Appendix B: Air Quality and Greenhouse Gas Emissions Assessment

BALL ESTATES PROJECT
AIR QUALITY & GREENHOUSE GAS EMISSIONS ASSESSMENT

Alamo, California

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Introduction

The purpose of this report is to address air quality, toxic air contaminant (TAC), and greenhouse gas (GHG) emission impacts associated with the proposed parcel subdivision project located at 333 Camille Avenue in Alamo, California. While the project does not request approval to construct any new residence at this time, this assessment assumes the ultimate full build-out of 35 single-family residential lots on the 21.7-acre lower portion of the property. Two additional parcels would be designated as open space. Air quality and GHG impacts could occur due to temporary construction emissions and as a result of direct and indirect emissions from new residences. The primary issue addressed in this air quality study is localized community risk impacts from emissions of project construction equipment. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD). This analysis was also conducted to fulfill General Conformity requirements for federally-funded projects.

Setting

The project is located in southern Contra Costa County, which is in 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 ($PM_{2.5}$).

Air Pollutants of Concern

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

Toxic air contaminants (TAC) 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. 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 recently published California Environmental Quality Act (CEQA) Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.[2]

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. The closest sensitive receptors are residences adjacent to the project site to the north, east, and west.

Greenhouse Gases

Gases that trap heat in the atmosphere, GHGs, regulate the earth's temperature. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate.

[1] Available online: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm. Accessed: June 9, 2015.
[2] Bay Area Air Quality Management District, 2017. *BAAQMD CEQA Air Quality Guidelines*. May.

The most common GHGs are carbon dioxide (CO_2) and water vapor but there are also several others, most importantly methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These are released into the earth's atmosphere through a variety of natural processes and human activities. Sources of GHGs are generally as follows:

- CO_2 and N_2O are byproducts of fossil fuel combustion.
- N_2O is associated with agricultural operations such as fertilization of crops.
- CH_4 is commonly created by off-gassing from agricultural practices (e.g., keeping livestock) and landfill operations.
- Chlorofluorocarbons (CFCs) were widely used as refrigerants, propellants, and cleaning solvents but their production has been stopped by international treaty.
- HFCs are now used as a substitute for CFCs in refrigeration and cooling.
- PFCs and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semi-conductor manufacturing.

Each GHG has its own potency and effect upon the earth's energy balance. This is expressed in terms of a global warming potential (GWP), with CO_2 being assigned a value of 1 and sulfur hexafluoride being several orders of magnitude stronger with a GWP of 23,900. In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of CO_2 equivalents (CO_2e).

An expanding body of scientific research supports the theory that global warming is currently affecting changes in weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally occurring resources within California could be adversely affected by the global warming trend. Increased precipitation and sea level rise could increase coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal species could also occur. Potential effects of global climate change that could adversely affect human health include more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes and drought; and increased levels of air pollution.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. These Thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were posted on BAAQMD's website and included in the Air District's updated CEQA Guidelines (updated May 2017). The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 1.

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		
Chronic or Acute Hazard Index	>1.0		
Incremental annual average $PM_{2.5}$	>0.3 µg/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 µg/m^3		
Greenhouse Gas Emissions			
GHG Annual Emissions	Compliance with a Qualified GHG Reduction Strategy OR 1,100 metric tons or 4.6 metric tons per capita		

Note: ROG = reactive organic gases, 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.

BAAQMD's adoption of significance thresholds 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 (Cal. Court of Appeal, First Appellate District, Case Nos. A135335 & A136212). CBIA sought review by the California Supreme Court on three issues, including the appellate court's decision to uphold the

BAAQMD's adoption of the thresholds, and the Court granted review on just one: Under what circumstances, if any, does CEQA require an analysis of how existing environmental conditions will impact future residents or users of a proposed project? In December 2015, the Supreme Court determined that an analysis of the impacts of the environment on a project – known as "CEQA-in-reverse" – is only required under two limited circumstances: (1) when a statute provides an express legislative directive to consider such impacts; and (2) when a proposed project risks exacerbating environmental hazards or conditions that already exist (Cal. Supreme Court Case No. S213478). The Supreme Court reversed the Court of Appeal's decision and remanded the matter back to the appellate court to reconsider the case in light of the Supreme Court's ruling. Though not necessarily a CEQA issue, the effect of existing TAC sources on future project receptors (residences) is analyzed to comply with the Clean Air Plan key goal of reducing population TAC exposure and protecting public health in the Bay Area.

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 *2017 Clean Air Plan* that was adopted by BAAQMD in April 2017. . The proposed project would not conflict with the latest Clean Air planning efforts since the project would have emissions well below the BAAQMD thresholds (see Impact 2). The project is too small to exceed any of the significance thresholds and, thus, it is 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 State or federal 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 $PM_{2.5}$ under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for 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 Emissions Estimator Model (CalEEMod) Version 2013.2.2 was used to predict emissions from construction of the site assuming full build out of the project. The project land use types and size, and anticipated construction schedule were input to CalEEMod.

Construction period emissions

CalEEMod provided annual emissions for construction. CalEEMod provides emission estimates for both on-site and off-site construction activities. On-site activities are primarily made up of construction equipment emissions, while off-site activity includes worker, hauling, and vendor traffic. A construction build-out scenario, including equipment list and phasing schedule, was developed based on information provided by the project applicant. The proposed project land uses were input into CalEEMod, which included 35 dwelling units entered as "Single Family Housing," on a 21.7-acre site. It was estimated that the project would require up to 125,000 square feet (sf) of building and pavement demolition, which was entered into the model. In addition, approximately 1,800 one-way trips of concrete trucks are anticipated during the building construction phase, and 1,000 cubic yards (cy) of asphalt and concrete are anticipated during the paving phase. The number of asphalt trips entered into the model was based on an estimated 16 cy/truck.

The project schedule assumes that the project would be built out over a period of approximately 30 months beginning in April 2017, or an estimated 660 construction workdays (based on an average of 22 workdays per month). Average daily emissions were computed by dividing the total construction emissions by the number of construction days. Table 2 shows average daily construction emissions of ROG, NO_X, PM_{10} exhaust, and $PM_{2.5}$ exhaust during construction of the project. As indicated in Table 2, predicted project emissions would not exceed the BAAQMD significance thresholds. *Attachment 1* includes the CalEEMod input and output values for construction emissions.

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 soils. 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. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are implemented to reduce these emissions. *Mitigation Measure AQ-1 would implement BAAQMD-recommended best management practices*.

Table 2. Construction Period Emissions

Scenario	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
Construction emissions (tons)	0.68 tons	2.20 tons	0.11 tons	0.11 tons
Average daily emissions (pounds)[1]	2.1 lbs.	6.7 lbs.	0.3 lbs.	0.3 lbs.
BAAQMD Thresholds (pounds per day)	*54* lbs.	*54* lbs.	*82* lbs.	*54* lbs.
Exceed Threshold?	**No**	**No**	**No**	**No**
Notes: [1]Assumes 660 workdays.				

Operational Period Emissions

Due to the project size, operational-period emissions would be less than significant. In the 2017 update to the CEQA Air Quality Guidelines, BAAQMD identifies screening criteria for the sizes

of land use projects that could result in significant air pollutant emissions. For operational impacts, the screening project size is identified at 325 dwelling units. Single family housing projects of smaller size would be expected to have less-than-significant impacts with respect to operational-period emissions. Since the project proposes to develop up to 35 dwelling units, it is concluded that emissions would be below the BAAQMD significance thresholds for the operational period. Stationary sources of air pollution (e.g., back-up generators) have not been identified with this project.

Mitigation Measure AQ-1: **Include basic measures to control dust and exhaust during construction.**

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

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

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

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

4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

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

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

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

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

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

As discussed under Impact 2, the project would have emissions less than the BAAQMD screening size 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. 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.[3]

Impact 4: Expose sensitive receptors to substantial pollutant concentrations? ***Less than significant.***

Project impacts related to increased community risk can occur either by introducing a new sensitive receptor, such as a residential use, in proximity to an existing source of TACs or by introducing a new source of TACs with the potential to adversely affect existing sensitive receptors in the project vicinity. The BAAQMD recommends using a 1,000-foot screening radius around a project site for purposes of identifying community health risk from siting a new sensitive receptor or a new source of TACs. Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. No stationary sources of TACs, such as generators, are proposed as part of the project. The project would introduce new sensitive receptors to the area in the form of future residences. However, there are no existing TAC sources (e.g., high-volume roadways or highways, emergency back-up generators, and gas stations) within 1,000 of the proposed project. Construction activity would generate dust and equipment exhaust on a temporary basis that could affect nearby sensitive receptors that include residences.

Project Construction

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

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

the construction site and trucks carrying uncovered loads of soils. 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. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less-than-significant if best management practices are employed to reduce these emissions.

