**	**0.1340**	**0.0570**	**8.6000e-004**		**0.0108**	**0.0108**		**0.0108**	**0.0108**	**0.0000**	**155.1364**	**155.1364**	**2.9800e-003**	**2.8400e-003**	**156.0806**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	968914	281.8681	0.0128	2.6400e-003	282.9532
Condo/Townhouse	93779.2	27.2814	1.2300e-003	2.6000e-004	27.3865
Enclosed Parking with Elevator	1.24555e+006	362.3454	0.0164	3.3900e-003	363.7403
Parking Lot	3520	1.0240	5.0000e-005	1.0000e-005	1.0280
Total		**672.5189**	**0.0304**	**6.3000e-003**	**675.1079**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	968914	281.8681	0.0128	2.6400e-003	282.9532
Condo/Townhouse	93779.2	27.2814	1.2300e-003	2.6000e-004	27.3865
Enclosed Parking with Elevator	1.24555e+006	362.3454	0.0164	3.3900e-003	363.7403
Parking Lot	3520	1.0240	5.0000e-005	1.0000e-005	1.0280
Total		**672.5189**	**0.0304**	**6.3000e-003**	**675.1079**

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	2.4621	0.0289	2.4901	3.9000e-004		0.0587	0.0587		0.0587	0.0587	4.7466	11.1938	15.9404	0.0123	4.0000e-004	16.3211
Unmitigated	2.4621	0.0289	2.4901	3.9000e-004		0.0587	0.0587		0.0587	0.0587	4.7466	11.1938	15.9404	0.0123	4.0000e-004	16.3211

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	0.3006					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.8700					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Hearth	0.2249	3.8200e-003	0.3218	2.8000e-004		0.0468	0.0468		0.0468	0.0468	4.7466	7.6680	12.4146	8.8100e-003	4.0000e-004	12.7224
Landscaping	0.0667	0.0251	2.1683	1.1000e-004		0.0119	0.0119		0.0119	0.0119	0.0000	3.5258	3.5258	3.4800e-003	0.0000	3.5988
Total	**2.4621**	**0.0289**	**2.4901**	**3.9000e-004**		**0.0587**	**0.0587**		**0.0587**	**0.0587**	**4.7466**	**11.1938**	**15.9404**	**0.0123**	**4.0000e-004**	**16.3212**

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	0.3006					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.8700					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.2249	3.8200e-003	0.3218	2.8000e-004		0.0468	0.0468		0.0468	0.0468	4.7466	7.6680	12.4146	8.8100e-003	4.0000e-004	12.7224
Landscaping	0.0667	0.0251	2.1683	1.1000e-004		0.0119	0.0119		0.0119	0.0119	0.0000	3.5258	3.5258	3.4800e-003	0.0000	3.5988
Total	**2.4621**	**0.0289**	**2.4901**	**3.9000e-004**		**0.0587**	**0.0587**		**0.0587**	**0.0587**	**4.7466**	**11.1938**	**15.9404**	**0.0123**	**4.0000e-004**	**16.3212**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	47.8655	0.6175	0.0149	65.4531
Unmitigated	47.8655	0.6176	0.0149	65.4626

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	17.4613 / 11.0082	44.2343	0.5707	0.0138	60.4965
Condo/Townhouse	1.43339 / 0.903658	3.6312	0.0469	1.1300e-003	4.9661
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**47.8655**	**0.6176**	**0.0149**	**65.4626**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	17.4613 / 11.0082	44.2343	0.5706	0.0138	60.4877
Condo/Townhouse	1.43339 / 0.903658	3.6312	0.0468	1.1300e-003	4.9654
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**47.8655**	**0.6175**	**0.0149**	**65.4531**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	27.0790	1.6003	0.0000	60.6858
Unmitigated	27.0790	1.6003	0.0000	60.6858

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	123.28	25.0247	1.4789	0.0000	56.0820
Condo/Townhouse	10.12	2.0543	0.1214	0.0000	4.6038
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**27.0790**	**1.6003**	**0.0000**	**60.6858**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	123.28	25.0247	1.4789	0.0000	56.0820
Condo/Townhouse	10.12	2.0543	0.1214	0.0000	4.6038
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000

Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**27.0790**	**1.6003**	**0.0000**	**60.6858**

9.0 Operational Offroad

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

10.0 Vegetation

Attachment 2: Construction Community Risk Analysis Calculations

Carolan-Rollins, Burlingame, CA

DPM Construction Emissions and Modeling Emission Rates - Unmitigated

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2017	Construction	0.0662	CON_DPM	132.4	0.04030	5.08E-03	21,433	2.37E-07
2018	Construction	0.0305	CON_DPM	61.0	0.01857	2.34E-03	21,433	1.09E-07
Total		***0.0967***		***193***	***0.0589***	***0.0074***		

Notes:

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

PM2.5 Fugitive Dust Construction Emissions for Modeling - Unmitigated

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	PM2.5 Emissions (lb/yr)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (g/s)	Modeled Area (m^2)	PM2.5 Emission Rate $g/s/m^2$
2017	Construction	CON_FUG	0.0354	70.8	0.02155	2.72E-03	21,433	1.27E-07
2018	Construction	CON_FUG	0.00165	3.3	0.00100	1.27E-04	21,433	5.91E-09
Total			***0.0371***	***74.1***	***0.0226***	***0.0028***		

Notes:

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

DPM Construction Emissions and Modeling Emission Rates - With Mitigation

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2017	Construction	0.0171	CON_DPM	34.2	0.01041	1.31E-03	21,433	6.12E-08
2018	Construction	0.0080	CON_DPM	15.9	0.00485	6.11E-04	21,433	2.85E-08
Total		***0.0251***		***50***	***0.0153***	***0.0019***		

Notes:

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

PM2.5 Fugitive Dust Construction Emissions for Modeling - With Mitigation

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	PM2.5 Emissions (lb/yr)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (g/s)	Modeled Area (m^2)	PM2.5 Emission Rate $g/s/m^2$
2017	Construction	CON_FUG	0.0096	19.1	0.00582	7.33E-04	21,433	3.42E-08
2018	Construction	CON_FUG	0.00165	3.3	0.00100	1.27E-04	21,433	5.91E-09
Total			***0.0112***	***22.4***	***0.0068***	***0.0009***		

Notes:

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

Carolan-Rollins, Burlingame, CA - Construction Health Impact Summary

Unmitigated Emissions

Construction Year	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2015	0.1205	0.0836	10.55	0.55	0.024	0.204
2016	0.0554	0.0039	4.85	0.25	0.011	0.059
Total	-	-	**15.4**	**0.8**	-	-
Maximum Annual	0.1205	0.0836	-	-	**0.024**	**0.204**

Mitigated Emissions

Construction Year	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2015	0.0311	0.0225	2.7	0.1	0.006	0.054
2016	0.0145	0.0039	1.3	0.1	0.003	0.018
Total	-	-	**4.0**	**0.2**	-	-
Maximum Annual	0.0311	0.0225	-	-	**0.006**	**0.054**

Carolan-Rollins, Burlingame, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.5 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

		Child - Exposure Information				Adult - Exposure Information					
					Child	Modeled			Adult		
Exposure	Exposure Duration	DPM Conc (ug/m3)		Exposure Adjust	Cancer Risk	DPM Conc (ug/m3)		Exposure Adjust	Cancer Risk	Fugitive	Total
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	PM2.5	PM2.5
1	1	2017	0.1205	10	10.55	2017	0.1205	1	0.55	0.0836	0.204
2	1	2018	0.0554	10	4.85	2018	0.0554	1	0.25	0.0039	0.059
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**15.40**				**0.80**		

133-149 Fairchild Drive, Mountain View, CA - Construction Impacts- Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.8 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

		Child - Exposure Information				Adult - Exposure Information					
					Child		Modeled		Adult		
Exposure	Exposure Duration	DPM Conc (ug/m3)		Exposure Adjust	Cancer Risk	DPM Conc (ug/m3)		Exposure Adjust	Cancer Risk	Mitigated Fugitive	Total
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	PM2.5	PM2.5
1	1	2015	0.0474	10	4.15	2015	0.0474	1	0.22	0.0379	0.085
2	1	2016	0.0243	10	2.13	2016	0.0243	1	0.11	0.0365	0.061
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**6.27**				**0.33**		

Carolan-Rollins, Burlingame, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 4.5 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

		Child - Exposure Information				Adult - Exposure Information					
						Modeled					
Exposure	Exposure Duration	DPM Conc (ug/m3)		Exposure Adjust	Child Cancer Risk	DPM Conc (ug/m3)		Exposure Adjust	Adult Cancer Risk	Fugitive	Total
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	PM2.5	PM2.5
1	1	2017	0.0889	10	7.78	2017	0.0889	1	0.40	0.0509	0.140
2	1	2018	0.0432	10	3.78	2018	0.0432	1	0.20	0.0024	0.046
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**11.56**				**0.60**		

Carolan-Rollins, Burlingame, CA - Construction Impacts - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.5 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

		Child - Exposure Information				Adult - Exposure Information					
						Modeled					
Exposure	Exposure Duration	DPM Conc (ug/m3)		Exposure Adjust	Child Cancer Risk	DPM Conc (ug/m3)		Exposure Adjust	Adult Cancer Risk	Mitigated Fugitive	Total
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	PM2.5	PM2.5
1	1	2017	0.0311	10	2.72	2017	0.0311	1	0.14	0.0225	0.054
2	1	2018	0.0145	10	1.27	2018	0.0145	1	0.07	0.0039	0.018
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**3.99**				**0.21**		

Attachment 3: U.S. Highway 101 and Caltrain Rail Line Community Risk Calculations

Highway 101 Traffic Emissions and Risk Calculations

Carolan-Rollns, Burlingame, CA
Highway 101
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2019

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Width (ft)	Link Width (m)	Release Height (m)	Diesel ADT	Average Speed (mph)
SB-101	Southbound Hwy 101	S	4	761	68	20.6	0.0	2,422	Variable
NB-101	Northbound Hwy 101	N	4	743	68	20.6	0.0	2,422	Variable

Carolan-Rollns, Burlingame, CA
Hwy 101 Traffic Data and PM2.5 & TOG Emission Factors - 60 mph Trucks & 65 mph Other Vehicles

Analysis Year = *2019*

Vehicle Type	2012 Caltrans Number Vehicles (veh/day)	2019 Number Vehicles (veh/day)	2019 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	162,427	173,797	0.41%	719	65	0.0141	0.0192	0.0014	0.0230	0.041
LDT	67,013	71,704	0.08%	55	65	0.0239	0.0195	0.0018	0.0411	0.088
MDT	6,384	6,830	6.39%	437	60	0.0209	0.0223	0.0033	0.0532	0.130
HDT	4,176	4,469	81.33%	3,634	60	0.0834	0.1185	0.0700	0.1236	0.168
Total	240,000	256,800	-	4,845	62.5	-	-		-	-
Mix Avg Emission Factor						**0.06683**	**0.02110**	**0.00278**	**0.02922**	**0.05684**
Increase From 2012		1.07								
Vehicles/Direction		128,400		2,422						
Avg Vehicles/Hour/Direction		**5,350**		**101**						

