

March 15, 2012
Revised December 10, 2013

Vincent Smith
Basin Street Properties

VIA E-MAIL: vin.smith@comcast.net

**SUBJECT: Riverfront Mixed Use Development in Petaluma, CA –
Air Quality and Greenhouse Gas Emissions Analysis**

Dear Vin:

In 2012, Illingworth & Rodkin, Inc. prepared an air quality and greenhouse gas (GHG) emissions analysis for the Riverfront Mixed-Use Development project. The purpose of this letter is to update this study to use the new CalEEMod 2013.2.2 emission model and address issues brought up since the report that include impacts from a nearby sewage pump station and construction impacts to existing sensitive receptors. This letter is an update to our previous letter report on March 15, 2012.

The project site is approximately 36 acres and located within the City of Petaluma. Currently, the project site includes industrial uses. We understand that this proposed project would consist of 60,000 square feet of office space; 33 townhouse units, and six units designated as live/work spaces; a 120-room hotel; 30,000 square feet of mixed use commercial development with 100 apartment units; 134 single-family residential units; and approximately 6.2 acres of parks, including a 0.38-acre central green, 2.14-acre active park, and 3.67-acre river park.

We understand that the City has requested that you address GHG impacts for compliance with the California Environmental Quality Act (CEQA). Modeling of project GHG emissions was conducted and is reported in this letter. In addition, we have provided an analysis of air quality impacts that may need to be addressed. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD).¹ Our report is as follows:

GHGs and Global Climate Change

Global temperatures are affected by naturally occurring and anthropogenic-generated (generated by mankind) atmospheric gases, such as water vapor, carbon dioxide, methane, and nitrous oxide.² Gases that trap heat in the atmosphere are called greenhouse gases (GHG). Solar radiation enters the earth's atmosphere from space, and a portion of the radiation is absorbed at the surface. The earth emits this radiation back toward space as infrared radiation. Greenhouse

¹ BAAQMD, 2011. California Environmental Quality Act Air Quality Guidelines. May.

² IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate

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gases, which are mostly transparent to incoming solar radiation, are effective in absorbing infrared radiation and redirecting some of this back to the earth's surface. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This is known as the greenhouse effect. The greenhouse effect maintains a habitable climate. Natural processes and human activities emit GHGs. Emissions from human activities, such as electricity production, motor vehicle use and agriculture are elevating the concentration of GHGs in the atmosphere, and are reported to have led to a trend of unnatural warming of the earth's natural climate, known as global warming or climate change. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred because it implies that there are other consequences to the global climate in addition to rising temperatures. Other than water vapor, the GHGs contributing to global warming include the following gases:

- Carbon dioxide, primarily a byproduct of fuel combustion.
- Nitrous oxide is a byproduct of fuel combustion and also associated with agricultural operations such as fertilization of crops.
- Methane is commonly created by off-gassing from agricultural practices (e.g. keeping livestock) and landfill operations.
- Chlorofluorocarbons that were widely used as refrigerants, propellants and cleaning solvents but their production has been mostly reduced by international treaty.
- Hydrofluorocarbons are now used as a substitute for chlorofluorocarbons in refrigeration and cooling.
- Perfluorocarbons and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semiconductor manufacturing.

Gases in the atmosphere can contribute to the greenhouse effect both directly and indirectly. Direct effects occur when the gas itself absorbs outgoing radiation. Indirect effects occur when gases cause chemical reactions that produce other GHGs or prolong the existence of other GHGs. The Global Warming Potential (GWP) concept is used to compare the ability of each GHG to trap heat in the atmosphere relative to carbon dioxide (CO₂), which is the most abundant GHG. CO₂ has a GWP of 1, expressed as CO₂ equivalent (i.e., CO₂e). Other GHGs, such as methane and nitrous oxide are commonly found in the atmosphere but at much lower concentrations. However, the GWP for methane is 21, while nitrous oxide has a GWP of 310. Other trace gases, such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), which are halocarbons that contain chlorine, have much greater GWPs. Fortunately these gases are found at much lower concentrations and many are being phased out as a result of global efforts to reduce destruction of stratospheric ozone. In the United States, CO₂ emissions account for about 85 percent of the CO₂e emissions, followed by methane at about eight percent and nitrous oxide at about five percent. For consistency purposes, emissions are typically reported as metric tons (MT) of CO₂e on an annual basis. Note that one metric ton is equivalent to 1.1 U.S. tons.