Construction equipment and associated heavy-duty truck traffic generate diesel exhaust, which is a known TAC. Diesel exhaust poses both potential health and nuisance impacts to nearby receptors. A community risk assessment of the project construction activities was conducted that evaluated potential health effects to sensitive receptors at nearby residences from construction emissions of DPM and $PM_{2.5}$.[4] A dispersion model was used to predict the off-site DPM concentrations resulting from project construction so that lifetime cancer risks could be predicted. Figure 1 shows the project site and sensitive receptor locations used in the air quality dispersion modeling analysis where potential community risk impacts were evaluated.

Construction Emissions

The CalEEMod model provided annual emissions for construction, as described above. 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, with total emissions of 0.1028 tons (206 pounds). A trip length of one mile was used to represent vehicle travel while at or near the construction site. For modeling purposes, it was assumed that these emissions from on-road vehicles would occur at the construction site. Fugitive $PM_{2.5}$ dust emissions were calculated by CalEEMod as 117 pounds for the construction period.

Dispersion Modeling

The U.S. EPA ISCST3 dispersion model was used to calculate concentrations of DPM and $PM_{2.5}$ at existing sensitive receptors in the vicinity of the project construction sites. The ISCST3 dispersion model is a BAAQMD-recommended model for use in modeling these types of emission activities for CEQA projects.[5] The dispersion 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 (19.7 feet) was used for the area sources. 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. For modeling fugitive $PM_{2.5}$ emissions, a near-ground level release height of two meters (6.6 feet) was used for the area sources. Construction emissions were modeled as occurring daily from 7:00 a.m. to 5 p.m., when the majority of construction activity involving equipment usage would occur.

The modeling used a one-year data set (1989) of hourly meteorological data from Danville that was prepared for use with the ISCST3 model by BAAQMD. Annual DPM and $PM_{2.5}$

[4] DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.
[5] Bay Area Air Quality Management District (BAAQMD), 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 3.0.* May.

concentrations from construction activities during the construction period were calculated using the model. DPM and $PM_{2.5}$ concentrations were calculated at nearby sensitive receptors. Receptor heights of 1.5 meters (4.9 feet) were used for nearby residences.

Predicted Cancer Risk and Hazards

A community risk assessment for exposure to TACs requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risk at each sensitive receptor location. The State of California Office of Environmental Health Hazard Assessment (OEHHA) and CARB develop recommended methods for conducting health risk assessments. The most recent OEHHA risk assessment guidelines were published in February of 2015.[6] These guidelines incorporate substantial changes designed to provide for enhanced protection of children, as required by state law, compared to previous published risk assessment guidelines. CARB has provided additional guidance on implementing OEHHA's recommended methods.[7] This health risk assessment used the recent 2015 OEHHA risk assessment guidelines and CARB guidance. While the OEHHA guidelines use substantially more conservative assumptions than the current BAAQMD guidelines, BAAQMD has not formally adopted recommended procedures for applying the newest OEHHA guidelines. However, BAAQMD is in the process of developing new guidance and has provided initial information on exposure parameter values they are proposing for use.[8] The OEHHA guidelines and newly recommended BAAQMD exposure parameters are used in this evaluation.

Potential increased cancer risk from inhalation of TACs are calculated based on the TAC concentration over the period of exposure, inhalation dose, the TAC cancer potency factor, and an age sensitivity factor to reflect the greater sensitivity of infants and children to cancer-causing TACs. The inhalation dose depends on a person's breathing rate, exposure time and frequency of exposure. These parameters vary depending on the age, or age range, of the persons being exposed and whether the exposure is considered to occur at a residential location or other sensitive receptor location.

The current OEHHA guidance recommends that cancer risk be calculated by age groups to account for different breathing rates and sensitivity to TACs. Specifically, they recommend evaluating risks for the third trimester of pregnancy to age zero, ages zero to less than two (infant exposure), ages two to less than 16 (child exposure), ages 16 to 70 (adult exposure). Age sensitivity factors (ASFs) associated with the different types of exposure are an ASF of 10 for the third trimester and infant exposures, an ASF of 3 for a child exposure, and an ASF of 1 for an adult exposure. Also associated with each exposure type are different breathing rates, expressed as liters per kilogram of body weight per day (L/kg-day). As recommended by the BAAQMD, 95th percentile breathing rates are used for the third trimester and infant exposures, and 80th percentile breathing rates for child and adult exposures. Additionally, CARB and the BAAQMD

[6] OEHHA, 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February.
[7] CARB, 2015. *Risk Management Guidance for Stationary Sources of Air Toxics*. July 23.
[8] Email correspondence from Virginia Lau, BAAQMD to Bill Popenuck of Illingworth & Rodkin, Inc, November 15, 2015.

recommend the use of a residential exposure duration of 30 years for sources with long-term emissions (e.g., roadways).

Functionally, cancer risk is calculated using the following parameters and formulas:

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 10^6

Where:

CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

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)
10^{-6} = Conversion factor

The health risk parameters used in this evaluation are summarized in Table 3.

Table 3. Health Risk Parameters Used for Cancer Risk Calculations

Parameter	*Exposure Type* / *Age Range*	Infant		Child	Adult
		3rd Trimester	0<2	2 < 16	16 - 30
DPM Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$		1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day)*		361	1,090	572	261
Inhalation Absorption Factor		1	1	1	1
Exposure Duration (years)		0.25	2	14	14
Exposure Frequency (days/year)		350	350	350	350
Age Sensitivity Factor		10	10	3	1
Fraction of Time at Home		1.0	1.0	1.0	0.73

* 95th percentile breathing rates for 3rd trimester and infants and 80th percentile for children and adults

Non-Cancer Hazards

Potential 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). 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 total HI is calculated as the sum of the HIs for each TAC evaluated and the total HI is compared to the BAAQMD significance thresholds to determine whether a significant non-cancer health impact from a project would occur.

Typically, for projects involving construction, the primary TAC of concern with non-cancer health effects is DPM. For DPM, the chronic inhalation REL is 5 $\mu g/m^3$.

While not a TAC, $PM_{2.5}$ has been identified by the BAAQMD as a pollutant with potential non-cancer health effects that should be included when evaluating potential community health impacts under CEQA. The thresholds of significance for $PM_{2.5}$ (project level and cumulative) are in terms of an increase in the annual average concentration. When considering $PM_{2.5}$ impacts, the contribution from all sources of $PM_{2.5}$ emissions should be included. For projects involving construction, $PM_{2.5}$ impacts should include those from construction equipment and vehicle exhaust in addition to fugitive dust impacts from construction activities.

The maximum-modeled DPM and $PM_{2.5}$ concentrations occurred in the residential area southeast of the project site on Underhill Drive, as shown in Figure 1 for the maximally exposed individual (MEI). Using the maximum annual modeled DPM concentration, the maximum increased cancer risk was calculated. Infant exposures were assumed in calculating cancer risks for the first two years of residential exposures. Because an infant (0 to 2 years of age) breathing rate is greater than the breathing rate for the 3rd trimester, the contribution to total cancer risk from an infant exposure is greater than if the initial exposure assumed for the 3rd trimester is assumed.

Construction TAC Summary

Results of the assessment for project construction indicate the maximum excess residential infant cancer risk would be 8.1 in one million and the residential adult incremental cancer risk would be 0.2 in one million. Therefore, excess cancer risk at off-site residential receptors would be below the BAAQMD significance threshold of 10 in one million.

The maximum-modeled annual $PM_{2.5}$ concentration, which is based on combined exhaust and fugitive dust emissions, was 0.1 $\mu g/m^3$. Therefore, annual $PM_{2.5}$ concentration would be below the BAAQMD significance threshold of 0.3 $\mu g/m^3$.

The maximum modeled annual residential DPM concentration (i.e., from construction exhaust) was 0.0329 $\mu g/m^3$. The maximum computed HI based on this DPM concentration is 0.01, which is much lower than the BAAQMD significance criterion of a HI greater than 1.0.

The project would have a *less-than-significant impact* with respect to community risk caused by construction activities at nearby residential receptors.

Combined Construction Risk Assessment

As discussed above, there are no existing TAC sources within 1,000 feet of the project area. Therefore, the cumulative impact of project construction combined with existing nearby TAC sources would be *less than significant*.