Traffic Data Year = *2012*

Caltrans 2012 AADT Data	Total	Total Truck	Truck by Axle: 2	3	4	5
Rte 101, B Burlingame, Brodway	240,000	10,560	6,384	817	418	2,941
Rte 101, B Millbrae, Millbrae Ave			60.45%	7.74%	3.96%	27.85%
Percent of Total Vehicles		4.40%	2.66%	0.34%	0.17%	1.23%

Traffic Increase per Year (%) = *1.00%*

Carolan-Rollns, Burlingame, CA
Highway 101 Traffic Data and PM2.5 & TOG Emission Factors - 25 mph

Analysis Year = *2019*

Vehicle Type	2012 Caltrans Number Vehicles (veh/day)	2019 Number Vehicles (veh/day)	2019 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	162,427	173,797	0.41%	719	25	0.0218	0.0201	0.0023	0.0369	0.041
LDT	67,013	71,704	0.08%	55	25	0.0424	0.0207	0.0030	0.0677	0.088
MDT	6,384	6,830	6.39%	437	25	0.0410	0.0260	0.0070	0.1146	0.130
HDT	4,176	4,469	81.33%	3,634	25	0.1224	0.1492	0.1007	0.7097	0.168
Total	240,000	256,800	-	4,845	25	-	-		-	-
Mix Avg Emission Factor						**0.09920**	**0.02267**	**0.00436**	**0.04988**	**0.05684**

Fairchild Drive, Mountain View, CA
Hwy 101
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2020

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Width (ft)	Link Width (m)	Release Height (m)	Diesel ADT	Average Speed (mph)
NB Hwy-101	Northbound Highway 101	N	4	755	68	20.6	0.0	2,639	Variable
SB Hwy-101	Southbound Highway 101	S	4	743	68	20.6	0.0	2,639	Variable

Fairchild Drive, Mountain View, CA
Hwy 101 Traffic Data and PM2.5 & TOG Emission Factors - 60 mph Trucks & 65 mph Other Vehicles

Analysis Year = ***2020***

Vehicle Type	2013 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	115,796	123,902	0.33%	411	65	0.0121	0.0192	0.0015	0.0202	0.044
LDT	51,189	54,773	0.07%	39	65	0.0188	0.0195	0.0017	0.0333	0.103
MDT	3,170	3,392	6.48%	220	60	0.0190	0.0217	0.0027	0.0498	0.161
HDT	4,844	5,183	88.92%	4,609	60	0.0797	0.1107	0.0682	0.0864	0.115
Total	174,999	187,249	-	5,279	62.5	-	-		-	-
Mix Avg Emission Factor						**0.07150**	**0.02186**	**0.00340**	**0.02484**	**0.06392**
Increase From 2013		1.07								
Vehicles/Direction		93,625		2,639						
Avg Vehicles/Hour/Direction		**3,901**		**110**						

Traffic Data Year = ***2013***

Caltrans 2013 AADT & 2012 Truck AADT Data	Total	Total Truck	Truck by Axle: 2	3	4	5
SR 101 B Mountain View, Moffett Blvd	175,000	8,015	3,170	676	228	3,941
SR 101 B Mountain View, Jct Rte 85 South			39.55%	8.43%	2.84%	49.17%
Percent of Total Vehicles		4.58%	1.81%	0.39%	0.13%	2.25%

Traffic Increase per Year (%) = ***1.00%***

Fairchild Drive, Mountain View, CA
Hwy 101 Traffic Data and PM2.5 & TOG Emission Factors - 60 mph

Analysis Year = ***2020***

Vehicle Type	2013 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	115,796	123,902	0.33%	411	60	0.0111	0.0190	0.0013	0.0179	0.044
LDT	51,189	54,772	0.07%	39	60	0.0180	0.0193	0.0015	0.0298	0.103
MDT	3,170	3,392	6.48%	220	60	0.0190	0.0217	0.0027	0.0498	0.161
HDT	4,844	5,183	88.92%	4,609	60	0.0797	0.1107	0.0682	0.0864	0.115
Total	174,999	187,249	-	5,279	60	-	-		-	-
Mix Avg Emission Factor						**0.07142**	**0.02170**	**0.00324**	**0.02225**	**0.06392**

2019 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - SB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	2.92%	71	0.0737	9	5.81%	141	0.1123	17	9.32%	226	0.0792
2	2.53%	61	0.0655	10	7.23%	175	0.0792	18	6.89%	167	0.0598
3	1.42%	34	0.0353	11	5.42%	131	0.0777	19	1.85%	45	0.0654
4	0.84%	20	0.0699	12	6.45%	156	0.0783	20	0.88%	21	0.0677
5	0.77%	19	0.0611	13	5.86%	142	0.0787	21	2.54%	61	0.0735
6	1.97%	48	0.0834	14	5.79%	140	0.0777	22	4.42%	107	0.0790
7	4.14%	100	0.0829	15	5.28%	128	0.0793	23	2.87%	69	0.0747
8	6.76%	164	0.0641	16	7.51%	182	0.0463	24	0.55%	13	0.0584
								Total		2,422	

2019 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - NB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	2.92%	71	0.0737	9	5.81%	141	0.1123	17	9.32%	226	0.0792
2	2.53%	61	0.0655	10	7.23%	175	0.0792	18	6.89%	167	0.0598
3	1.42%	34	0.0353	11	5.42%	131	0.0777	19	1.85%	45	0.0654
4	0.84%	20	0.0699	12	6.45%	156	0.0783	20	0.88%	21	0.0677
5	0.77%	19	0.0611	13	5.86%	142	0.0787	21	2.54%	61	0.0735
6	1.97%	48	0.0834	14	5.79%	140	0.0777	22	4.42%	107	0.0790
7	4.14%	100	0.0829	15	5.28%	128	0.0793	23	2.87%	69	0.0747
8	6.76%	164	0.0641	16	7.51%	182	0.0463	24	0.55%	13	0.0584
								Total		2,422	

Carolan-Rollns, Burlingame, CA
Highway 101
PM2.5 & TOG Modeling - Roadway Links, Traffic Volumes, and PM2.5 Emissions
Year = 2019

Group Link	Description	Direction	No. Lanes	Link Length (m)	Link Width (ft)	Link Width (m)	Release Height (m)	ADT	Average Speed (mph)
SB-101	Southbound Hwy 101	S	4	761	68	20.6	0.0	128,400	Variable
NB-101	Northbound Hwy 101	N	4	743	68	20.6	0.0	128,400	Variable

2019 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - SB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	1411	0.0241	9	7.09%	9101	0.0231	17	7.40%	9499	0.0224
2	0.38%	488	0.0284	10	4.31%	5539	0.0232	18	8.28%	10633	0.0217
3	0.30%	384	0.0228	11	4.61%	5919	0.0217	19	5.78%	7420	0.0201
4	0.17%	213	0.0269	12	5.87%	7536	0.0219	20	4.35%	5582	0.0200
5	0.44%	566	0.0215	13	6.18%	7930	0.0212	21	3.28%	4208	0.0206
6	0.83%	1060	0.0257	14	6.05%	7766	0.0214	22	3.32%	4263	0.0217
7	3.75%	4818	0.0216	15	7.09%	9100	0.0209	23	2.49%	3191	0.0214
8	7.86%	10090	0.0213	16	7.22%	9266	0.0205	24	1.88%	2417	0.0197
								Total		128,400	

2019 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - NB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	1411	0.0241	9	7.09%	9101	0.0231	17	7.40%	9499	0.0224
2	0.38%	488	0.0284	10	4.31%	5539	0.0232	18	8.28%	10633	0.0217
3	0.30%	384	0.0228	11	4.61%	5919	0.0217	19	5.78%	7420	0.0201
4	0.17%	213	0.0269	12	5.87%	7536	0.0219	20	4.35%	5582	0.0200
5	0.44%	566	0.0215	13	6.18%	7930	0.0212	21	3.28%	4208	0.0206
6	0.83%	1060	0.0257	14	6.05%	7766	0.0214	22	3.32%	4263	0.0217
7	3.75%	4818	0.0216	15	7.09%	9100	0.0209	23	2.49%	3191	0.0214
8	7.86%	10090	0.0213	16	7.22%	9266	0.0205	24	1.88%	2417	0.0197
								Total		128,400	

Carolan-Rollns, Burlingame, CA
Highway 101
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2020

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Width (ft)	Link Width (m)	Release Height (m)	Diesel ADT	Average Speed (mph)
SB-101	Southbound Hwy 101	S	4	761	68	20.6	0.0	2,443	Variable
NB-101	Northbound Hwy 101	N	4	743	68	20.6	0.0	2,443	Variable

Carolan-Rollns, Burlingame, CA

Hwy 101 Traffic Data and PM2.5 & TOG Emission Factors - 60 mph Trucks & 65 mph Other Vehicles

Analysis Year = ***2020***

Vehicle Type	2012 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	162,434	175,429	0.41%	723	65	0.0128	0.0192	0.0015	0.0214	0.039
LDT	67,006	72,366	0.08%	55	65	0.0219	0.0195	0.0017	0.0367	0.084
MDT	6,384	6,894	6.39%	441	60	0.0199	0.0221	0.0032	0.0490	0.129
HDT	4,176	4,511	81.32%	3,668	60	0.0720	0.1088	0.0604	0.1096	0.159
Total	240,000	259,200	-	4,887	62.5	-	-		-	-
Mix Avg Emission Factor						**0.05797**	**0.02092**	**0.00261**	**0.02672**	**0.05456**
Increase From 2012		1.08								
Vehicles/Direction		129,600		2,443						
Avg Vehicles/Hour/Direction		**5,400**		**102**						

Traffic Data Year = ***2012***

Caltrans 2012 AADT Data	Total	Total Truck	Truck by Axle: 2	3	4	5
Rte 101, B Burlingame, Brodway	240,000	10,560	6,384	817	418	2,941
Rte 101, B Millbrae, Millbrae Ave			60.45%	7.74%	3.96%	27.85%
Percent of Total Vehicles		4.40%	2.66%	0.34%	0.17%	1.23%

Traffic Increase per Year (%) = ***1.00%***

Carolan-Rollns, Burlingame, CA

Highway 101 Traffic Data and PM2.5 & TOG Emission Factors - 25 mph

Analysis Year = ***2020***

Vehicle Type	2012 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	162,434	175,429	0.41%	723	25	0.0188	0.0201	0.0024	0.0346	0.039
LDT	67,006	72,366	0.08%	55	25	0.0379	0.0207	0.0029	0.0612	0.084
MDT	6,384	6,894	6.39%	441	25	0.0390	0.0257	0.0067	0.1049	0.129
HDT	4,176	4,511	81.32%	3,668	25	0.1150	0.1430	0.0946	0.6692	0.159
Total	240,000	259,200	-	4,887	25	-	-		-	-
Mix Avg Emission Factor						**0.09307**	**0.02255**	**0.00424**	**0.04604**	**0.05456**

2020 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - SB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.26%	80	0.0633	9	6.97%	170	0.0893	17	7.08%	173	0.0936
2	2.48%	61	0.0568	10	7.69%	188	0.0637	18	4.41%	108	0.0744
3	1.40%	34	0.0318	11	5.93%	145	0.0612	19	2.42%	59	0.0455
4	0.82%	20	0.0605	12	7.05%	172	0.0629	20	1.51%	37	0.0389
5	0.75%	18	0.0532	13	6.64%	162	0.0631	21	3.13%	76	0.0530
6	2.08%	51	0.0720	14	6.41%	157	0.0620	22	4.96%	121	0.0610
7	5.00%	122	0.0639	15	6.61%	161	0.0576	23	3.61%	88	0.0555
8	4.28%	105	0.0811	16	5.01%	122	0.0530	24	0.50%	12	0.0532
								Total		2,443	