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Air Quality

The air quality in a given area depends on the sources of air pollution in the area, transport of pollutants to and from surrounding areas, local and regional meteorological conditions, as well as the surrounding topography of the air basin. Air quality is described by the concentration of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The significance of a pollutant concentration is determined by comparing the concentration to an appropriate ambient air quality standard. The standards represent the allowable pollutant concentrations designed to ensure that the public health and welfare are protected, while including a reasonable margin of safety to protect the more sensitive individuals in the population.

Criteria Air Pollutants

The Federal and California Clean Air Acts have established ambient air quality standards for common pollutants. The ambient air quality standards are intended to protect human health and welfare. At the federal level, national ambient air quality standards have been established for criteria pollutants. These criteria pollutants include carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), respirable particulate matter with a diameter less than 10 microns (PM_{10}), fine particulate matter with a diameter less than 2.5 microns ($\text{PM}_{2.5}$), sulfur dioxide (SO_2), and lead.

California has adopted ambient air quality standards which are, in general, more stringent than the national ambient air quality standards, and include other pollutants not regulated at the federal level (sulfates, hydrogen sulfide, and vinyl chloride). Both the National and California ambient air quality standards have been adopted by the BAAQMD.

Toxic Air Contaminants

In addition to "criteria" air pollutants, there is another group of substances found in ambient air referred to as Toxic Air Contaminants (TACs). These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects including cancer. Sources of TACs include industrial processes such as petroleum refining and manufacturing, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. One of the TACS of greatest concern in California is diesel particulate matter, which is classified as a carcinogen (causes cancer). TACs are regulated at the local, state, and federal level.

Thresholds of Significance

Appendix G of the CEQA Guidelines (Environmental Checklist) contains a list of air quality and GHG emissions effects that may be considered significant. The proposed project would have a significant effect on the environment if it were to:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment;

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- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases;
- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

The BAAQMD has developed thresholds for evaluating GHG emissions from projects and developed guidelines for assessing these impacts.³ The recommendations include a bright line emissions threshold of 1,100 MT of CO₂e per year or an emission efficiency metric of 4.6 MT of CO₂e per year per service population if the bright-line threshold is exceeded. Service population is the sum of new residents and full time workers.

The BAAQMD has also adopted thresholds for evaluating air pollutant emissions from projects. Recommended thresholds of significance for construction and operational-related emissions are as follows:

- The proposed projects would generate construction-related exhaust emissions of Reactive Organic Gases (ROG) , NO_x or PM_{2.5} greater than 54 pounds per day or PM₁₀ greater than 82 pounds per day;
- The proposed projects would generate operational-related emissions of ROG, NO_x or PM_{2.5} greater than 54 pounds per day (or 10 tons per year) or PM₁₀ greater than 82 pounds per day (or 15 tons per year);

Impact GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? *Less-than-significant.*

GHG Emissions Analysis Methodology

Greenhouse gas emissions associated with the development of the proposed project were computed. The BAAQMD CEQA Air Quality Guidelines provide guidance for calculating project emissions.⁴ This includes the computation of emissions from traffic (mobile sources), area sources, electricity and natural gas consumption, and water usage recommended by BAAQMD. In addition, potential emissions from solid waste generation were computed. These

³ BAAQMD, 2011, op cit.

⁴ BAAQMD, 2011, op cit.

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emissions were computed using the California Emissions Estimator Model Version 2013.2.2 (CalEEMod), as recommended by BAAQMD.

CalEEMod is a computer model developed by the South Coast Air Quality Management District (SCAQMD) to estimate air pollutant and GHG emissions from land use development projects. The model is basically an update to the URBEMIS2007 model that has traditionally been used over the last 5 years to compute air pollutant emissions from land-use projects. The model predicts emissions for construction activities, area sources (e.g., consumer products), traffic, and indirect sources (e.g., energy use, water and wastewater use, and solid waste disposal) associated with a project. The model uses the latest statewide emission inventory models for mobile sources (i.e., EMFAC2011) and construction equipment (i.e., latest CARB OFFROAD emission database). The model is periodically updated to reflect most recent emissions estimates for source types and incorporate accuracies in estimating emission from land use activities. The latest version of this model was used in this analysis.

Construction Period Greenhouse Gas Emissions

The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions. The District recommends calculating the emissions and disclosure that GHG emissions would occur during construction. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices assumed to be incorporated into construction of the proposed project include, but are not limited to: using local building materials of at least 10 percent and recycling or reusing at least 50 percent of construction waste or demolition materials.