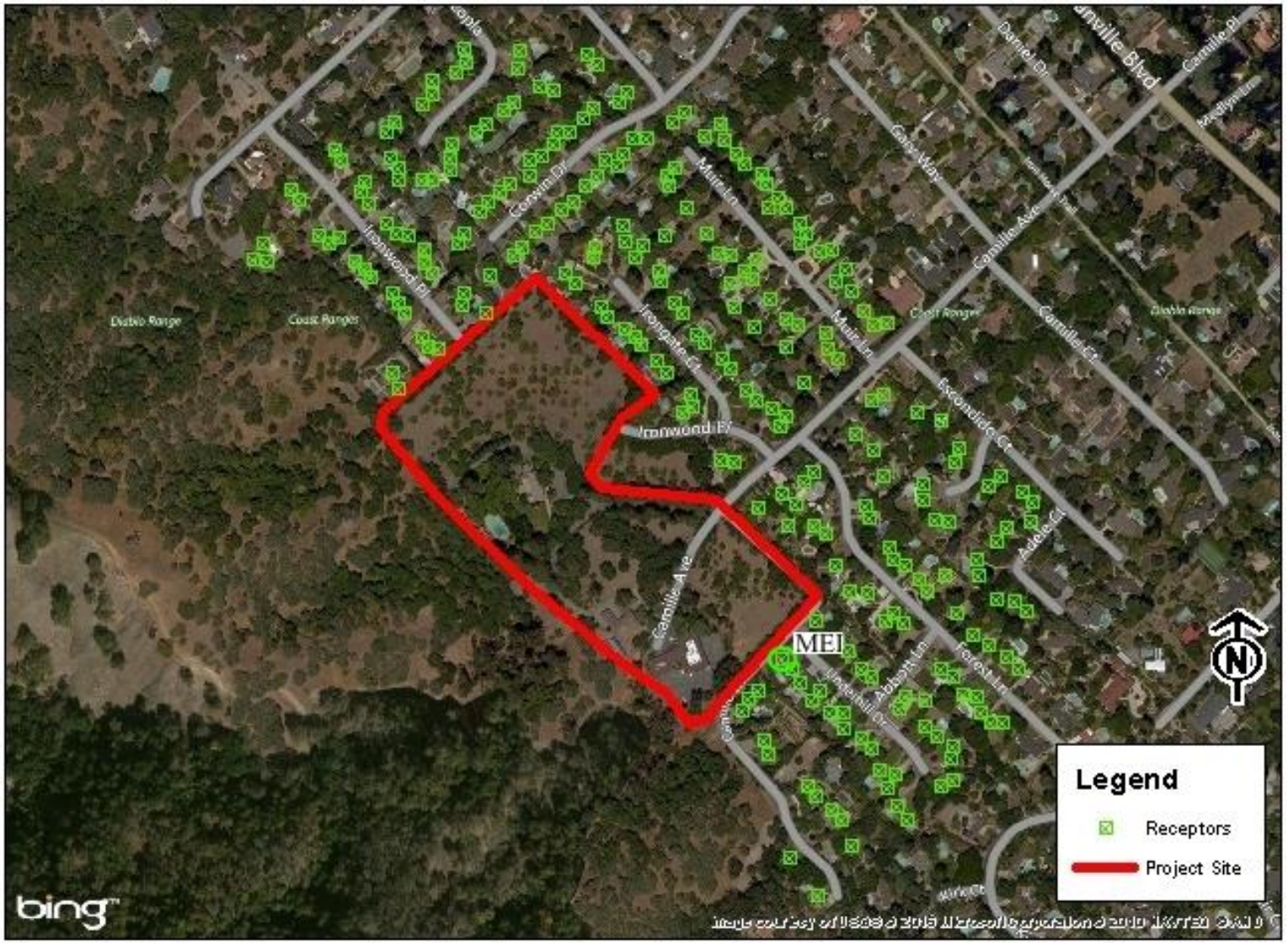

Figure 1. Project Construction Site, Locations of Sensitive Receptors, and Maximum Cancer Risk

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. The project would not include any sources of significant odors that would cause complaints from surrounding uses. This would be a *less-than-significant impact*

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

GHG emissions associated with development of the proposed project would occur over the short-term from construction activities, consisting primarily of emissions from equipment exhaust and worker and vendor trips. There would also be long-term operational emissions associated with vehicular traffic within the project vicinity, energy and water usage, and solid waste disposal. Emissions for the proposed project are discussed below and were analyzed using the methodology recommended in the BAAQMD CEQA Air Quality Guidelines.[9]

Construction Phase

Construction of the proposed project was estimated by CalEEMod to emit 274 MT of CO_2e. Neither BAAQMD nor the City has an adopted threshold of significance for construction-related GHG emissions. However, this would be below the BAAQMD operational threshold of 1,100 MT of CO_2e and would be considered less than significant. BAAQMD encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices may include, but are not limited to: using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment for at least 15 percent of the fleet; using at least 10 percent local building materials; and recycling or reusing at least 50 percent of construction waste or demolition materials.

Operational Impacts

Due to the project size, operational period GHG emissions would be less than significant. In their May 2017 update to the CEQA Air Quality Guidelines, BAAQMD identified screening criteria for the sizes of land use projects that could result in significant GHG emissions. For operational impacts, the screening project size is identified at 56 dwelling units. Single family housing projects of smaller size would be expected to have less-than-significant impacts with respect to operational period GHG emissions. Since the project proposes to operate 35 dwelling units, it is concluded that emissions would be below the BAAQMD significance threshold of 1,100 MT of CO_2e annually and, therefore, this impact is considered *less than significant*.

[9] BAAQMD, 2017. *Op cit.*

Impact 7: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? ***Less than significant.***

The Contra Costa County Climate Action Plan[10] serves as a Qualified Greenhouse Gas Reduction Strategy or a community-wide plan approved by BAAQMD to reduce greenhouse gas (GHG) emissions in accordance with AB 32 goals. A Scoping Plan for AB 32 was adopted by CARB in December 2008. It contains the State of California's main strategies to reduce GHGs from business-as-usual emissions projected in 2020 back down to 1990 levels. Business-as-usual (BAU) is the projected emissions in 2020, including increases in emissions caused by growth, without any GHG reduction measures. The Scoping Plan has a range of GHG reduction actions, including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. One purpose of the Qualified Greenhouse Gas Reduction Strategy is to streamline the decision-making process regarding a proposed project's impact on GHG emissions within the County.

The following measures and actions shown in Table 4 are relevant to the proposed project, with the project's consistency evaluated below. As shown in Table 4, the proposed project would be consistent with the applicable climate action plan measures and actions and this would be considered a less-than-significant impact.

Table 4. Climate Action Plan Consistency

Climate Action Plan Measures and Actions	Consistency
Energy Efficiency	
Measure EE 1: Energy-Efficient Retrofits – Residential Buildings Provide opportunities for residential buildings to become more energy efficient. Action items: • Continue to expand single-family participation in energy efficiency rebate programs, including BayREN and East Bay Energy Watch.	Consistent 1. The proposed project would install high-efficiency kitchen and laundry appliances (e.g., Energy Star-rated appliances or equivalent). 2. Tankless water heaters or a similar hot water energy-saving device or system shall be installed.
Measure EE 6: Energy-Efficient New Buildings Support the statewide transition to net zero energy construction for new residential buildings by 2020 Action Items: • Work with developers, property owners, and financial donors to construct and publicize example zero net energy homes prior to adoption of zero net energy building codes by the California Energy Commission.	Consistent In addition to meeting Title 24 energy requirements for the home, homes which are not suited for solar energy, due to inadequate sun exposure or other factors as detailed in the solar exposure study (see Measure RE 1), will insulate the attic with R-49 insulation batts to prepare for the statewide transition to zero net energy.
Renewable Energy	

[10] Contra Costa County, 2015. *Contra Costa County Climate Action Plan*. December.

Climate Action Plan Measures and Actions	Consistency
Measure RE 1: Alternative Energy Installations Promote installation of alternative energy facilities on homes and businesses.	Consistent – 1. The proposed project would submit a solar exposure study to determine which residences would benefit from solar energy considering cost effectiveness. Those residences determined to benefit will be wired to be solar ready, as defined by the California Building Standards Code. The solar study will be submitted prior to obtaining a building permit 2. Those residences which would not cost-effectively benefit from solar energy will have the attic insulated with R-49 insulation batts.
Land Use and Transportation	
Measure LUT 2: Alternative-Fuel Infrastructure Expand the use of alternative fuels in vehicle travel.	Consistent – The proposed project would provide prewiring for EV charging stations for each residence.