2020 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - NB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.26%	80	0.0633	9	6.97%	170	0.0893	17	7.08%	173	0.0936
2	2.48%	61	0.0568	10	7.69%	188	0.0637	18	4.41%	108	0.0744
3	1.40%	34	0.0318	11	5.93%	145	0.0612	19	2.42%	59	0.0455
4	0.82%	20	0.0605	12	7.05%	172	0.0629	20	1.51%	37	0.0389
5	0.75%	18	0.0532	13	6.64%	162	0.0631	21	3.13%	76	0.0530
6	2.08%	51	0.0720	14	6.41%	157	0.0620	22	4.96%	121	0.0610
7	5.00%	122	0.0639	15	6.61%	161	0.0576	23	3.61%	88	0.0555
8	4.28%	105	0.0811	16	5.01%	122	0.0530	24	0.50%	12	0.0532
								Total		2,443	

Carolan-Rollns, Burlingame, CA
Highway 101
PM2.5 & TOG Modeling - Roadway Links, Traffic Volumes, and PM2.5 Emissions
Year = 2020

Group Link	Description	Direction	No. Lanes	Link Length (m)	Link Width (ft)	Link Width (m)	Release Height (m)	ADT	Average Speed (mph)
SB-101	Southbound Hwy 101	S	4	761	68	20.6	0.0	129,600	Variable
NB-101	Northbound Hwy 101	N	4	743	68	20.6	0.0	129,600	Variable

2020 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - SB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	1425	0.0236	9	7.09%	9192	0.0230	17	7.40%	9594	0.0223
2	0.38%	493	0.0273	10	4.31%	5591	0.0228	18	8.28%	10734	0.0216
3	0.30%	387	0.0224	11	4.61%	5974	0.0215	19	5.78%	7485	0.0200
4	0.16%	210	0.0261	12	5.87%	7607	0.0216	20	4.35%	5639	0.0199
5	0.44%	571	0.0213	13	6.18%	8011	0.0211	21	3.28%	4246	0.0204
6	0.82%	1063	0.0250	14	6.05%	7835	0.0212	22	3.32%	4300	0.0214
7	3.75%	4866	0.0213	15	7.08%	9181	0.0208	23	2.48%	3219	0.0211
8	7.86%	10188	0.0212	16	7.22%	9352	0.0203	24	1.88%	2440	0.0197
								Total		129,600	

2020 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - NB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	1425	0.0236	9	7.09%	9192	0.0230	17	7.40%	9594	0.0223
2	0.38%	493	0.0273	10	4.31%	5591	0.0228	18	8.28%	10734	0.0216
3	0.30%	387	0.0224	11	4.61%	5974	0.0215	19	5.78%	7485	0.0200
4	0.16%	210	0.0261	12	5.87%	7607	0.0216	20	4.35%	5639	0.0199
5	0.44%	571	0.0213	13	6.18%	8011	0.0211	21	3.28%	4246	0.0204
6	0.82%	1063	0.0250	14	6.05%	7835	0.0212	22	3.32%	4300	0.0214
7	3.75%	4866	0.0213	15	7.08%	9181	0.0208	23	2.48%	3219	0.0211
8	7.86%	10188	0.0212	16	7.22%	9352	0.0203	24	1.88%	2440	0.0197
								Total		129,600	

Carolan-Rollns, Burlingame, CA
Highway 101
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2025

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Width (ft)	Link Width (m)	Release Height (m)	Diesel ADT	Average Speed (mph)
SB-101	Southbound Hwy 101	S	4	761	68	20.6	0.0	2,575	Variable
NB-101	Northbound Hwy 101	N	4	743	68	20.6	0.0	2,575	Variable

Carolan-Rollns, Burlingame, CA

Hwy 101 Traffic Data and PM2.5 & TOG Emission Factors - 60 mph Trucks & 65 mph Other Vehicles

Analysis Year = ***2025***

Vehicle Type	2012 Caltrans Number Vehicles (veh/day)	2025 Number Vehicles (veh/day)	2025 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	162,722	183,875	0.40%	744	65	0.0084	0.0193	0.0016	0.0168	0.033
LDT	66,718	75,392	0.08%	57	65	0.0154	0.0194	0.0017	0.0270	0.072
MDT	6,384	7,213	6.37%	460	60	0.0156	0.0217	0.0027	0.0322	0.119
HDT	4,176	4,719	82.42%	3,890	60	0.0575	0.0972	0.0487	0.0556	0.141
Total	240,000	271,200	-	5,150	62.5	-	-		-	-
Mix Avg Emission Factor						**0.04620**	**0.02076**	**0.00245**	**0.02022**	**0.04658**
Increase From 2012		1.13								
Vehicles/Direction		135,600		2,575						
Avg Vehicles/Hour/Direction		**5,650**		**107**						

Traffic Data Year = ***2012***

Caltrans 2011 AADT Data	Total	Total Truck	Truck by Axle: 2	3	4	5
Rte 101, B Burlingame, Brodway	240,000	10,560	6,384	817	418	2,941
Rte 101, B Millbrae, Millbrae Ave			60.45%	7.74%	3.96%	27.85%
Percent of Total Vehicles		4.40%	2.66%	0.34%	0.17%	1.23%

Traffic Increase per Year (%) = ***1.00%***

Carolan-Rollns, Burlingame, CA

Highway 101 Traffic Data and PM2.5 & TOG Emission Factors - 25 mph

Analysis Year = ***2025***

Vehicle Type	2012 Caltrans Number Vehicles (veh/day)	2025 Number Vehicles (veh/day)	2025 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	162,722	183,875	0.40%	744	25	0.0086	0.0203	0.0026	0.0279	0.033
LDT	66,718	75,392	0.08%	57	25	0.0233	0.0206	0.0028	0.0454	0.072
MDT	6,384	7,213	6.37%	460	25	0.0308	0.0245	0.0055	0.0658	0.119
HDT	4,176	4,719	82.42%	3,890	25	0.1021	0.1332	0.0846	0.3783	0.141
Total	240,000	271,200	-	5,150	25	-	-		-	-
Mix Avg Emission Factor						**0.08138**	**0.02245**	**0.00413**	**0.03491**	**0.04658**

2025 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - SB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.13%	81	0.0507	9	6.88%	177	0.0799	17	6.85%	176	0.0833
2	2.38%	61	0.0455	10	8.33%	215	0.0480	18	4.26%	110	0.0662
3	1.48%	38	0.0287	11	6.48%	167	0.0452	19	2.85%	74	0.0309
4	0.79%	20	0.0484	12	7.72%	199	0.0472	20	1.98%	51	0.0246
5	0.72%	18	0.0426	13	7.32%	189	0.0471	21	2.34%	60	0.0514
6	2.00%	52	0.0575	14	6.86%	177	0.0464	22	4.42%	114	0.0551
7	4.32%	111	0.0575	15	6.54%	168	0.0470	23	2.89%	74	0.0513
8	3.99%	103	0.0713	16	4.84%	125	0.0433	24	0.63%	16	0.0462
								Total		2,575	

2025 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - NB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.13%	81	0.0507	9	6.88%	177	0.0799	17	6.85%	176	0.0833
2	2.38%	61	0.0455	10	8.33%	215	0.0480	18	4.26%	110	0.0662
3	1.48%	38	0.0287	11	6.48%	167	0.0452	19	2.85%	74	0.0309
4	0.79%	20	0.0484	12	7.72%	199	0.0472	20	1.98%	51	0.0246
5	0.72%	18	0.0426	13	7.32%	189	0.0471	21	2.34%	60	0.0514
6	2.00%	52	0.0575	14	6.86%	177	0.0464	22	4.42%	114	0.0551
7	4.32%	111	0.0575	15	6.54%	168	0.0470	23	2.89%	74	0.0513
8	3.99%	103	0.0713	16	4.84%	125	0.0433	24	0.63%	16	0.0462
								Total		2,575	

Carolan-Rollns, Burlingame, CA
Highway 101
PM2.5 & TOG Modeling - Roadway Links, Traffic Volumes, and PM2.5 Emissions
Year = 2025

Group Link	Description	Direction	No. Lanes	Link Length (m)	Link Width (ft)	Link Width (m)	Release Height (m)	ADT	Average Speed (mph)
SB-101	Southbound Hwy 101	S	4	761	68	20.6	0.0	135,600	Variable
NB-101	Northbound Hwy 101	N	4	743	68	20.6	0.0	135,600	Variable

2025 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - SB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.09%	1484	0.0231	9	7.10%	9622	0.0229	17	7.40%	10035	0.0222
2	0.38%	509	0.0261	10	4.31%	5849	0.0224	18	8.27%	11219	0.0215
3	0.30%	407	0.0227	11	4.61%	6256	0.0213	19	5.78%	7839	0.0200
4	0.16%	219	0.0250	12	5.87%	7956	0.0214	20	4.35%	5900	0.0199
5	0.44%	598	0.0210	13	6.18%	8386	0.0209	21	3.28%	4446	0.0204
6	0.82%	1112	0.0243	14	6.04%	8193	0.0209	22	3.32%	4504	0.0212
7	3.75%	5090	0.0211	15	7.09%	9617	0.0207	23	2.49%	3370	0.0209
8	7.86%	10653	0.0212	16	7.22%	9784	0.0203	24	1.88%	2553	0.0198
								Total		135,600	

2025 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - NB-101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.09%	1484	0.0231	9	7.10%	9622	0.0229	17	7.40%	10035	0.0222
2	0.38%	509	0.0261	10	4.31%	5849	0.0224	18	8.27%	11219	0.0215
3	0.30%	407	0.0227	11	4.61%	6256	0.0213	19	5.78%	7839	0.0200
4	0.16%	219	0.0250	12	5.87%	7956	0.0214	20	4.35%	5900	0.0199
5	0.44%	598	0.0210	13	6.18%	8386	0.0209	21	3.28%	4446	0.0204
6	0.82%	1112	0.0243	14	6.04%	8193	0.0209	22	3.32%	4504	0.0212
7	3.75%	5090	0.0211	15	7.09%	9617	0.0207	23	2.49%	3370	0.0209
8	7.86%	10653	0.0212	16	7.22%	9784	0.0203	24	1.88%	2553	0.0198
								Total		135,600	

CAL3QHCR Risk Modeling Parameters and Maximum Cancer Risk at Project Site
Burlingame-Highway 101 - DPM & TOG TACs
Ground Floor Receptors

Receptor Information

Number of Receptors	36
Receptor Height =	1.5 meters
Receptor distances =	variable

Meteorological Conditions

San Mateo STP Hourly Met Data	2002-2005
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	**DBR (L/kg BW-day)**	**A (-)**	**Exposure (hr/day)**	**Exposure (days/week)**	**Exposure (week/year)**	**EF (days/yr)**	**ED (Years)**	**AT (days)**
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
CRAF = Cancer Risk Adjustment Factor [adjustment factors are dependent on emissions period and duration of exposure]
SWFi = Sensitivity weighting factor dependent on emissions period i and duration of exposure
URF =Unit risk factor (cancer risk per $\mu g/m^3$)

Unit Risk Factors (risk per million per $\mu g/m^3$) for DPM and Organic TACs from Vehicle TOG Exhaust & Evaporative Emissions