The CalEEMod modeling provided the estimate of construction GHG emissions in the form of CO₂e. Emissions associated with construction were assumed to all occur over approximately five years, beginning in 2014 and continuing through the end of 2018. Under this scenario, construction of the project would emit up to 1,042 MT of CO₂e annually. This would be the emissions from construction equipment, truck traffic and associated construction worker traffic. It does not include indirect emissions associated with the manufacturing and transport of building materials.

These emissions, an average of 784 MT of CO₂e annually, were conservatively compared to the BAAQMD operational threshold of 1,100 annual MT and determined to be a *less-than-significant impact* for the construction period.

Project Operation Period Greenhouse Gas Emissions

Net new project GHG emissions were computed and take into account emissions associated with the proposed uses for the project site, as detailed below.

Proposed Uses

Office (CalEEMod = "Office Park") – 60,000 square feet

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Townhouse (CalEEMod = “Condo/Townhouse”) – 33 units
Hotel (CalEEMod = “Hotel”) – 120 rooms
Specialty Retail (CalEEMod = “Regional Shopping Center”) – 30,000 square feet
Apartments (CalEEMod = “Apartments Low Rise”) – 100 units
Single Family Housing (CalEEMod = “Single Family Housing”) – 134 units
Live/Work Units (CalEEMod = “Apartments Mid Rise”) – 6 units
City Park (CalEEMod = “City Park”) – 6.2 acres

The project is not likely to be fully built and occupied prior to 2020. GHG emissions were computed for 2020 in order to evaluate emissions against the BAAQMD significance thresholds that are meant to be consistent with AB32 GHG emission targets. The AB32 Scoping Plan identifies 2020 as the target date to reduce statewide emissions to 1990 levels. BAAQMD developed their CEQA thresholds to be consistent with this target year. The land use types, sizes and vehicle trip generation rates were input to CalEEMod. A majority of the emissions from this type of project are associated with motor vehicle usage.

Trip generation rates produced by W-Trans were input to CalEEMod. The W-Trans trip generation rates include internal capture which are trips made from one use to another that do not involve a vehicle trip. The methodology for developing the trip rates is described in the W-Trans report.⁵ Trip generation represents the daily number of trips generated when the land use is fully operational. Internal capture trips were subtracted from the Retail land use. The adjusted trip rates were entered into CalEEMod, such that CalEEMod computed the same total number of trips generated as the W-Trans study. In addition, W-Trans used the Sonoma County Transportation Authority traffic model to predict average trip length for the project. The average trip length of 5.11 miles was input to the CalEEMod model (i.e., average trip distances were from the SCTA Model TAZ 307).

CalEEMod model default rates for energy consumption were assumed in this analysis. The model includes 2008 base emission rates for PG&E, which are 641 pounds of carbon dioxide (CO₂) per megawatt of electricity consumed. PG&E’s average CO₂ emission rate has been steadily decreasing as the utility increases their renewable portfolio, in response to State law. The Renewables Portfolio Standard (RPS) was established in 2002 under Senate Bill 1078, accelerated in 2006 under Senate Bill 107 and expanded in 2011 under Senate Bill 2. The RPS program requires investor-owned utilities (e.g., PG&E), electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33% of total procurement by 2020. PG&E uses the California Public Utilities Commission’s *Greenhouse Gas Calculator for the California Electricity Sector, Version 3c* to independently calculate their future CO₂ emission rate. As with future vehicle emissions rates predicted using CalEEMod, this analysis used future electricity consumption emission rates. These rates are

⁵ W-Trans memorandum to Mr. Gian Aggarwal, September 6, 2011. *Subject: Traffic Impact Study for Petaluma Riverfront Project at 500 Hopper Street.*

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independently developed by the State (i.e., California’s Public Utilities Commission and Air Resources Board). PG&E’s 2020 emission rate, as reported by PG&E using the California Public Utilities Commission’s CPUC GHG Calculator was used in this analysis. Project construction would not occur until 2014 at the earliest. According to the applicant, the project would not be fully constructed and operated until after 2020. Therefore, PG&E’s emission rate for 2020, as computed using the CPUC’s *Greenhouse Gas Calculator for the California Electricity Sector* was input to the model.

Default model assumptions for GHG emissions associated with area sources, solid waste generation and water/wastewater use were applied to the project.