Attachment 1: CalEEMod Input and Output Worksheets, and Risk Calculations

Project Name: Ball Estates, Alamo								
	Project Size	**35**	**residential**	**21.7**	**total project acres disturbed**			
	Construction Hours	**7:30**	**am to**	**5:00**	**pm**			
Qty	**Description**	**HP**	**Load Factor**	**Hours/day**	**Total Work Days**	**Avg. Hours per day**	**Annual Hours**	**Comments**
	Demolition	**Start Date:**	**4/15/2017**	**Total work days:**	12			**Overall Import/Export Volumes**
		End Date:	**5/2/2017**					
1	Excavator (30 ton)	160	0.38	8	7	4.7	56	**Demolition Volume**
1	Loader	264	0.38	8	12	8.0	96	Buildings Removed = 65,000sf
								Pavement Demolished & Hauled = 60,000 sf
	Site Preperation	**Start Date:**	**4/15/2017**	**Total work days:**	10			
		End Date:	**4/30/2017**					
1	Chipper	800	0.75	8	10	8.0	80	
1	Dozer (D-4)	140	0.40	8	5	4.0	40	
1	Excavator (30 ton)	160	0.38	8	10	8.0	80	
	Grading / Excavation	**Start Date:**	**5/1/2017**	**Total work days:**	45			
		End Date:	**7/1/2017**					**Soil Hauling Volume**
2	CAT 627 Scrapers	394	0.48	8	40	7.1	640	Export volume = **0** cubic yards
1	Motor Grader	150	0.41	8	40	7.1	320	Import volume = **0** cubic yards
1	Dozer (D-6)	140	0.44	8	20	3.6	160	
1	Utility Loader	264	0.36	8	20	3.6	160	
1	Compactor, CAT 815	255	0.38	8	20	3.6	160	
1	Loader (small)	97	0.36	8	20	3.6	160	
1	Roller	130	0.38	8	20	3.6	160	
	Trenching	**Start Date:**	**7/2/2017**	**Total work days:**	30			
		End Date:	**8/11/2017**					
1	Excavator (30 ton)	160	0.38	8	20	5.3	160	
1	Tractor Backhoe	90	0.37	8	10	2.7	80	
2	Trench Compactor (small)	120	0.50	8	25	6.7	400	
	Building - Exterior	**Start Date:**	**10/2/2017**	**Total work days:**	395			
		End Date:	**4/5/2019**					
1	Forklift	89	0.20	8	395	8.0	3,160	**Concrete Trucks, 900 Trips, Diesel**
2	Tractors/Loaders/Backhoes	90	0.37	8	5	0.1	80	Temporary Power Line
	Bldg - Interior/Architectural Coating	**Start Date:**	**4/2/2018**	**Total work days:**	402			
		End Date:	**10/15/2019**					
1	Air Compressor	78	0.48	5	402	5.0	2,010	
	Curb & Gutter/Paving	**Start Date:**	**8/12/2017**	**Total work days:**	35			
		Start Date:	**10/1/2017**					
1	Asphalt Paving Machine	174	0.36	8	8	1.8	64	**750 cubic yards, Asphalt**
1	Breakdown Roller	60	0.38	8	8	1.8	64	**250 cubic yards, Concrete**
1	Finish Roller	50	0.38	8	8	1.8	64	
1	Loader (small)	97	0.37	8	8	1.8	64	

Ball Estates Construction

Contra Costa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	35.00	Dwelling Unit	21.70	63,000.00	100

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2014
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

Land Use - Lot acreage from data request spreadsheet

Construction Phase - Anticipated schedule provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Trips and VMT - Bldg: 1,800 one-way concrete truck trips. Paving: 1,000 cy asphaly + concrete @ 16cy/truck = 126 one-way trips. Vendor trip length for concrete/asphalt.

Demolition - 125,000 sf buildings and pavement demo

Table Name	Column Name	Default Value	New Value
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
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tblConstEquipMitigation	Tier	No Change	Tier 2
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tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	35.00	45.00
tblConstructionPhase	NumDays	20.00	35.00
tblConstructionPhase	PhaseEndDate	10/20/2020	10/15/2019
tblConstructionPhase	PhaseEndDate	6/30/2017	7/1/2017

tblConstructionPhase	PhaseEndDate	9/29/2017	10/1/2017
tblConstructionPhase	PhaseEndDate	5/16/2017	4/28/2017
tblConstructionPhase	PhaseStartDate	4/6/2019	4/2/2018
tblConstructionPhase	PhaseStartDate	4/29/2017	5/1/2017
tblConstructionPhase	PhaseStartDate	5/3/2017	4/15/2017
tblLandUse	LotAcreage	11.36	21.70
tblOffRoadEquipment	HorsePower	162.00	160.00
tblOffRoadEquipment	HorsePower	174.00	150.00
tblOffRoadEquipment	HorsePower	125.00	174.00
tblOffRoadEquipment	HorsePower	80.00	60.00
tblOffRoadEquipment	HorsePower	80.00	50.00
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tblOffRoadEquipment	HorsePower	255.00	140.00
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tblOffRoadEquipment	HorsePower	97.00	90.00
tblOffRoadEquipment	HorsePower	97.00	264.00
tblOffRoadEquipment	HorsePower	162.00	160.00
tblOffRoadEquipment	HorsePower	162.00	160.00
tblOffRoadEquipment	HorsePower	171.00	800.00
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tblOffRoadEquipment	UsageHours	8.00	7.10
tblOffRoadEquipment	UsageHours	8.00	1.80
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tblOffRoadEquipment	UsageHours	8.00	3.60
tblTripsAndVMT	HaulingTripLength	20.00	7.30
tblTripsAndVMT	HaulingTripLength	20.00	7.30
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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	0.1343	1.4743	1.0222	1.6800e-003	0.2125	0.0664	0.2789	0.0627	0.0611	0.1238	0.0000	152.5474	152.5474	0.0360	0.0000	153.3040
2018	0.2836	0.4897	0.5789	9.6000e-004	0.0266	0.0308	0.0573	7.1400e-003	0.0293	0.0364	0.0000	80.8911	80.8911	8.8900e-003	0.0000	81.0777
2019	0.2611	0.2370	0.2759	4.7000e-004	0.0122	0.0154	0.0276	3.2000e-003	0.0151	0.0183	0.0000	39.1432	39.1432	3.7400e-003	0.0000	39.2218
Total	**0.6791**	**2.2010**	**1.8770**	**3.1100e-003**	**0.2513**	**0.1126**	**0.3638**	**0.0730**	**0.1055**	**0.1785**	**0.0000**	**272.5816**	**272.5816**	**0.0487**	**0.0000**	**273.6034**

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	4/15/2017	5/2/2017	5	12	
2	Site Preparation	Site Preparation	4/15/2017	4/28/2017	5	10	
3	Grading	Grading	5/1/2017	7/1/2017	5	45	
4	Trenching	Trenching	7/2/2017	8/11/2017	5	30	

5	Paving	Paving	8/12/2017	10/1/2017	5	35	
6	Building Construction	Building Construction	10/2/2017	4/5/2019	5	395	
7	Architectural Coating	Architectural Coating	4/2/2018	10/15/2019	5	402	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 99.84

Acres of Paving: 0

Residential Indoor: 127,575; Residential Outdoor: 42,525; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	1	4.70	160	0.38
Demolition	Rubber Tired Dozers	0	8.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	1	8.00	264	0.38
Site Preparation	Excavators	1	8.00	160	0.38
Site Preparation	Other Construction Equipment	1	8.00	800	0.75
Site Preparation	Rubber Tired Dozers	1	4.00	140	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Excavators	0	8.00	162	0.38
Grading	Graders	1	7.10	150	0.41
Grading	Plate Compactors	1	3.60	255	0.38
Grading	Rollers	1	3.60	130	0.38
Grading	Rubber Tired Dozers	1	3.60	140	0.44
Grading	Scrapers	2	7.10	394	0.48
Grading	Tractors/Loaders/Backhoes	1	3.60	264	0.36
Grading	Tractors/Loaders/Backhoes	1	3.60	97	0.36
Trenching	Excavators	1	5.30	160	0.38
Trenching	Plate Compactors	2	6.70	120	0.50
Trenching	Tractors/Loaders/Backhoes	1	2.70	90	0.37

Paving	Pavers	1	1.80	174	0.36
Paving	Paving Equipment	0	8.00	130	0.36
Paving	Rollers	1	1.80	60	0.38
Paving	Rollers	1	1.80	50	0.38
Paving	Tractors/Loaders/Backhoes	1	1.80	97	0.37
Building Construction	Cranes	0	7.00	226	0.29
Building Construction	Forklifts	1	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	2	0.10	90	0.37
Building Construction	Welders	0	8.00	46	0.45
Architectural Coating	Air Compressors	1	5.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	2	5.00	0.00	569.00	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	8	20.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	4	10.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	4	10.00	0.00	126.00	12.40	7.30	7.30	LD_Mix	HDT_Mix	HHDT
Building Construction	3	13.00	4.00	1,800.00	12.40	7.30	7.30	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	3.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

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					0.0615	0.0000	0.0615	9.3200e-003	0.0000	9.3200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1500e-003	0.0510	0.0304	7.0000e-005		1.9800e-003	1.9800e-003		1.8200e-003	1.8200e-003	0.0000	6.4971	6.4971	1.9900e-003	0.0000	6.5389
Total	**4.1500e-003**	**0.0510**	**0.0304**	**7.0000e-005**	**0.0615**	**1.9800e-003**	**0.0635**	**9.3200e-003**	**1.8200e-003**	**0.0111**	**0.0000**	**6.4971**	**6.4971**	**1.9900e-003**	**0.0000**	**6.5389**

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	6.2300e-003	0.0766	0.0685	2.1000e-004	4.8100e-003	9.8000e-004	5.7800e-003	1.3200e-003	9.0000e-004	2.2200e-003	0.0000	19.1748	19.1748	1.4000e-004	0.0000	19.1777
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	1.0000e-004	1.5000e-004	1.4400e-003	0.0000	2.7000e-004	0.0000	2.8000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2373	0.2373	1.0000e-005	0.0000	0.2375
Total	**6.3300e-003**	**0.0767**	**0.0700**	**2.1000e-004**	**5.0800e-003**	**9.8000e-004**	**6.0600e-003**	**1.3900e-003**	**9.0000e-004**	**2.2900e-003**	**0.0000**	**19.4120**	**19.4120**	**1.5000e-004**	**0.0000**	**19.4152**