Exposure Type	**CPF $(mg/kg\text{-}day)^{-1}$**	**CRAF (-)**	***DPM***	**Exhaust TOG TACs**	**Evaporative TOG TACs**
Residential (70-Yr Exposure)	1.10E+00	1	318.5	1.8	0.107

MEI Cancer Risk Calculations - Receptor Height = 1.5 m

Meteorological Data Year	**Maximum DPM Concentration ($\mu g/m^3$)**			**Maximum Exhaust TOG Concentration $\mu g/m^3$)**			**Maximum Evaporative TOG Concentration ($\mu g/m^3$)**			**Maximum PM2.5 Concentration ($\mu g/m^3$)**		
	2018	**2020**	**2025**	**2016**	**2020**	**2025**	**2016**	**2020**	**2025**	**2018**	**2020**	**2025**
2002	0.0475	0.0421	0.0366	1.0870	1.0088	0.8124	1.9040	1.8494	1.6855	0.7295	0.7310	0.7593
2003	0.0470	0.0417	0.0362	1.0695	0.9924	0.7993	1.8734	1.8194	1.6583	0.7178	0.7191	0.7470
2004	0.0456	0.0405	0.0352	1.0392	0.9645	0.7768	1.8204	1.7682	1.6117	0.6975	0.6989	0.7260
2005	0.0470	0.0417	0.0361	1.0840	1.0060	0.8103	1.8988	1.8443	1.6812	0.7275	0.7290	0.7573
Average	0.0468	0.0415	0.0360	1.0699	0.9929	0.7997	1.8742	1.8203	1.6592	0.718	0.720	0.747
Unadjusted Cancer Risk[a]	14.89	13.22	11.47	1.94	1.80	1.45	0.20	0.19	0.18			
Age Sensitivity Weighting Factor	0.143	0.339	1.207	0.143	0.339	1.207	0.143	0.339	1.207			
Contribution to Total Cancer Risk	2.13	4.49	13.84	0.28	0.6	1.7	0.03	0.1	0.2			
70-yr Cumulative Risk[b]	20.46			2.63			0.31			**Average PM2.5 =**		**0.73**

Total Risk From All TACs = 23.4 per million

Notes:
Maximum DPM & PM2.5 concentrations occur at receptor in northeast corner of site closest to Highway 101
a Cancer risk (per million) calculated assuming constant 70-year exposure to concentration for year of analysis - without age sensitivity adjustments.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time and incorporating age adjustment factors.

CAL3QHCR Risk Modeling Parameters and Maximum Cancer Risk in Project Area
Highway 101, Burlingame - DPM & TOG TACs - Risk By Receptor from Hwy 101 - Uncontrolled Risks
Ground Level Residential Units & Town Homes

Receptor Information

Total Number of Receptors	36
Receptor Height =	1.5 m
Receptor distances =	variable

Meteorological Conditions

San Mateo STP Hourly 12001 - 2005	2002 - 2005
Land Use Classification	suburban
Wind speed =	variable
Wind direction =	variable
Surface roughness =	200 cm

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where:
C_{air} = concentration in air (µg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	**DBR (L/kg BW-day)**	**A (-)**	**Exposure (hr/day)**	**Exposure (days/week)**	**Exposure (week/year)**	**EF (days/yr)**	**ED (Years)**	**AT (days)**
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair x SWF
Where: CPF = Cancer potency factor (mg/kg-day)$^{-1}$
URF =Unit risk factor (cancer risk per µg/m^3)
SWF = Sensitivity Weighting Factor - calculated for each period based on the exposure period and age sensitivity factor (ASF)

Unit Risk Factors for DPM and Organic TACs from Vehicle TOG Exhaust & Evaporative Emissions

		Unit Risk Factors[a]		
Exposure Type	**DPM CPF (mg/kg-day)$^{-1}$**	***DPM***	**Exhaust TOG TACs**	**Evaporative TOG TACs**
Residential (70-Yr Exposure)	1.10E+00	318.5	1.8	0.11

a Unit risk factor for DPM calculated. URF for TOG TACS from BAAQMD *Recommended Methods for Screening Local Risks and Hazards* .

Average Concentration (µg/m3) **at 0% Ave Control** 1.00

	DPM Concentration (µg/m^3)			Exhaust TOG Concentration (µg/m^3)			Evaporative TOG Concentration (µg/m^3)		
Receptor No.	**2019**	**2020**	**2025**	**2019**	**2020**	**2025**	**2019**	**2020**	**2025**
1	0.0091	0.0080	0.0070	0.1980	0.1837	0.1478	0.3468	0.3367	0.3067
2	0.0091	0.0081	0.0071	0.2003	0.1858	0.1496	0.3509	0.3407	0.3103
3	0.0091	0.0081	0.0070	0.2003	0.1858	0.1496	0.3508	0.3407	0.3103
4	0.0092	0.0081	0.0071	0.2016	0.1871	0.1506	0.3532	0.3430	0.3124
5	0.0097	0.0086	0.0075	0.2143	0.1989	0.1601	0.3754	0.3646	0.3321
6	0.0103	0.0091	0.0080	0.2277	0.2112	0.1700	0.3988	0.3872	0.3528
7	0.0451	0.0400	0.0347	1.0241	0.9503	0.7653	1.7938	1.7422	1.5878
8	0.0110	0.0097	0.0085	0.2428	0.2252	0.1813	0.4252	0.4129	0.3762
9	0.0117	0.0103	0.0090	0.2588	0.2401	0.1933	0.4534	0.4402	0.4011
10	0.0180	0.0160	0.0139	0.4044	0.3752	0.3021	0.7083	0.6879	0.6268
11	0.0450	0.0400	0.0347	1.0244	0.9506	0.7656	1.7944	1.7428	1.5884
12	0.0126	0.0112	0.0097	0.2797	0.2595	0.2089	0.4899	0.4758	0.4335
13	0.0200	0.0178	0.0154	0.4501	0.4176	0.3363	0.7884	0.7657	0.6977
14	0.0131	0.0117	0.0101	0.2932	0.2720	0.2190	0.5135	0.4987	0.4544
15	0.0138	0.0123	0.0107	0.3090	0.2867	0.2308	0.5413	0.5256	0.4789
16	0.0224	0.0199	0.0173	0.5063	0.4698	0.3783	0.8868	0.8612	0.7848
17	0.0145	0.0129	0.0112	0.3253	0.3019	0.2430	0.5699	0.5534	0.5042
18	0.0453	0.0402	0.0349	1.0321	0.9578	0.7713	1.8079	1.7559	1.6003
19	0.0254	0.0226	0.0196	0.5757	0.5342	0.4301	1.0084	0.9793	0.8925
20	0.0153	0.0136	0.0118	0.3440	0.3192	0.2570	0.6026	0.5852	0.5332
21	0.0160	0.0142	0.0124	0.3597	0.3338	0.2688	0.6302	0.6120	0.5576
22	0.0293	0.0260	0.0226	0.6641	0.6162	0.4962	1.1632	1.1297	1.0296
23	0.0173	0.0154	0.0134	0.3902	0.3621	0.2915	0.6835	0.6638	0.6049
24	0.0452	0.0401	0.0348	1.0290	0.9549	0.7690	1.8025	1.7507	1.5956
25	0.0184	0.0163	0.0142	0.4141	0.3842	0.3094	0.7253	0.7044	0.6419
26	0.0345	0.0306	0.0265	0.7834	0.7269	0.5854	1.3722	1.3327	1.2146
27	0.0196	0.0174	0.0151	0.4411	0.4093	0.3296	0.7727	0.7504	0.6838
28	0.0209	0.0185	0.0161	0.4712	0.4373	0.3521	0.8255	0.8017	0.7306
29	0.0448	0.0398	0.0345	1.0224	0.9488	0.7641	1.7909	1.7394	1.5854
30	0.0234	0.0207	0.0180	0.5295	0.4914	0.3957	0.9276	0.9009	0.8210
31	0.0262	0.0233	0.0202	0.5947	0.5519	0.4445	1.0418	1.0118	0.9221
32	0.0296	0.0263	0.0228	0.6740	0.6255	0.5037	1.1806	1.1467	1.0450
33	0.0330	0.0293	0.0254	0.7524	0.6982	0.5623	1.3179	1.2800	1.1666
34	0.0367	0.0326	0.0283	0.8384	0.7780	0.6266	1.4686	1.4264	1.3001
35	0.0411	0.0365	0.0317	0.9403	0.8726	0.7028	1.6471	1.5998	1.4581
36	0.0468	0.0415	0.0360	1.0699	0.9929	0.7997	1.8742	1.8203	1.6592
Maximum	***0.0468***	***0.0415***	***0.0360***	***1.0699***	***0.9929***	***0.7997***	***1.8742***	***1.8203***	***1.6592***

PM2.5 Average Concentrations

	PM2.5 Concentration (µg/m^3)		
Receptor No.	**2019**	**2020**	**2025**
1	0.133	0.133	0.138
2	0.134	0.135	0.140
3	0.134	0.135	0.140
4	0.135	0.136	0.141
5	0.144	0.144	0.150
6	0.153	0.153	0.159
7	0.687	0.689	0.715
8	0.163	0.163	0.169
9	0.174	0.174	0.181
10	0.271	0.272	0.282
11	0.688	0.689	0.715
12	0.188	0.188	0.195
13	0.302	0.303	0.314
14	0.197	0.197	0.205
15	0.207	0.208	0.216
16	0.340	0.340	0.354
17	0.218	0.219	0.227
18	0.693	0.694	0.721
19	0.386	0.387	0.402
20	0.231	0.231	0.240
21	0.241	0.242	0.251
22	0.446	0.447	0.464
23	0.262	0.262	0.272
24	0.691	0.692	0.719
25	0.278	0.278	0.289
26	0.526	0.527	0.547
27	0.296	0.297	0.308
28	0.316	0.317	0.329
29	0.686	0.688	0.714
30	0.355	0.356	0.370
31	0.399	0.400	0.415
32	0.452	0.453	0.471
33	0.505	0.506	0.526
34	0.563	0.564	0.586
35	0.631	0.632	0.657
36	0.718	0.720	0.747
	0.718	***0.720***	***0.747***

Carolan-Rollins Project Site Cancer Risk Calculations for 70-Year Residential Exposure from Hwy -101