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					0.0151	0.0000	0.0151	8.2800e-003	0.0000	8.2800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.0200e-003	0.0424	0.0271	4.0000e-005		2.2700e-003	2.2700e-003		2.0900e-003	2.0900e-003	0.0000	3.5435	3.5435	1.0900e-003	0.0000	3.5663

Total	**4.0200e-003**	**0.0424**	**0.0271**	**4.0000e-005**	**0.0151**	**2.2700e-003**	**0.0173**	**8.2800e-003**	**2.0900e-003**	**0.0104**	**0.0000**	**3.5435**	**3.5435**	**1.0900e-003**	**0.0000**	**3.5663**

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	1.3000e-004	2.0000e-004	1.9200e-003	0.0000	3.6000e-004	0.0000	3.7000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3163	0.3163	2.0000e-005	0.0000	0.3167
Total	**1.3000e-004**	**2.0000e-004**	**1.9200e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.7000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3163**	**0.3163**	**2.0000e-005**	**0.0000**	**0.3167**

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					0.1139	0.0000	0.1139	0.0392	0.0000	0.0392	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0935	1.1011	0.6528	9.7000e-004		0.0496	0.0496		0.0456	0.0456	0.0000	89.6611	89.6611	0.0275	0.0000	90.2380
Total	**0.0935**	**1.1011**	**0.6528**	**9.7000e-004**	**0.1139**	**0.0496**	**0.1635**	**0.0392**	**0.0456**	**0.0848**	**0.0000**	**89.6611**	**89.6611**	**0.0275**	**0.0000**	**90.2380**

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	1.5000e-003	2.2300e-003	0.0216	5.0000e-005	4.1000e-003	3.0000e-005	4.1300e-003	1.0900e-003	3.0000e-005	1.1200e-003	0.0000	3.5588	3.5588	1.9000e-004	0.0000	3.5627
Total	**1.5000e-003**	**2.2300e-003**	**0.0216**	**5.0000e-005**	**4.1000e-003**	**3.0000e-005**	**4.1300e-003**	**1.0900e-003**	**3.0000e-005**	**1.1200e-003**	**0.0000**	**3.5588**	**3.5588**	**1.9000e-004**	**0.0000**	**3.5627**

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	5.0400e-003	0.0537	0.0448	7.0000e-005		3.0100e-003	3.0100e-003		2.7700e-003	2.7700e-003	0.0000	6.1755	6.1755	1.8900e-003	0.0000	6.2152
Total	**5.0400e-003**	**0.0537**	**0.0448**	**7.0000e-005**		**3.0100e-003**	**3.0100e-003**		**2.7700e-003**	**2.7700e-003**	**0.0000**	**6.1755**	**6.1755**	**1.8900e-003**	**0.0000**	**6.2152**

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-004	7.4000e-004	7.2000e-003	2.0000e-005	1.3700e-003	1.0000e-005	1.3800e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.1863	1.1863	6.0000e-005	0.0000	1.1876
Total	**5.0000e-004**	**7.4000e-004**	**7.2000e-003**	**2.0000e-005**	**1.3700e-003**	**1.0000e-005**	**1.3800e-003**	**3.6000e-004**	**1.0000e-005**	**3.7000e-004**	**0.0000**	**1.1863**	**1.1863**	**6.0000e-005**	**0.0000**	**1.1876**

3.6 Paving - 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	5.4400e-003	0.0462	0.0354	5.0000e-005		3.0300e-003	3.0300e-003		2.7900e-003	2.7900e-003	0.0000	4.4887	4.4887	1.3800e-003	0.0000	4.5176
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.4400e-003**	**0.0462**	**0.0354**	**5.0000e-005**		**3.0300e-003**	**3.0300e-003**		**2.7900e-003**	**2.7900e-003**	**0.0000**	**4.4887**	**4.4887**	**1.3800e-003**	**0.0000**	**4.5176**

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	7.0700e-003	0.0126	2.0000e-005	3.9000e-004	8.0000e-005	4.7000e-004	1.1000e-004	7.0000e-005	1.8000e-004	0.0000	1.6126	1.6126	1.0000e-005	0.0000	1.6128
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	8.7000e-004	8.4000e-003	2.0000e-005	1.5900e-003	1.0000e-005	1.6100e-003	4.2000e-004	1.0000e-005	4.4000e-004	0.0000	1.3840	1.3840	7.0000e-005	0.0000	1.3855
Total	**1.5200e-003**	**7.9400e-003**	**0.0210**	**4.0000e-005**	**1.9800e-003**	**9.0000e-005**	**2.0800e-003**	**5.3000e-004**	**8.0000e-005**	**6.2000e-004**	**0.0000**	**2.9965**	**2.9965**	**8.0000e-005**	**0.0000**	**2.9983**

3.7 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	7.0900e-003	0.0617	0.0424	5.0000e-005		5.0700e-003	5.0700e-003		4.6600e-003	4.6600e-003	0.0000	4.8246	4.8246	1.4800e-003	0.0000	4.8556
Total	**7.0900e-003**	**0.0617**	**0.0424**	**5.0000e-005**		**5.0700e-003**	**5.0700e-003**		**4.6600e-003**	**4.6600e-003**	**0.0000**	**4.8246**	**4.8246**	**1.4800e-003**	**0.0000**	**4.8556**

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	2.2100e-003	0.0166	0.0295	4.0000e-005	4.4000e-003	1.9000e-004	4.5900e-003	1.1100e-003	1.8000e-004	1.2800e-003	0.0000	3.7908	3.7908	3.0000e-005	0.0000	3.7915
Vendor	1.5100e-003	0.0117	0.0178	3.0000e-005	8.4000e-004	1.7000e-004	1.0000e-003	2.4000e-004	1.5000e-004	3.9000e-004	0.0000	2.7549	2.7549	2.0000e-005	0.0000	2.7554
Worker	1.4100e-003	2.0900e-003	0.0203	5.0000e-005	3.8500e-003	3.0000e-005	3.8800e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.3413	3.3413	1.8000e-004	0.0000	3.3450
Total	**5.1300e-003**	**0.0304**	**0.0676**	**1.2000e-004**	**9.0900e-003**	**3.9000e-004**	**9.4700e-003**	**2.3700e-003**	**3.6000e-004**	**2.7200e-003**	**0.0000**	**9.8870**	**9.8870**	**2.3000e-004**	**0.0000**	**9.8918**

3.7 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	0.0241	0.2134	0.1651	2.1000e-004		0.0170	0.0170		0.0156	0.0156	0.0000	19.0655	19.0655	5.9400e-003	0.0000	19.1901
Total	**0.0241**	**0.2134**	**0.1651**	**2.1000e-004**		**0.0170**	**0.0170**		**0.0156**	**0.0156**	**0.0000**	**19.0655**	**19.0655**	**5.9400e-003**	**0.0000**	**19.1901**

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	7.7100e-003	0.0611	0.1105	1.7000e-004	5.0900e-003	7.5000e-004	5.8400e-003	1.3600e-003	6.9000e-004	2.0500e-003	0.0000	14.9512	14.9512	1.3000e-004	0.0000	14.9539
Vendor	5.3600e-003	0.0425	0.0664	1.2000e-004	3.3600e-003	6.2000e-004	3.9800e-003	9.6000e-004	5.7000e-004	1.5300e-003	0.0000	10.8671	10.8671	8.0000e-005	0.0000	10.8688
Worker	5.0300e-003	7.5700e-003	0.0728	1.8000e-004	0.0155	1.2000e-004	0.0156	4.1100e-003	1.1000e-004	4.2100e-003	0.0000	12.9172	12.9172	6.5000e-004	0.0000	12.9308
Total	**0.0181**	**0.1112**	**0.2497**	**4.7000e-004**	**0.0239**	**1.4900e-003**	**0.0254**	**6.4300e-003**	**1.3700e-003**	**7.7900e-003**	**0.0000**	**38.7355**	**38.7355**	**8.6000e-004**	**0.0000**	**38.7535**

3.7 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.7000e-003	0.0512	0.0430	6.0000e-005		3.9400e-003	3.9400e-003		3.6300e-003	3.6300e-003	0.0000	4.9593	4.9593	1.5700e-003	0.0000	4.9922
Total	**5.7000e-003**	**0.0512**	**0.0430**	**6.0000e-005**		**3.9400e-003**	**3.9400e-003**		**3.6300e-003**	**3.6300e-003**	**0.0000**	**4.9593**	**4.9593**	**1.5700e-003**	**0.0000**	**4.9922**

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	0.0150	0.0285	4.0000e-005	4.4100e-003	2.0000e-004	4.6100e-003	1.1100e-003	1.8000e-004	1.2900e-003	0.0000	3.8857	3.8857	3.0000e-005	0.0000	3.8865
Vendor	1.3200e-003	0.0103	0.0168	3.0000e-005	8.9000e-004	1.5000e-004	1.0400e-003	2.5000e-004	1.4000e-004	3.9000e-004	0.0000	2.8232	2.8232	2.0000e-005	0.0000	2.8237
Worker	1.2100e-003	1.8200e-003	0.0175	5.0000e-005	4.0800e-003	3.0000e-005	4.1100e-003	1.0900e-003	3.0000e-005	1.1100e-003	0.0000	3.2917	3.2917	1.6000e-004	0.0000	3.2950
Total	**4.4700e-003**	**0.0270**	**0.0628**	**1.2000e-004**	**9.3800e-003**	**3.8000e-004**	**9.7600e-003**	**2.4500e-003**	**3.5000e-004**	**2.7900e-003**	**0.0000**	**10.0006**	**10.0006**	**2.1000e-004**	**0.0000**	**10.0051**