	DPM			Exhaust TOG			Evaporative TOG			
	Unit Risk Factor = 318.5			*Unit Risk Factor = 1.8*			*Unit Risk Factor = 0.11*			
Sensitivity Weighting Factors	***0.143***	***0.339***	***1.207***	***0.143***	***0.339***	***1.207***	***0.143***	***0.339***	***1.207***	**70-Year Total Cancer Risk**
70-yr Residential Risk										
Receptor No.	**2019**	**2020**	**2025**	**2019**	**2020**	**2025**	**2019**	**2020**	**2025**	**(per million)**
1	0.41	0.87	2.69	0.05	0.11	0.32	0.005	0.012	0.040	**4.5**
2	0.42	0.88	2.71	0.05	0.11	0.33	0.005	0.012	0.040	**4.6**
3	0.41	0.88	2.71	0.05	0.11	0.33	0.005	0.012	0.040	**4.6**
4	0.42	0.88	2.72	0.05	0.11	0.33	0.005	0.012	0.040	**4.6**
5	0.44	0.93	2.88	0.06	0.12	0.35	0.006	0.013	0.043	**4.8**
6	0.47	0.99	3.06	0.06	0.13	0.37	0.006	0.014	0.046	**5.1**
7	2.05	4.32	13.35	0.26	0.58	1.67	0.027	0.063	0.205	**22.5**
8	0.50	1.05	3.25	0.06	0.14	0.40	0.007	0.015	0.049	**5.5**
9	0.53	1.12	3.46	0.07	0.15	0.42	0.007	0.016	0.052	**5.8**
10	0.82	1.73	5.35	0.10	0.23	0.66	0.011	0.025	0.081	**9.0**
11	2.05	4.32	13.34	0.26	0.58	1.67	0.027	0.063	0.205	**22.5**
12	0.57	1.21	3.73	0.07	0.16	0.46	0.007	0.017	0.056	**6.3**
13	0.91	1.92	5.94	0.12	0.26	0.73	0.012	0.028	0.090	**10.0**
14	0.60	1.26	3.90	0.08	0.17	0.48	0.008	0.018	0.059	**6.6**
15	0.63	1.33	4.11	0.08	0.18	0.50	0.008	0.019	0.062	**6.9**
16	1.02	2.15	6.66	0.13	0.29	0.83	0.014	0.031	0.101	**11.2**
17	0.66	1.40	4.32	0.08	0.19	0.53	0.009	0.020	0.065	**7.3**
18	2.06	4.35	13.43	0.27	0.59	1.69	0.028	0.064	0.207	**22.7**
19	1.16	2.44	7.54	0.15	0.33	0.94	0.015	0.036	0.115	**12.7**
20	0.70	1.47	4.55	0.09	0.20	0.56	0.009	0.021	0.069	**7.7**
21	0.73	1.54	4.76	0.09	0.20	0.59	0.010	0.022	0.072	**8.0**
22	1.33	2.81	8.68	0.17	0.38	1.08	0.018	0.041	0.133	**14.6**
23	0.79	1.66	5.15	0.10	0.22	0.64	0.010	0.024	0.078	**8.7**
24	2.06	4.33	13.38	0.27	0.59	1.68	0.028	0.064	0.206	**22.6**
25	0.84	1.76	5.45	0.11	0.24	0.68	0.011	0.026	0.083	**9.2**
26	1.57	3.31	10.21	0.20	0.45	1.28	0.021	0.048	0.157	**17.2**
27	0.89	1.88	5.80	0.11	0.25	0.72	0.012	0.027	0.088	**9.8**
28	0.95	2.00	6.18	0.12	0.27	0.77	0.013	0.029	0.094	**10.4**
29	2.04	4.30	13.28	0.26	0.58	1.67	0.027	0.063	0.205	**22.4**
30	1.06	2.24	6.93	0.14	0.30	0.86	0.014	0.033	0.106	**11.7**
31	1.19	2.51	7.76	0.15	0.34	0.97	0.016	0.037	0.119	**13.1**
32	1.35	2.84	8.78	0.17	0.38	1.10	0.018	0.042	0.135	**14.8**
33	1.50	3.17	9.78	0.19	0.43	1.23	0.020	0.046	0.151	**16.5**
34	1.67	3.52	10.88	0.22	0.48	1.37	0.022	0.052	0.168	**18.4**
35	1.87	3.95	12.18	0.24	0.54	1.54	0.025	0.058	0.188	**20.6**
36	2.13	4.49	13.84	0.28	0.61	1.75	0.029	0.066	0.214	**23.4**
Max	***2.1***	***4.5***	***13.8***	***0.3***	***0.6***	***1.7***	***0.0***	***0.1***	***0.2***	***23.40***
Min	***0.41***	***0.87***	***2.69***	***0.05***	***0.11***	***0.32***	***0.01***	***0.01***	***0.04***	***4.51***

Carolan Rollins, Burlingame, CA - MERV 13 Air Filtration & 3 Hour Outdoor Exposure (MERV13)
CAL3QHCR Risk Modeling Parameters and Cancer Risk in Project Area
DPM & TOG TACs - Risk By Receptor from Highway 101

Receptor Information

Total Number of Receptors	36
Receptor Height =	1.5 m
Receptor distances =	variable

Meteorological Conditions

San Mateo STP Hourly !2001 - 2005	2002 - 2005
Land Use Classification	suburban
Wind speed =	variable
Wind direction =	variable
Surface roughness =	200 cm

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where:
C_{air} = concentration in air (µg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure (days/week)	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair x SWF

Where:
CPF = Cancer potency factor (mg/kg-day)$^{-1}$
URF =Unit risk factor (cancer risk per µg/m^3)
SWF = Sensitivity Weighting Factor - calculated for each period based on the exposure period and age sensitivity factor (ASF)

Unit Risk Factors for DPM and Organic TACs from Vehicle TOG Exhaust & Evaporative Emissions

		Unit Risk Factors[a]		
Exposure Type	DPM CPF (mg/kg-day)-1	*DPM*	Exhaust TOG TACs	Evaporative TOG TACs
Residential (70-Yr Exposure)	1.10E+00	318.5	1.8	0.11

a Unit risk factor for DPM calculated. URF for TOG TACS from BAAQMD *Recommended Methods for Screening Local Risks and Hazards .*

Average Concentration (µg/m3) **at 52.5% Ave Control** 0.475

	DPM Concentration (µg/m^3)			Exhaust TOG Concentration (µg/m^3)			Evaporative TOG Concentration (µg/m^3)		
Receptor No.	2017	2020	2025	2017	2020	2025	2017	2020	2025
1	0.0043	0.0038	0.0033	0.1980	0.1837	0.1478	0.3468	0.3367	0.3067
2	0.0043	0.0039	0.0034	0.2003	0.1858	0.1496	0.3509	0.3407	0.3103
3	0.0043	0.0038	0.0033	0.2003	0.1858	0.1496	0.3508	0.3407	0.3103
4	0.0043	0.0039	0.0034	0.2016	0.1871	0.1506	0.3532	0.3430	0.3124
5	0.0046	0.0041	0.0036	0.2143	0.1989	0.1601	0.3754	0.3646	0.3321
6	0.0049	0.0043	0.0038	0.2277	0.2112	0.1700	0.3988	0.3872	0.3528
7	0.0214	0.0190	0.0165	1.0241	0.9503	0.7653	1.7938	1.7422	1.5878
8	0.0052	0.0046	0.0040	0.2428	0.2252	0.1813	0.4252	0.4129	0.3762
9	0.0055	0.0049	0.0043	0.2588	0.2401	0.1933	0.4534	0.4402	0.4011
10	0.0086	0.0076	0.0066	0.4044	0.3752	0.3021	0.7083	0.6879	0.6268
11	0.0214	0.0190	0.0165	1.0244	0.9506	0.7656	1.7944	1.7428	1.5884
12	0.0060	0.0053	0.0046	0.2797	0.2595	0.2089	0.4899	0.4758	0.4335
13	0.0095	0.0084	0.0073	0.4501	0.4176	0.3363	0.7884	0.7657	0.6977
14	0.0062	0.0055	0.0048	0.2932	0.2720	0.2190	0.5135	0.4987	0.4544
15	0.0066	0.0058	0.0051	0.3090	0.2867	0.2308	0.5413	0.5256	0.4789
16	0.0107	0.0095	0.0082	0.5063	0.4698	0.3783	0.8868	0.8612	0.7848
17	0.0069	0.0061	0.0053	0.3253	0.3019	0.2430	0.5699	0.5534	0.5042
18	0.0215	0.0191	0.0166	1.0321	0.9578	0.7713	1.8079	1.7559	1.6003
19	0.0121	0.0107	0.0093	0.5757	0.5342	0.4301	1.0084	0.9793	0.8925
20	0.0073	0.0065	0.0056	0.3440	0.3192	0.2570	0.6026	0.5852	0.5332
21	0.0076	0.0068	0.0059	0.3597	0.3338	0.2688	0.6302	0.6120	0.5576
22	0.0139	0.0123	0.0107	0.6641	0.6162	0.4962	1.1632	1.1297	1.0296
23	0.0082	0.0073	0.0064	0.3902	0.3621	0.2915	0.6835	0.6638	0.6049
24	0.0215	0.0190	0.0165	1.0290	0.9549	0.7690	1.8025	1.7507	1.5956
25	0.0087	0.0078	0.0067	0.4141	0.3842	0.3094	0.7253	0.7044	0.6419
26	0.0164	0.0145	0.0126	0.7834	0.7269	0.5854	1.3722	1.3327	1.2146
27	0.0093	0.0082	0.0072	0.4411	0.4093	0.3296	0.7727	0.7504	0.6838
28	0.0099	0.0088	0.0076	0.4712	0.4373	0.3521	0.8255	0.8017	0.7306
29	0.0213	0.0189	0.0164	1.0224	0.9488	0.7641	1.7909	1.7394	1.5854
30	0.0111	0.0099	0.0086	0.5295	0.4914	0.3957	0.9276	0.9009	0.8210
31	0.0124	0.0110	0.0096	0.5947	0.5519	0.4445	1.0418	1.0118	0.9221
32	0.0141	0.0125	0.0108	0.6740	0.6255	0.5037	1.1806	1.1467	1.0450
33	0.0157	0.0139	0.0121	0.7524	0.6982	0.5623	1.3179	1.2800	1.1666
34	0.0174	0.0155	0.0134	0.8384	0.7780	0.6266	1.4686	1.4264	1.3001
35	0.0195	0.0173	0.0150	0.9403	0.8726	0.7028	1.6471	1.5998	1.4581
36	0.0222	0.0197	0.0171	1.0699	0.9929	0.7997	1.8742	1.8203	1.6592
Maximum	***0.0222***	***0.0197***	***0.0171***	***1.0699***	***0.9929***	***0.7997***	***1.8742***	***1.8203***	***1.6592***

PM2.5 Average Concentrations

	PM2.5 Concentration (µg/m^3)		
Receptor No.	2017	2020	2025
1	0.063	0.063	0.066
2	0.064	0.064	0.066
3	0.064	0.064	0.066
4	0.064	0.064	0.067
5	0.068	0.068	0.071
6	0.073	0.073	0.075
7	0.326	0.327	0.340
8	0.077	0.078	0.080
9	0.083	0.083	0.086
10	0.129	0.129	0.134
11	0.327	0.327	0.340
12	0.089	0.089	0.093
13	0.143	0.144	0.149
14	0.093	0.094	0.097
15	0.099	0.099	0.102
16	0.161	0.162	0.168
17	0.104	0.104	0.108
18	0.329	0.330	0.342
19	0.184	0.184	0.191
20	0.110	0.110	0.114
21	0.115	0.115	0.119
22	0.212	0.212	0.220
23	0.124	0.125	0.129
24	0.328	0.329	0.341
25	0.132	0.132	0.137
26	0.250	0.250	0.260
27	0.141	0.141	0.146
28	0.150	0.151	0.156
29	0.326	0.327	0.339
30	0.169	0.169	0.176
31	0.190	0.190	0.197
32	0.215	0.215	0.224
33	0.240	0.240	0.250
34	0.267	0.268	0.278
35	0.300	0.300	0.312
36	0.341	0.342	0.355
Max	***0.341***	***0.342***	***0.355***
Min	***0.063***	***0.063***	***0.066***

Carolan Rollins Site - Cancer Risk Calculations for 70-Year Residential Exposure - MERV 13 Air Filtration & 3 Hour Outdoor Exposure

	DPM			Exhaust TOG			Evaporative TOG			
	Unit Risk Factor = 318.5			*Unit Risk Factor = 1.8*			*Unit Risk Factor = 0.11*			
Sensitivity Weighting Factors	***0.143***	***0.339***	***1.207***	***0.143***	***0.339***	***1.207***	***0.143***	***0.339***	***1.207***	**70-Year Total**
70-yr Residential Risk										**Cancer Risk**
Receptor No.	**2017**	**2020**	**2025**	**2017**	**2020**	**2025**	**2017**	**2020**	**2025**	**(per million)**
1	0.20	0.41	1.28	0.05	0.11	0.32	0.005	0.012	0.040	**2.4**
2	0.20	0.42	1.29	0.05	0.11	0.33	0.005	0.012	0.040	**2.5**
3	0.20	0.42	1.29	0.05	0.11	0.33	0.005	0.012	0.040	**2.5**
4	0.20	0.42	1.29	0.05	0.11	0.33	0.005	0.012	0.040	**2.5**
5	0.21	0.44	1.37	0.06	0.12	0.35	0.006	0.013	0.043	**2.6**
6	0.22	0.47	1.45	0.06	0.13	0.37	0.006	0.014	0.046	**2.8**
7	0.97	2.05	6.34	0.26	0.58	1.67	0.027	0.063	0.205	**12.2**
8	0.24	0.50	1.54	0.06	0.14	0.40	0.007	0.015	0.049	**2.9**
9	0.25	0.53	1.64	0.07	0.15	0.42	0.007	0.016	0.052	**3.1**
10	0.39	0.82	2.54	0.10	0.23	0.66	0.011	0.025	0.081	**4.9**
11	0.97	2.05	6.34	0.26	0.58	1.67	0.027	0.063	0.205	**12.2**
12	0.27	0.57	1.77	0.07	0.16	0.46	0.007	0.017	0.056	**3.4**
13	0.43	0.91	2.82	0.12	0.26	0.73	0.012	0.028	0.090	**5.4**
14	0.28	0.60	1.85	0.08	0.17	0.48	0.008	0.018	0.059	**3.5**
15	0.30	0.63	1.95	0.08	0.18	0.50	0.008	0.019	0.062	**3.7**
16	0.49	1.02	3.16	0.13	0.29	0.83	0.014	0.031	0.101	**6.1**
17	0.31	0.66	2.05	0.08	0.19	0.53	0.009	0.020	0.065	**3.9**
18	0.98	2.07	6.38	0.27	0.59	1.69	0.028	0.064	0.207	**12.3**
19	0.55	1.16	3.58	0.15	0.33	0.94	0.015	0.036	0.115	**6.9**
20	0.33	0.70	2.16	0.09	0.20	0.56	0.009	0.021	0.069	**4.1**
21	0.35	0.73	2.26	0.09	0.20	0.59	0.010	0.022	0.072	**4.3**
22	0.63	1.33	4.12	0.17	0.38	1.08	0.018	0.041	0.133	**7.9**
23	0.37	0.79	2.44	0.10	0.22	0.64	0.010	0.024	0.078	**4.7**
24	0.98	2.06	6.36	0.27	0.59	1.68	0.028	0.064	0.206	**12.2**
25	0.40	0.84	2.59	0.11	0.24	0.68	0.011	0.026	0.083	**5.0**
26	0.74	1.57	4.85	0.20	0.45	1.28	0.021	0.048	0.157	**9.3**
27	0.42	0.89	2.75	0.11	0.25	0.72	0.012	0.027	0.088	**5.3**
28	0.45	0.95	2.94	0.12	0.27	0.77	0.013	0.029	0.094	**5.6**
29	0.97	2.04	6.31	0.26	0.58	1.67	0.027	0.063	0.205	**12.1**
30	0.51	1.07	3.29	0.14	0.30	0.86	0.014	0.033	0.106	**6.3**
31	0.57	1.19	3.69	0.15	0.34	0.97	0.016	0.037	0.119	**7.1**
32	0.64	1.35	4.17	0.17	0.38	1.10	0.018	0.042	0.135	**8.0**
33	0.71	1.50	4.64	0.19	0.43	1.23	0.020	0.046	0.151	**8.9**
34	0.79	1.67	5.17	0.22	0.48	1.37	0.022	0.052	0.168	**9.9**
35	0.89	1.87	5.79	0.24	0.54	1.54	0.025	0.058	0.188	**11.1**
36	1.01	2.13	6.58	0.28	0.61	1.75	0.029	0.066	0.214	**12.7**
Max	***1.0***	***2.1***	***6.6***	***0.3***	***0.6***	***1.7***	***0.0***	***0.1***	***0.2***	***12.66***
Min	***0.20***	***0.41***	***1.28***	***0.05***	***0.11***	***0.32***	***0.01***	***0.01***	***0.04***	***2.43***

Carolan Rollins, Burlingame, CA- MERV 16 Air Filtration & 3 Hour Outdoor Exposure (MERV16)
CAL3QHCR Risk Modeling Parameters and Maximum Cancer Risk in Project Area
DPM & TOG TACs - Risk By Receptor from Highway 101

Receptor Information

Total Number of Receptors	36
Receptor Height =	1.5 m
Receptor distances =	variable

Meteorological Conditions

San Mateo STP Hourly !2001 - 2005	2002 - 2005
Land Use Classification	suburban
Wind speed =	variable
Wind direction =	variable
Surface roughness =	200 cm

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air (µg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure (days/week)	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6

= URF x Cair x SWF

Where: CPF = Cancer potency factor (mg/kg-day)$^{-1}$
URF =Unit risk factor (cancer risk per µg/m^3)
SWF = Sensitivity Weighting Factor - calculated for each period based on the exposure period and age sensitivity factor (ASF)

Unit Risk Factors for DPM and Organic TACs from Vehicle TOG Exhaust & Evaporative Emissions

		Unit Risk Factors[a]		
Exposure Type	DPM CPF (mg/kg-day)-1	*DPM*	Exhaust TOG TACs	Evaporative TOG TACs
Residential (70-Yr Exposure)	1.10E+00	318.5	1.8	0.11

a Unit risk factor for DPM calculated. URF for TOG TACS from BAAQMD *Recommended Methods for Screening Local Risks and Hazards* .

Average Concentration (µg/m3) **at 74.4% Ave Control** 0.256

	DPM Concentration (µg/m^3)			Exhaust TOG Concentration (µg/m^3)			Evaporative TOG Concentration (µg/m^3)		
Receptor No.	2017	2020	2025	2017	2020	2025	2017	2020	2025
1	0.0023	0.0021	0.0018	0.1980	0.1837	0.1478	0.3468	0.3367	0.3067
2	0.0023	0.0021	0.0018	0.2003	0.1858	0.1496	0.3509	0.3407	0.3103
3	0.0023	0.0021	0.0018	0.2003	0.1858	0.1496	0.3508	0.3407	0.3103
4	0.0023	0.0021	0.0018	0.2016	0.1871	0.1506	0.3532	0.3430	0.3124
5	0.0025	0.0022	0.0019	0.2143	0.1989	0.1601	0.3754	0.3646	0.3321
6	0.0026	0.0023	0.0020	0.2277	0.2112	0.1700	0.3988	0.3872	0.3528
7	0.0115	0.0102	0.0089	1.0241	0.9503	0.7653	1.7938	1.7422	1.5878
8	0.0028	0.0025	0.0022	0.2428	0.2252	0.1813	0.4252	0.4129	0.3762
9	0.0030	0.0026	0.0023	0.2588	0.2401	0.1933	0.4534	0.4402	0.4011
10	0.0046	0.0041	0.0036	0.4044	0.3752	0.3021	0.7083	0.6879	0.6268
11	0.0115	0.0102	0.0089	1.0244	0.9506	0.7656	1.7944	1.7428	1.5884
12	0.0032	0.0029	0.0025	0.2797	0.2595	0.2089	0.4899	0.4758	0.4335
13	0.0051	0.0045	0.0040	0.4501	0.4176	0.3363	0.7884	0.7657	0.6977
14	0.0034	0.0030	0.0026	0.2932	0.2720	0.2190	0.5135	0.4987	0.4544
15	0.0035	0.0031	0.0027	0.3090	0.2867	0.2308	0.5413	0.5256	0.4789
16	0.0057	0.0051	0.0044	0.5063	0.4698	0.3783	0.8868	0.8612	0.7848
17	0.0037	0.0033	0.0029	0.3253	0.3019	0.2430	0.5699	0.5534	0.5042
18	0.0116	0.0103	0.0089	1.0321	0.9578	0.7713	1.8079	1.7559	1.6003
19	0.0065	0.0058	0.0050	0.5757	0.5342	0.4301	1.0084	0.9793	0.8925
20	0.0039	0.0035	0.0030	0.3440	0.3192	0.2570	0.6026	0.5852	0.5332
21	0.0041	0.0036	0.0032	0.3597	0.3338	0.2688	0.6302	0.6120	0.5576
22	0.0075	0.0067	0.0058	0.6641	0.6162	0.4962	1.1632	1.1297	1.0296
23	0.0044	0.0039	0.0034	0.3902	0.3621	0.2915	0.6835	0.6638	0.6049
24	0.0116	0.0103	0.0089	1.0290	0.9549	0.7690	1.8025	1.7507	1.5956
25	0.0047	0.0042	0.0036	0.4141	0.3842	0.3094	0.7253	0.7044	0.6419
26	0.0088	0.0078	0.0068	0.7834	0.7269	0.5854	1.3722	1.3327	1.2146
27	0.0050	0.0044	0.0039	0.4411	0.4093	0.3296	0.7727	0.7504	0.6838
28	0.0053	0.0047	0.0041	0.4712	0.4373	0.3521	0.8255	0.8017	0.7306
29	0.0115	0.0102	0.0088	1.0224	0.9488	0.7641	1.7909	1.7394	1.5854
30	0.0060	0.0053	0.0046	0.5295	0.4914	0.3957	0.9276	0.9009	0.8210
31	0.0067	0.0060	0.0052	0.5947	0.5519	0.4445	1.0418	1.0118	0.9221
32	0.0076	0.0067	0.0058	0.6740	0.6255	0.5037	1.1806	1.1467	1.0450
33	0.0084	0.0075	0.0065	0.7524	0.6982	0.5623	1.3179	1.2800	1.1666
34	0.0094	0.0083	0.0072	0.8384	0.7780	0.6266	1.4686	1.4264	1.3001
35	0.0105	0.0093	0.0081	0.9403	0.8726	0.7028	1.6471	1.5998	1.4581
36	0.0120	0.0106	0.0092	1.0699	0.9929	0.7997	1.8742	1.8203	1.6592
Maximum	***0.0120***	***0.0106***	***0.0092***	***1.0699***	***0.9929***	***0.7997***	***1.8742***	***1.8203***	***1.6592***