3.8 Architectural Coating - 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	0.2162					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0244	0.1638	0.1514	2.4000e-004		0.0123	0.0123		0.0123	0.0123	0.0000	20.8516	20.8516	1.9800e-003	0.0000	20.8932
Total	**0.2406**	**0.1638**	**0.1514**	**2.4000e-004**		**0.0123**	**0.0123**		**0.0123**	**0.0123**	**0.0000**	**20.8516**	**20.8516**	**1.9800e-003**	**0.0000**	**20.8932**

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	8.7000e-004	1.3100e-003	0.0126	3.0000e-005	2.6800e-003	2.0000e-005	2.7000e-003	7.1000e-004	2.0000e-005	7.3000e-004	0.0000	2.2385	2.2385	1.1000e-004	0.0000	2.2409
Total	**8.7000e-004**	**1.3100e-003**	**0.0126**	**3.0000e-005**	**2.6800e-003**	**2.0000e-005**	**2.7000e-003**	**7.1000e-004**	**2.0000e-005**	**7.3000e-004**	**0.0000**	**2.2385**	**2.2385**	**1.1000e-004**	**0.0000**	**2.2409**

3.8 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2273					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0229	0.1575	0.1581	2.6000e-004		0.0111	0.0111		0.0111	0.0111	0.0000	21.9154	21.9154	1.8500e-003	0.0000	21.9543
Total	**0.2501**	**0.1575**	**0.1581**	**2.6000e-004**		**0.0111**	**0.0111**		**0.0111**	**0.0111**	**0.0000**	**21.9154**	**21.9154**	**1.8500e-003**	**0.0000**	**21.9543**

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	8.3000e-004	1.2600e-003	0.0120	3.0000e-005	2.8100e-003	2.0000e-005	2.8300e-003	7.5000e-004	2.0000e-005	7.7000e-004	0.0000	2.2678	2.2678	1.1000e-004	0.0000	2.2702
Total	**8.3000e-004**	**1.2600e-003**	**0.0120**	**3.0000e-005**	**2.8100e-003**	**2.0000e-005**	**2.8300e-003**	**7.5000e-004**	**2.0000e-005**	**7.7000e-004**	**0.0000**	**2.2678**	**2.2678**	**1.1000e-004**	**0.0000**	**2.2702**

Ball Estates Construction TAC

Contra Costa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	35.00	Dwelling Unit	21.70	63,000.00	100

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2014
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

Land Use - Lot acreage from data request spreadsheet

Construction Phase - Anticipated schedule provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Demolition - 125,000 sf buildings and pavement demo

Trips and VMT - Bldg: 1,800 one-way concrete truck trips. Paving: 1,000 cy asphaly + concrete @ 16cy/truck = 126 one-way trips. 1 mile trip lengths.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
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 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
tblConstructionPhase	NumDays	20.00	402.00
tblConstructionPhase	NumDays	370.00	395.00
tblConstructionPhase	NumDays	20.00	12.00
tblConstructionPhase	NumDays	35.00	45.00
tblConstructionPhase	NumDays	20.00	35.00
tblConstructionPhase	PhaseEndDate	10/20/2020	10/15/2019
tblConstructionPhase	PhaseEndDate	6/30/2017	7/1/2017

tblConstructionPhase	PhaseEndDate	9/29/2017	10/1/2017
tblConstructionPhase	PhaseEndDate	5/16/2017	4/28/2017
tblConstructionPhase	PhaseStartDate	4/6/2019	4/2/2018
tblConstructionPhase	PhaseStartDate	4/29/2017	5/1/2017
tblConstructionPhase	PhaseStartDate	5/3/2017	4/15/2017
tblLandUse	LotAcreage	11.36	21.70
tblOffRoadEquipment	HorsePower	162.00	160.00
tblOffRoadEquipment	HorsePower	174.00	150.00
tblOffRoadEquipment	HorsePower	125.00	174.00
tblOffRoadEquipment	HorsePower	80.00	60.00
tblOffRoadEquipment	HorsePower	255.00	140.00
tblOffRoadEquipment	HorsePower	255.00	140.00
tblOffRoadEquipment	HorsePower	361.00	394.00
tblOffRoadEquipment	HorsePower	97.00	90.00
tblOffRoadEquipment	HorsePower	97.00	264.00
tblOffRoadEquipment	HorsePower	97.00	264.00
tblOffRoadEquipment	HorsePower	162.00	160.00
tblOffRoadEquipment	HorsePower	171.00	800.00
tblOffRoadEquipment	HorsePower	8.00	255.00
tblOffRoadEquipment	HorsePower	80.00	130.00
tblOffRoadEquipment	HorsePower	162.00	160.00
tblOffRoadEquipment	HorsePower	97.00	90.00
tblOffRoadEquipment	HorsePower	8.00	120.00
tblOffRoadEquipment	HorsePower	80.00	50.00
tblOffRoadEquipment	LoadFactor	0.42	0.36
tblOffRoadEquipment	LoadFactor	0.40	0.44
tblOffRoadEquipment	LoadFactor	0.37	0.36
tblOffRoadEquipment	LoadFactor	0.37	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.42	0.75

tblOffRoadEquipment	LoadFactor	0.43	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.36
tblOffRoadEquipment	LoadFactor	0.43	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	6.00	5.00
tblOffRoadEquipment	UsageHours	8.00	4.70
tblOffRoadEquipment	UsageHours	8.00	7.10
tblOffRoadEquipment	UsageHours	8.00	1.80
tblOffRoadEquipment	UsageHours	8.00	1.80
tblOffRoadEquipment	UsageHours	8.00	3.60
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	7.10
tblOffRoadEquipment	UsageHours	7.00	0.10
tblOffRoadEquipment	UsageHours	8.00	3.60
tblOffRoadEquipment	UsageHours	8.00	3.60
tblOffRoadEquipment	UsageHours	8.00	1.80
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,800.00
tblTripsAndVMT	HaulingTripNumber	0.00	126.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00

tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00

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	0.1290	1.3782	0.9508	1.2900e-003	0.1925	0.0651	0.2575	0.0573	0.0599	0.1172	0.0000	119.2029	119.2029	0.0354	0.0000	119.9467
2018	0.2786	0.4125	0.4919	5.3000e-004	2.6600e-003	0.0295	0.0322	7.2000e-004	0.0281	0.0289	0.0000	46.4963	46.4963	8.1000e-003	0.0000	46.6663
2019	0.2597	0.2176	0.2478	3.3000e-004	1.3000e-003	0.0151	0.0164	3.4000e-004	0.0147	0.0151	0.0000	28.7526	28.7526	3.4800e-003	0.0000	28.8256
Total	**0.6673**	**2.0084**	**1.6905**	**2.1500e-003**	**0.1964**	**0.1097**	**0.3061**	**0.0584**	**0.1028**	**0.1612**	**0.0000**	**194.4517**	**194.4517**	**0.0470**	**0.0000**	**195.4386**

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	4/15/2017	5/2/2017	5	12	
2	Site Preparation	Site Preparation	4/15/2017	4/28/2017	5	10	
3	Grading	Grading	5/1/2017	7/1/2017	5	45	

4	Trenching	Trenching	7/2/2017	8/11/2017	5	30	
5	Paving	Paving	8/12/2017	10/1/2017	5	35	
6	Building Construction	Building Construction	10/2/2017	4/5/2019	5	395	
7	Architectural Coating	Architectural Coating	4/2/2018	10/15/2019	5	402	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 99.84

Acres of Paving: 0

Residential Indoor: 127,575; Residential Outdoor: 42,525; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	1	4.70	160	0.38
Demolition	Rubber Tired Dozers	0	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	1	4.00	140	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Excavators	0	8.00	162	0.38
Grading	Graders	1	7.10	150	0.41
Grading	Rubber Tired Dozers	1	3.60	140	0.44
Grading	Scrapers	2	7.10	394	0.48
Grading	Tractors/Loaders/Backhoes	1	3.60	264	0.36
Building Construction	Cranes	0	7.00	226	0.29
Building Construction	Forklifts	1	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	2	0.10	90	0.37
Building Construction	Welders	0	8.00	46	0.45
Paving	Pavers	1	1.80	174	0.36
Paving	Paving Equipment	0	8.00	130	0.36
Paving	Rollers	1	1.80	60	0.38