PM2.5 Average Concentrations

	PM2.5 Concentration (µg/m^3)		
Receptor No.	2017	2020	2025
1	0.034	0.034	0.035
2	0.034	0.034	0.036
3	0.034	0.034	0.036
4	0.035	0.035	0.036
5	0.037	0.037	0.038
6	0.039	0.039	0.041
7	0.176	0.176	0.183
8	0.042	0.042	0.043
9	0.044	0.045	0.046
10	0.069	0.070	0.072
11	0.176	0.176	0.183
12	0.048	0.048	0.050
13	0.077	0.077	0.080
14	0.050	0.050	0.052
15	0.053	0.053	0.055
16	0.087	0.087	0.091
17	0.056	0.056	0.058
18	0.177	0.178	0.185
19	0.099	0.099	0.103
20	0.059	0.059	0.061
21	0.062	0.062	0.064
22	0.114	0.114	0.119
23	0.067	0.067	0.070
24	0.177	0.177	0.184
25	0.071	0.071	0.074
26	0.135	0.135	0.140
27	0.076	0.076	0.079
28	0.081	0.081	0.084
29	0.176	0.176	0.183
30	0.091	0.091	0.095
31	0.102	0.102	0.106
32	0.116	0.116	0.121
33	0.129	0.130	0.135
34	0.144	0.144	0.150
35	0.162	0.162	0.168
36	0.184	0.184	0.191
Max	***0.184***	***0.184***	***0.191***
Min	***0.034***	***0.034***	***0.035***

Carolan Rollins Site- Cancer Risk Calculations for 70-Year Residential Exposure - MERV 16 Air Filtration & 3 Hour Outdoor Exposure

	DPM			Exhaust TOG			Evaporative TOG			
	Unit Risk Factor = 318.5			*Unit Risk Factor = 1.8*			*Unit Risk Factor = 0.11*			
Sensitivity Weighting Factors	***0.143***	***0.339***	***1.207***	***0.143***	***0.339***	***1.207***	***0.143***	***0.339***	***1.207***	**70-Year Total Cancer Risk (per million)**
70-yr Residential Risk										
Receptor No.	**2017**	**2020**	**2025**	**2017**	**2020**	**2025**	**2017**	**2020**	**2025**	
1	0.11	0.22	0.69	0.05	0.11	0.32	0.005	0.012	0.040	**1.6**
2	0.11	0.22	0.69	0.05	0.11	0.33	0.005	0.012	0.040	**1.6**
3	0.11	0.22	0.69	0.05	0.11	0.33	0.005	0.012	0.040	**1.6**
4	0.11	0.22	0.70	0.05	0.11	0.33	0.005	0.012	0.040	**1.6**
5	0.11	0.24	0.74	0.06	0.12	0.35	0.006	0.013	0.043	**1.7**
6	0.12	0.25	0.78	0.06	0.13	0.37	0.006	0.014	0.046	**1.8**
7	0.53	1.11	3.42	0.26	0.58	1.67	0.027	0.063	0.205	**7.9**
8	0.13	0.27	0.83	0.06	0.14	0.40	0.007	0.015	0.049	**1.9**
9	0.14	0.29	0.89	0.07	0.15	0.42	0.007	0.016	0.052	**2.0**
10	0.21	0.44	1.37	0.10	0.23	0.66	0.011	0.025	0.081	**3.1**
11	0.52	1.11	3.42	0.26	0.58	1.67	0.027	0.063	0.205	**7.9**
12	0.15	0.31	0.95	0.07	0.16	0.46	0.007	0.017	0.056	**2.2**
13	0.23	0.49	1.52	0.12	0.26	0.73	0.012	0.028	0.090	**3.5**
14	0.15	0.32	1.00	0.08	0.17	0.48	0.008	0.018	0.059	**2.3**
15	0.16	0.34	1.05	0.08	0.18	0.50	0.008	0.019	0.062	**2.4**
16	0.26	0.55	1.70	0.13	0.29	0.83	0.014	0.031	0.101	**3.9**
17	0.17	0.36	1.10	0.08	0.19	0.53	0.009	0.020	0.065	**2.5**
18	0.53	1.11	3.44	0.27	0.59	1.69	0.028	0.064	0.207	**7.9**
19	0.30	0.63	1.93	0.15	0.33	0.94	0.015	0.036	0.115	**4.4**
20	0.18	0.38	1.17	0.09	0.20	0.56	0.009	0.021	0.069	**2.7**
21	0.19	0.39	1.22	0.09	0.20	0.59	0.010	0.022	0.072	**2.8**
22	0.34	0.72	2.22	0.17	0.38	1.08	0.018	0.041	0.133	**5.1**
23	0.20	0.43	1.32	0.10	0.22	0.64	0.010	0.024	0.078	**3.0**
24	0.53	1.11	3.43	0.27	0.59	1.68	0.028	0.064	0.206	**7.9**
25	0.21	0.45	1.40	0.11	0.24	0.68	0.011	0.026	0.083	**3.2**
26	0.40	0.85	2.61	0.20	0.45	1.28	0.021	0.048	0.157	**6.0**
27	0.23	0.48	1.48	0.11	0.25	0.72	0.012	0.027	0.088	**3.4**
28	0.24	0.51	1.58	0.12	0.27	0.77	0.013	0.029	0.094	**3.6**
29	0.52	1.10	3.40	0.26	0.58	1.67	0.027	0.063	0.205	**7.8**
30	0.27	0.57	1.77	0.14	0.30	0.86	0.014	0.033	0.106	**4.1**
31	0.31	0.64	1.99	0.15	0.34	0.97	0.016	0.037	0.119	**4.6**
32	0.35	0.73	2.25	0.17	0.38	1.10	0.018	0.042	0.135	**5.2**
33	0.38	0.81	2.50	0.19	0.43	1.23	0.020	0.046	0.151	**5.8**
34	0.43	0.90	2.78	0.22	0.48	1.37	0.022	0.052	0.168	**6.4**
35	0.48	1.01	3.12	0.24	0.54	1.54	0.025	0.058	0.188	**7.2**
36	0.54	1.15	3.54	0.28	0.61	1.75	0.029	0.066	0.214	**8.2**
Max	***0.5***	***1.1***	***3.5***	***0.3***	***0.6***	***1.7***	***0.0***	***0.1***	***0.2***	***8.18***
Min	***0.11***	***0.22***	***0.69***	***0.05***	***0.11***	***0.32***	***0.01***	***0.01***	***0.04***	***1.56***

Caltrain Rail Line – Emissions and Risk Calculations

Carolan-Rollins, Burlingame, CA
DPM Modeling - Rail Line Information and DPM and PM2.5 Emission Rates
Diesel-Powered Passenger and Freight Trains

Year	Description	No. Lines	Link Width (ft)	Link Width (m)	Link Length (ft)	Link Length (miles)	Link Length (m)	Release Height (m)	No. Trains per Day	Train Travel Speed (mph)	Average Daily Emission Rate (g/mi/day)	Average Daily Emission Rate (g/day)	Link Emission Rate (g/s)	Link Emission Rate (lb/hr)
2019	Passenger								75	30	294.5	131.9	1.53E-03	1.21E-02
	Freight Trains								4	40	21.5	9.6	1.12E-04	8.86E-04
	Total	**1**	**12**	**3.7**	**2,365**	**0.45**	**721**	**5.0**	**79**	**-**	**316.0**	**141.5**	**1.64E-03**	**1.30E-02**
2020	Passenger								75	30	294.5	131.9	1.53E-03	1.21E-02
	Freight Trains								4	40	21.5	9.6	1.12E-04	8.86E-04
	Total	**1**	**12**	**3.7**	**2,365**	**0.45**	**721**	**5.0**	**79**	**-**	**316.0**	**141.5**	**1.64E-03**	**1.30E-02**
2025+	Passenger								2	30	1.7	0.8	8.71E-06	6.91E-05
	Freight Trains								4	40	5.5	2.4	2.83E-05	2.25E-04
	Total	**1**	**12**	**3.7**	**2,365**	**0.45**	**721**	**5.0**	**6**	**-**	**7.1**	**3.2**	**3.70E-05**	**2.94E-04**

Notes: Emission based on Emission Factors for Locomotives, USEPA 2009 (EPA-420-F-09-025)
Average emissions calculated for periods 2019-2024 and 2025-2040.
Fuel correction factors from Offroad Modeling Change Technical memo, Changes to the Locomotive Inventory, CARB July 2006.
DPM & PM2.5 calculated as 92% of PM emissions (CARB CEIDERS PM2.5 fractions)
Passenger trains assumed to operate for 24 hours per day
Freight trains assumed to operate for 24 hours per day

Caltrain

Arrive/Depart Station	*Diesel*	*Electric*	*Total*
Passenger trains - weekday =	92	0	92
Passenger trains - weekend =	32	0	32
Passenger trains - Sat only =	4	0	4
Total Trains =	128	0	128
Annual average daily trains =	75	0	75
Locomotive horsepower =	3285		
Locomotives per train =	1		
Locomotive engine load =	0.6		

Freight

Freight trains per day =	4	7 days/week
Locomotive horsepower =	2300	(note: average hp for UPRR locomotive in CA in 2009 was 2,200 hp)
Locomotives per train =	2	
Total horsepower =	4600	
Locomotive engine load =	0.6	

Locomotive Emission Factors (g/hp-hr)*

Train Type	2019	2020	2025+
Passenger	0.091	0.091	0.020
Freight	0.101	0.101	0.026

* 2019 and 2020 are average emissions for 2019-2024. 2025+ emissions average for 2025-2040.

PM2.5 to PM ratio = 0.92

	CARB Fuel Adj Factor	
	2010	2011+
Passenger	0.717	0.709
Freight	0.851	0.840

Carolan-Rollins, Burlingame, CA
DPM Modeling - Rail Line Information and DPM and PM2.5 Emission Rates
Caltrain Electrification and Diesel-Powered Freight Trains

Year	Description	No. Lines	Link Width (ft)	Link Width (m)	Link Length (ft)	Link Length (miles)	Link Length (m)	Release Height (m)	No. Trains per Day	Train Travel Speed (mph)	Average Daily Emission Rate (g/mi/day)	Average Daily Emission Rate (g/day)	Link Emission Rate (g/s)	Link Emission Rate (lb/hr)
2019	Passenger								14	30	58.1	26.0	3.01E-04	2.39E-03
	Freight Trains								4	40	21.5	9.6	1.12E-04	8.86E-04
	Total	**1**	**12**	**3.7**	**2,365**	**0.45**	**721**	**5.0**	**18**	**-**	**79.6**	**35.7**	**4.13E-04**	**3.28E-03**
2020	Passenger								14	30	58.1	26.0	3.01E-04	2.39E-03
	Freight Trains								4	40	21.5	9.6	1.12E-04	8.86E-04
	Total	**1**	**12**	**3.7**	**2,365**	**0.45**	**721**	**5.0**	**18**	**-**	**79.6**	**35.7**	**4.13E-04**	**3.28E-03**
2025+	Passenger								2	30	1.8	0.8	9.54E-06	7.58E-05
	Freight Trains								4	40	5.5	2.4	2.83E-05	2.25E-04
	Total	**1**	**12**	**3.7**	**2,365**	**0.45**	**721**	**5.0**	**6**	**-**	**7.3**	**3.3**	**3.78E-05**	**3.00E-04**

Notes: Emission based on Emission Factors for Locomotives, USEPA 2009 (EPA-420-F-09-025)
Average emissions calculated for periods 2019-2024 and 2025-2040.
Fuel correction factors from Offroad Modeling Change Technical memo, Changes to the Locomotive Inventory, CARB July 2006.
DPM & PM2.5 calculated as 92% of PM emissions (CARB CEIDERS PM2.5 fractions)
25% of trains will be diesel in 2019. This represents about (7 or 8 trains of the current rolling stock of 29 trains). These will be operated only during weekday peak periods.
After 2025 it is assumed thaton an annual average basis there would be 2 trips per day between Sanfrancisco and San Jose.
Passenger trains assumed to operate for 24 hours per day
Freight trains assumed to operate for 24 hours per day

Caltrain

Arrive/Depart Station	*Diesel*	*Electric*	*Total*
Passenger trains - weekday =	19	73	92
Passenger trains - weekend =	0	32	32
Passenger trains - Sat only =	0	4	4
Total Trains =	19	109	128
Annual average daily trains =	14	62	75
Locomotive horsepower =	3600		
Locomotives per train =	1		
Locomotive engine load =	0.6		

Freight

Freight trains per day =	4	7 days/week
Locomotive horsepower =	2300	(note: average hp for UPRR locomotive in CA in 2009 was 2,200 hp)
Locomotives per train =	2	
Total horsepower =	4600	
Locomotive engine load =	0.6	

Locomotive Emission Factors (g/hp-hr)*

Train Type	2019	2020	2025+
Passenger	0.091	0.091	0.020
Freight	0.101	0.101	0.026

* 2019 and 2020 are average emissions for 2019-2024. 2025+ emissions average for 2025-2040.

PM2.5 to PM ratio = 0.92

	CARB Fuel Adj Factor	
	2010	2011+
Passenger	0.717	0.709
Freight	0.851	0.840

Carolan-Rollins, Burlingame, CA
ISCST3 Railroad DPM Risk Modeling Parameters and Maximum Cancer Risk at Project Site
Caltrain Electrification and Diesel-Powered Freight Trains

Receptor Information

Number of Receptors	36
Receptor Spacing =	variable
Receptor Height =	1.5 m

Meteorological Conditions

San Mateo STP Met Data	2002-2005
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	**DBR (L/kg BW-day)**	**A (-)**	**Exposure (hr/day)**	**Exposure (days/week)**	**Exposure (week/year)**	**EF (days/yr)**	**ED (Years)**	**AT (days)**
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
SWFi = Sensitivity weighting factor dependent on emissions period i and duration of exposure
URF =Unit risk factor (cancer risk per $\mu g/m^3$)

Unit Risk Factors (unadjusted for age sensitivity) for DPM

Exposure Type	**CPF $(mg/kg\text{-}day)^{-1}$**	***DPM***
Residential (70-Yr Exposure)	1.10E+00	318.5

MEI Cancer Risk Calculations

Meteorological Data Year	**Maximum Annual DPM Concentration ($\mu g/m^3$)**		
	2019	**2020**	**2025**
2002 - 2005	0.0193	0.0193	0.0018
Cancer Risk[a]	6.15	6.15	0.56
Sensitivity Weighting Factors	0.143	0.339	1.207
Contribution to Total Cancer Risk	0.88	2.1	0.7
70-yr Cumulative Risk [b]	***3.6***		

Notes:
Receptor Heights = 1.5 m
Maximum DPM & PM2.5 concentrations occur at the southern boundary of project site
a Cancer risk (per million) calculated assuming constant 70-year exposure to concentration for year of analysis.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time.

Carolan-Rollins, Burlingame, CA
ISCST3 Railroad DPM Risk Modeling Parameters and Maximum Cancer Risk at Project Site
Diesel-Powered Passenger and Freight Trains

Receptor Information

Number of Receptors	89
Receptor Spacing =	variable
Receptor Height =	4.8 m

Meteorological Conditions

San Mateo STP Met Data	2002-2005
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air (µg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	**DBR (L/kg BW-day)**	**A (-)**	**Exposure (hr/day)**	**Exposure (days/week)**	**Exposure (week/year)**	**EF (days/yr)**	**ED (Years)**	**AT (days)**
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor (mg/kg-day)$^{-1}$
SWFi = Sensitivity weighting factor dependent on emissions period i and duration of exposure
URF =Unit risk factor (cancer risk per µg/m^3)

Unit Risk Factors (unadjusted for age sensitivity) for DPM

Exposure Type	**CPF (mg/kg-day)$^{-1}$**	***DPM***
Residential (70-Yr Exposure)	1.10E+00	318.5

MEI Cancer Risk Calculations

Meteorological Data Year	**Maximum Annual DPM Concentration (µg/m^3)**		
	2019	**2020**	**2025**
2002 - 2005	0.0766	0.0766	0.0017
Cancer Risk[a]	24.39	24.39	0.55
Sensitivity Weighting Factors	0.143	0.339	1.207
Contribution to Total Cancer Risk	3.48	8.3	0.7
70-yr Cumulative Risk [b]	***12.4***		

Notes:
Receptor Heights = 1.5 m
Maximum DPM & PM2.5 concentrations occur at the southern boundary of project site
a Cancer risk (per million) calculated assuming constant 70-year exposure to concentration for year of analysis.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time.

ISCST3 Risk Modeling Parameters and Cancer Risks at Project Site
Rail Line DPM Cancer Risk and PM2.5 By Receptor - All Diesel Locomotives
Ground Level Residential Units & Town Homes

Receptor Information

Total Number of Receptors	36	
Receptor Height =	1.5 m	
Receptor distances =	variable	

Meteorological Conditions

San Mateo STP Hourly !2001 - 2005	2002 - 2005	
Land Use Classification	suburban	
Wind speed =	variable	
Wind direction =	variable	
Surface roughness =	200	cm

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where:
C_{air} = concentration in air (µg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	**DBR (L/kg BW-day)**	**A (-)**	**Exposure (hr/day)**	**Exposure (days/week)**	**Exposure (week/year)**	**EF (days/yr)**	**ED (Years)**	**AT (days)**
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair x SWF

Where:
CPF = Cancer potency factor (mg/kg-day)$^{-1}$
URF =Unit risk factor (cancer risk per µg/m^3)
SWF = Sensitivity Weighting Factor - calculated for each period based on the exposure period and age sensitivity factor (ASF)

Unit Risk Factor (URF) for Diesel DPM

Exposure Type	**DPM CPF (mg/kg-day)$^{-1}$**	**Unit Risk Factor[a] *DPM***
Residential (70-Yr Exposure)	1.10E+00	318.5

a Unit risk factor for DPM calculated.

Average Concentration (µg/m3) **at 0% Ave Control** 1.00

	DPM Concentration (µg/m^3)			PM2.5 Concentration (µg/m^3)		
Receptor No.	**2019**	**2020**	**2025**	**2019**	**2020**	**2025**
1	0.0738	0.0738	0.0017	0.074	0.074	0.002
2	0.0744	0.0744	0.0017	0.074	0.074	0.002
3	0.0753	0.0753	0.0017	0.075	0.075	0.002
4	0.0766	0.0766	0.0017	0.077	0.077	0.002
5	0.0688	0.0688	0.0016	0.069	0.069	0.002
6	0.0626	0.0626	0.0014	0.063	0.063	0.001
7	0.0235	0.0235	0.0005	0.023	0.023	0.001
8	0.0572	0.0572	0.0013	0.057	0.057	0.001
9	0.0528	0.0528	0.0012	0.053	0.053	0.001
10	0.0350	0.0350	0.0008	0.035	0.035	0.001
11	0.0236	0.0236	0.0005	0.024	0.024	0.001
12	0.0483	0.0483	0.0011	0.048	0.048	0.001
13	0.0328	0.0328	0.0007	0.033	0.033	0.001
14	0.0459	0.0459	0.0010	0.046	0.046	0.001
15	0.0436	0.0436	0.0010	0.044	0.044	0.001
16	0.0307	0.0307	0.0007	0.031	0.031	0.001
17	0.0416	0.0416	0.0009	0.042	0.042	0.001
18	0.0236	0.0236	0.0005	0.024	0.024	0.001
19	0.0288	0.0288	0.0007	0.029	0.029	0.001
20	0.0397	0.0397	0.0009	0.040	0.040	0.001
21	0.0383	0.0383	0.0009	0.038	0.038	0.001
22	0.0271	0.0271	0.0006	0.027	0.027	0.001
23	0.0360	0.0360	0.0008	0.036	0.036	0.001
24	0.0237	0.0237	0.0005	0.024	0.024	0.001
25	0.0346	0.0346	0.0008	0.035	0.035	0.001
26	0.0256	0.0256	0.0006	0.026	0.026	0.001
27	0.0332	0.0332	0.0008	0.033	0.033	0.001
28	0.0319	0.0319	0.0007	0.032	0.032	0.001
29	0.0237	0.0237	0.0005	0.024	0.024	0.001
30	0.0299	0.0299	0.0007	0.030	0.030	0.001
31	0.0283	0.0283	0.0006	0.028	0.028	0.001
32	0.0269	0.0269	0.0006	0.027	0.027	0.001
33	0.0258	0.0258	0.0006	0.026	0.026	0.001
34	0.0249	0.0249	0.0006	0.025	0.025	0.001
35	0.0241	0.0241	0.0005	0.024	0.024	0.001
36	0.0233	0.0233	0.0005	0.023	0.023	0.001
Maximum	***0.0766***	***0.0766***	***0.0017***	***0.077***	***0.077***	***0.002***

Cancer Risk Calculations for 70-Year Residential Exposure from Diesel Powered Locomotives

	DPM			
	Unit Risk Factor = 318.5			
Sensitivity Weighting Factors	***0.143***	***0.339***	***1.207***	**70-Year Total Cancer Risk (per million)**
70-yr Residential Risk				
Receptor No.	**2019**	**2020**	**2025**	
1	3.36	7.98	0.64	**12.0**
2	3.38	8.04	0.65	**12.1**
3	3.43	8.14	0.65	**12.2**
4	3.48	8.27	0.67	**12.4**
5	3.13	7.44	0.60	**11.2**
6	2.85	6.77	0.55	**10.2**
7	1.07	2.54	0.20	**3.8**
8	2.60	6.18	0.50	**9.3**
9	2.40	5.70	0.46	**8.6**
10	1.59	3.79	0.30	**5.7**
11	1.07	2.55	0.20	**3.8**
12	2.20	5.22	0.42	**7.8**
13	1.49	3.54	0.28	**5.3**
14	2.09	4.97	0.40	**7.5**
15	1.99	4.72	0.38	**7.1**
16	1.40	3.32	0.27	**5.0**
17	1.89	4.50	0.36	**6.8**
18	1.07	2.55	0.20	**3.8**
19	1.31	3.11	0.25	**4.7**
20	1.81	4.29	0.35	**6.4**
21	1.74	4.14	0.33	**6.2**
22	1.24	2.93	0.23	**4.4**
23	1.64	3.89	0.31	**5.8**
24	1.08	2.56	0.21	**3.8**
25	1.57	3.74	0.30	**5.6**
26	1.16	2.76	0.22	**4.2**
27	1.51	3.59	0.29	**5.4**
28	1.45	3.45	0.28	**5.2**
29	1.08	2.56	0.21	**3.8**
30	1.36	3.24	0.26	**4.9**
31	1.29	3.06	0.25	**4.6**
32	1.22	2.91	0.23	**4.4**
33	1.17	2.79	0.22	**4.2**
34	1.13	2.69	0.22	**4.0**
35	1.10	2.60	0.21	**3.9**
36	1.06	2.52	0.20	**3.8**
Max	***3.5***	***8.3***	***0.7***	***12.42***
Min	***1.06***	***2.52***	***0.20***	***3.78***