Architectural Coating	Air Compressors	1	5.00	78	0.48
Demolition	Tractors/Loaders/Backhoes	1	8.00	264	0.38
Site Preparation	Excavators	1	8.00	160	0.38
Site Preparation	Other Construction Equipment	1	8.00	800	0.75
Grading	Plate Compactors	1	3.60	255	0.38
Grading	Tractors/Loaders/Backhoes	1	3.60	97	0.36
Grading	Rollers	1	3.60	130	0.38
Trenching	Excavators	1	5.30	160	0.38
Trenching	Tractors/Loaders/Backhoes	1	2.70	90	0.37
Trenching	Plate Compactors	2	6.70	120	0.50
Paving	Rollers	1	1.80	50	0.38
Paving	Tractors/Loaders/Backhoes	1	1.80	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	2	5.00	0.00	569.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Building Construction	3	13.00	4.00	1,800.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Paving	4	10.00	0.00	126.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	3.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Trenching	4	10.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

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					0.0615	0.0000	0.0615	9.3200e-003	0.0000	9.3200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1500e-003	0.0510	0.0304	7.0000e-005		1.9800e-003	1.9800e-003		1.8200e-003	1.8200e-003	0.0000	6.4971	6.4971	1.9900e-003	0.0000	6.5389
Total	**4.1500e-003**	**0.0510**	**0.0304**	**7.0000e-005**	**0.0615**	**1.9800e-003**	**0.0635**	**9.3200e-003**	**1.8200e-003**	**0.0111**	**0.0000**	**6.4971**	**6.4971**	**1.9900e-003**	**0.0000**	**6.5389**

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	3.2600e-003	9.8100e-003	0.0508	2.0000e-005	2.5000e-004	6.0000e-005	3.1000e-004	7.0000e-005	6.0000e-005	1.3000e-004	0.0000	1.3825	1.3825	2.0000e-005	0.0000	1.3830
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	7.0000e-005	3.0000e-005	3.3000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0247	0.0247	0.0000	0.0000	0.0247
Total	**3.3300e-003**	**9.8400e-003**	**0.0511**	**2.0000e-005**	**2.7000e-004**	**6.0000e-005**	**3.3000e-004**	**8.0000e-005**	**6.0000e-005**	**1.4000e-004**	**0.0000**	**1.4072**	**1.4072**	**2.0000e-005**	**0.0000**	**1.4077**

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					0.0151	0.0000	0.0151	8.2800e-003	0.0000	8.2800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.0300e-003	0.0425	0.0272	4.0000e-005		2.2800e-003	2.2800e-003		2.0900e-003	2.0900e-003	0.0000	3.5556	3.5556	1.0900e-003	0.0000	3.5785

Total	**4.0300e-003**	**0.0425**	**0.0272**	**4.0000e-005**	**0.0151**	**2.2800e-003**	**0.0173**	**8.2800e-003**	**2.0900e-003**	**0.0104**	**0.0000**	**3.5556**	**3.5556**	**1.0900e-003**	**0.0000**	**3.5785**

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	1.0000e-004	3.0000e-005	4.4000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0329	0.0329	0.0000	0.0000	0.0329
Total	**1.0000e-004**	**3.0000e-005**	**4.4000e-004**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0329**	**0.0329**	**0.0000**	**0.0000**	**0.0329**

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					0.1139	0.0000	0.1139	0.0392	0.0000	0.0392	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0935	1.1011	0.6528	9.7000e-004		0.0496	0.0496		0.0456	0.0456	0.0000	89.6611	89.6611	0.0275	0.0000	90.2380
Total	**0.0935**	**1.1011**	**0.6528**	**9.7000e-004**	**0.1139**	**0.0496**	**0.1635**	**0.0392**	**0.0456**	**0.0848**	**0.0000**	**89.6611**	**89.6611**	**0.0275**	**0.0000**	**90.2380**

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	1.0800e-003	3.9000e-004	4.9100e-003	1.0000e-005	3.3000e-004	1.0000e-005	3.4000e-004	9.0000e-005	1.0000e-005	9.0000e-005	0.0000	0.3697	0.3697	3.0000e-005	0.0000	0.3703
Total	**1.0800e-003**	**3.9000e-004**	**4.9100e-003**	**1.0000e-005**	**3.3000e-004**	**1.0000e-005**	**3.4000e-004**	**9.0000e-005**	**1.0000e-005**	**9.0000e-005**	**0.0000**	**0.3697**	**0.3697**	**3.0000e-005**	**0.0000**	**0.3703**

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	5.0400e-003	0.0537	0.0448	7.0000e-005		3.0100e-003	3.0100e-003		2.7700e-003	2.7700e-003	0.0000	6.1755	6.1755	1.8900e-003	0.0000	6.2152
Total	**5.0400e-003**	**0.0537**	**0.0448**	**7.0000e-005**		**3.0100e-003**	**3.0100e-003**		**2.7700e-003**	**2.7700e-003**	**0.0000**	**6.1755**	**6.1755**	**1.8900e-003**	**0.0000**	**6.2152**

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	3.6000e-004	1.3000e-004	1.6400e-003	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1232	0.1232	1.0000e-005	0.0000	0.1234
Total	**3.6000e-004**	**1.3000e-004**	**1.6400e-003**	**0.0000**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1232**	**0.1232**	**1.0000e-005**	**0.0000**	**0.1234**

3.6 Paving - 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	5.4400e-003	0.0462	0.0354	5.0000e-005		3.0300e-003	3.0300e-003		2.7900e-003	2.7900e-003	0.0000	4.4887	4.4887	1.3800e-003	0.0000	4.5176
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.4400e-003**	**0.0462**	**0.0354**	**5.0000e-005**		**3.0300e-003**	**3.0300e-003**		**2.7900e-003**	**2.7900e-003**	**0.0000**	**4.4887**	**4.4887**	**1.3800e-003**	**0.0000**	**4.5176**

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	7.2000e-004	2.1700e-003	0.0113	0.0000	5.0000e-005	1.0000e-005	7.0000e-005	2.0000e-005	1.0000e-005	3.0000e-005	0.0000	0.3062	0.3062	0.0000	0.0000	0.3062
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	4.2000e-004	1.5000e-004	1.9100e-003	0.0000	1.3000e-004	0.0000	1.3000e-004	3.0000e-005	0.0000	4.0000e-005	0.0000	0.1438	0.1438	1.0000e-005	0.0000	0.1440
Total	**1.1400e-003**	**2.3200e-003**	**0.0132**	**0.0000**	**1.8000e-004**	**1.0000e-005**	**2.0000e-004**	**5.0000e-005**	**1.0000e-005**	**7.0000e-005**	**0.0000**	**0.4499**	**0.4499**	**1.0000e-005**	**0.0000**	**0.4503**

3.7 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	7.0900e-003	0.0617	0.0424	5.0000e-005		5.0700e-003	5.0700e-003		4.6600e-003	4.6600e-003	0.0000	4.8246	4.8246	1.4800e-003	0.0000	4.8556
Total	**7.0900e-003**	**0.0617**	**0.0424**	**5.0000e-005**		**5.0700e-003**	**5.0700e-003**		**4.6600e-003**	**4.6600e-003**	**0.0000**	**4.8246**	**4.8246**	**1.4800e-003**	**0.0000**	**4.8556**

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	1.7000e-003	5.1100e-003	0.0264	1.0000e-005	6.1000e-004	3.0000e-005	6.4000e-004	1.5000e-004	3.0000e-005	1.8000e-004	0.0000	0.7197	0.7197	1.0000e-005	0.0000	0.7199
Vendor	1.1200e-003	3.8700e-003	0.0154	1.0000e-005	1.2000e-004	3.0000e-005	1.5000e-004	3.0000e-005	3.0000e-005	6.0000e-005	0.0000	0.5506	0.5506	1.0000e-005	0.0000	0.5507
Worker	1.0100e-003	3.7000e-004	4.6100e-003	0.0000	3.1000e-004	1.0000e-005	3.2000e-004	8.0000e-005	1.0000e-005	9.0000e-005	0.0000	0.3471	0.3471	3.0000e-005	0.0000	0.3477
Total	**3.8300e-003**	**9.3500e-003**	**0.0465**	**2.0000e-005**	**1.0400e-003**	**7.0000e-005**	**1.1100e-003**	**2.6000e-004**	**7.0000e-005**	**3.3000e-004**	**0.0000**	**1.6174**	**1.6174**	**5.0000e-005**	**0.0000**	**1.6183**

3.7 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	0.0241	0.2134	0.1651	2.1000e-004		0.0170	0.0170		0.0156	0.0156	0.0000	19.0655	19.0655	5.9400e-003	0.0000	19.1901
Total	**0.0241**	**0.2134**	**0.1651**	**2.1000e-004**		**0.0170**	**0.0170**		**0.0156**	**0.0156**	**0.0000**	**19.0655**	**19.0655**	**5.9400e-003**	**0.0000**	**19.1901**

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	5.6600e-003	0.0193	0.0984	3.0000e-005	7.1000e-004	1.3000e-004	8.4000e-004	1.9000e-004	1.2000e-004	3.1000e-004	0.0000	2.8341	2.8341	4.0000e-005	0.0000	2.8350
Vendor	3.8600e-003	0.0145	0.0574	3.0000e-005	4.7000e-004	1.1000e-004	5.8000e-004	1.4000e-004	1.0000e-004	2.4000e-004	0.0000	2.1705	2.1705	3.0000e-005	0.0000	2.1710
Worker	3.7400e-003	1.3200e-003	0.0167	2.0000e-005	1.2600e-003	2.0000e-005	1.2800e-003	3.4000e-004	2.0000e-005	3.6000e-004	0.0000	1.3421	1.3421	9.0000e-005	0.0000	1.3441
Total	**0.0133**	**0.0351**	**0.1725**	**8.0000e-005**	**2.4400e-003**	**2.6000e-004**	**2.7000e-003**	**6.7000e-004**	**2.4000e-004**	**9.1000e-004**	**0.0000**	**6.3466**	**6.3466**	**1.6000e-004**	**0.0000**	**6.3501**

3.7 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.7000e-003	0.0512	0.0430	6.0000e-005		3.9400e-003	3.9400e-003		3.6300e-003	3.6300e-003	0.0000	4.9593	4.9593	1.5700e-003	0.0000	4.9922
Total	**5.7000e-003**	**0.0512**	**0.0430**	**6.0000e-005**		**3.9400e-003**	**3.9400e-003**		**3.6300e-003**	**3.6300e-003**	**0.0000**	**4.9593**	**4.9593**	**1.5700e-003**	**0.0000**	**4.9922**

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	1.4000e-003	4.8200e-003	0.0254	1.0000e-005	6.1000e-004	3.0000e-005	6.4000e-004	1.5000e-004	3.0000e-005	1.8000e-004	0.0000	0.7364	0.7364	1.0000e-005	0.0000	0.7366
Vendor	9.4000e-004	3.5900e-003	0.0146	1.0000e-005	1.2000e-004	3.0000e-005	1.5000e-004	4.0000e-005	2.0000e-005	6.0000e-005	0.0000	0.5639	0.5639	1.0000e-005	0.0000	0.5640
Worker	9.2000e-004	3.1000e-004	4.0100e-003	1.0000e-005	3.3000e-004	1.0000e-005	3.4000e-004	9.0000e-005	1.0000e-005	9.0000e-005	0.0000	0.3420	0.3420	2.0000e-005	0.0000	0.3425
Total	**3.2600e-003**	**8.7200e-003**	**0.0440**	**3.0000e-005**	**1.0600e-003**	**7.0000e-005**	**1.1300e-003**	**2.8000e-004**	**6.0000e-005**	**3.3000e-004**	**0.0000**	**1.6422**	**1.6422**	**4.0000e-005**	**0.0000**	**1.6431**

3.8 Architectural Coating - 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	0.2162					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0244	0.1638	0.1514	2.4000e-004		0.0123	0.0123		0.0123	0.0123	0.0000	20.8516	20.8516	1.9800e-003	0.0000	20.8932
Total	**0.2406**	**0.1638**	**0.1514**	**2.4000e-004**		**0.0123**	**0.0123**		**0.0123**	**0.0123**	**0.0000**	**20.8516**	**20.8516**	**1.9800e-003**	**0.0000**	**20.8932**

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	6.5000e-004	2.3000e-004	2.8900e-003	0.0000	2.2000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.2326	0.2326	2.0000e-005	0.0000	0.2329
Total	**6.5000e-004**	**2.3000e-004**	**2.8900e-003**	**0.0000**	**2.2000e-004**	**0.0000**	**2.2000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.2326**	**0.2326**	**2.0000e-005**	**0.0000**	**0.2329**

3.8 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2273					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0229	0.1575	0.1581	2.6000e-004		0.0111	0.0111		0.0111	0.0111	0.0000	21.9154	21.9154	1.8500e-003	0.0000	21.9543
Total	**0.2501**	**0.1575**	**0.1581**	**2.6000e-004**		**0.0111**	**0.0111**		**0.0111**	**0.0111**	**0.0000**	**21.9154**	**21.9154**	**1.8500e-003**	**0.0000**	**21.9543**

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	6.4000e-004	2.2000e-004	2.7600e-003	0.0000	2.3000e-004	0.0000	2.3000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.2356	0.2356	2.0000e-005	0.0000	0.2360
Total	**6.4000e-004**	**2.2000e-004**	**2.7600e-003**	**0.0000**	**2.3000e-004**	**0.0000**	**2.3000e-004**	**6.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2356**	**0.2356**	**2.0000e-005**	**0.0000**	**0.2360**

Ball Estates, Alamo, 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	Const-Area 1	0.0599	CON1_DPM	119.8	0.03282	4.14E-03	82,371	5.02E-08
2018	Const-Area 1	0.0281	CON1_DPM	56.2	0.01540	1.94E-03	82,371	2.36E-08
2019	Const-Area 1	0.0147	CON1_DPM	29.4	0.00805	1.01E-03	82,371	1.23E-08
Total		***0.1027***		***205***	***0.0563***	***0.0071***		

Construction Hours

hr/day =	10	(7am - 5pm)
days/yr =	365	
hours/year =	3650	

Ball Estates, Alamo, CA

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	Const-Area 1	CON1_FUG	0.0573	114.6	0.03140	3.96E-03	82,371	4.80E-08
2018	Const-Area 1	CON1_FUG	0.0007	1.4	0.00038	4.83E-05	82,371	5.87E-10
2019	Const-Area 1	CON1_FUG	0.0003	0.6	0.00016	2.07E-05	82,371	2.51E-10
Total			***0.0583***	***116.6***	***0.0319***	***0.0040***		

Construction Hours

hr/day =	10	(7am - 5pm)
days/yr =	365	
hours/year =	3650	

Ball Estates, Alamo, CA - Project Construction Health Impact Summary

Maximum Impacts at Off-Site Residences

	Unmitigated					
	Maximum Concentrations					Maximum
	Exhaust	Fugitive	Cancer Risk		Hazard	Annual PM2.5
Construction	PM10 5/DPM	PM2.5	(per million)		Index	Concentration
Year	($\mu g/m^3$)	($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2017	0.0329	0.0395	5.40	0.09	0.007	0.072
2018	0.0155	0.0005	2.54	0.04	0.003	0.016
2019	0.0081	0.0002	0.21	0.02	0.002	0.008
Total	-	-	**8.1**	**0.2**	-	-
Maximum Annual	0.0329	0.0395	-	-	**0.007**	**0.072**

Ball Estates, Alamo, 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 ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

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)
10^{-6} = Conversion factor

Values

	Infant/Child			Adult
Age -->	**3rd Trimester**	**0 - 2**	**2 - 16**	**16 - 30**
Parameter				
ASF =	10	10	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

			Infant/Child - Exposure Information			Infant/Child	Adult - Exposure Information			Adult		
	Exposure				Age	Cancer	Modeled		Age	Cancer		
Exposure	Duration		DPM Conc (ug/m3)		Sensitivity	Risk	DPM Conc (ug/m3)		Sensitivity	Risk	Fugitive	Total
Year	(years)	Age	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	PM2.5	PM2.5
0	0.25	-0.25 - 0*	-	0.0000	10	-	-	-	-	-		
1	1	0 - 1	2017	0.0329	10	5.40	2017	0.0329	1	0.09	0.0395	0.072
2	1	1 - 2	2018	0.0155	10	2.54	2018	0.0155	1	0.04	0.0005	0.016
3	1	2 - 3	2019	0.0081	3	0.21	2019	0.0081	1	0.02	0.0002	0.008
4	1	3 - 4		0.0000	3	0.00		0.0000	1	0.00		
5	1	4 - 5		0.0000	3	0.00		0.0000	1	0.00		
6	1	5 - 6		0.0000	3	0.00		0.0000	1	0.00		
7	1	6 - 7		0.0000	3	0.00		0.0000	1	0.00		
8	1	7 - 8		0.0000	3	0.00		0.0000	1	0.00		
9	1	8 - 9		0.0000	3	0.00		0.0000	1	0.00		
10	1	9 - 10		0.0000	3	0.00		0.0000	1	0.00		
11	1	10 - 11		0.0000	3	0.00		0.0000	1	0.00		
12	1	11 - 12		0.0000	3	0.00		0.0000	1	0.00		
13	1	12 - 13		0.0000	3	0.00		0.0000	1	0.00		
14	1	13 - 14		0.0000	3	0.00		0.0000	1	0.00		
15	1	14 - 15		0.0000	3	0.00		0.0000	1	0.00		
16	1	15 - 16		0.0000	3	0.00		0.0000	1	0.00		
17	1			0.0000	-	-		0.0000	1	0.00		
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65	1			0.0000	-	-		0.0000	1	0.00		
66	1			0.0000	-	-		0.0000	1	0.00		
67	1			0.0000	-	-		0.0000	1	0.00		
68	1			0.0000	-	-		0.0000	1	0.00		
69	1			0.0000	-	-		0.0000	1	0.00		
70	1			0.0000	-	-		0.0000	1	0.00		
Total Increased Cancer Risk						**8.1**				**0.2**		

* Third trimester of pregnancy