In 2020, annual emissions resulting from the proposed project would be 4,324 MT of CO₂e. Because the projected GHG emissions exceed the BAAQMD threshold of 1,100 MT of CO₂e/yr, the emission efficiency metric per year per service population was computed.

Table 1 shows the computed GHG emissions for the project. The project service population was calculated by applying a rate of 2.64 persons per household, which is based on the latest census data (2006-2010) for the City of Petaluma.⁶ There would be 718 new residents. The service population also includes the number of workers. The Fiscal and Economic Impact Analysis (FEIA) estimated that the project would produce 348 on-site workers. In terms of per capita emissions, the project would emit 4.06 MT of CO₂e per year per service population, which is less than the threshold of 4.6 tons of CO₂e per year per service population. Therefore, the project’s GHG emissions would *not* be considered to have a cumulatively considerable contribution to a significant impact and would be considered *less-than-significant*.

Table 1 Average Annual Operational GHG Emissions

Scenario Analyzed	Annual CO ₂ e Emissions in metric tons
Total Construction 2014 - 2017	3,921
Proposed Project operating in 2020	4,324
2020 Per Capita Emissions (service population = 718 residents and 348 workers)	4.06
<i>BAAQMD Threshold</i>	<i>1,100 or 4.6</i>

Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? *No Impact.*

The project would be subject to new requirements under rule making developed at the State and local level regarding greenhouse gas emissions and would be subject to local policies that may affect emissions of greenhouse gases.

⁶ U.S. Census Bureau, 2012. Petaluma (city), California. Available on-line: <http://quickfacts.census.gov/qfd/states/06/0656784.html>. Accessed: March, 14, 2012.

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Impact AIR-1: **Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?** *Less than significant with mitigation measures*

The Bay Area is considered a non-attainment area for ground-level ozone and fine particulate matter (PM_{2.5}) under both the federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for respirable particulates or particulate matter with a diameter of less than 10 micrometers (PM₁₀) 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 PM₁₀, the BAAQMD has established thresholds of significance for air pollutants. These thresholds are for ozone precursor pollutants (ROG and NO_x), PM₁₀ and PM_{2.5} and apply to both construction period and operational period impacts.

The same CalEEMod run that was used to compute GHG emissions was used to predict criteria pollutant emissions from construction and operation of the site assuming full build out of the project. The model worksheet is included as Attachment 1.

Construction Period Criteria Pollutant Emissions

Table 2 shows average daily construction emissions of ROG, NO_x, PM₁₀ exhaust, and PM_{2.5} exhaust during project construction. As indicated in Table 2, predicted project emissions would not exceed the BAAQMD significance thresholds.

Table 2 Project Average Daily Construction Emissions (pounds per day)

	ROG	NO_x	PM10 Exhaust	PM2.5 Exhaust
Total Emissions (tons)	8.86	22.94	1.20	1.12
Average Daily Emissions (lbs/day) Based on 1,320 construction days	13.4	34.8	1.8	1.7
BAAQMD Thresholds	54	54	82	54

The effects of construction activities would be increased dust fall and locally elevated levels of particulate matter downwind of construction, which is potentially significant if unmitigated. The BAAQMD CEQA Air Quality Guidelines recommend that construction emissions of fugitive dust be judged on the application of Best Management Practices. While dust control would be included in the project, specific control measures are not identified. BAAQMD recommends construction mitigation measures that should be applied to construction projects to serve as Best Management Practices. Without these measures, project construction emissions of dust and exhaust would be considered significant.

Mitigation Measure AIR-1: The construction contractor shall implement the following measures at the project sites:

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- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day;
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered;
- All visible mud or dirt tracked-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 shall be prohibited;
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour;
- All paving shall be completed as soon as possible after pipeline replacement work is finished;
- 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;
- All construction equipment shall be maintained and properly tuned in accordance with the manufacturer’s specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation; and
- Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD’s phone number shall also be visible to ensure compliance with applicable regulations.

Implementation of the measures listed above would ensure compliance with BAAQMD-recommended measures for dust control and Best Management Practices and would reduce this impact to a less-than-significant level.

Project Operation Period Criteria Pollutant Emissions

Operational emission of criteria air pollutants are based on the project CalEEMod modeling used to predict emissions of GHG. Table 3 reports the estimated 2020 daily operational emissions. As indicated in Table 2, predicted project emissions would not exceed the BAAQMD significance thresholds and this impact is considered *less than significant*.

Table 3 Project Operational Period Emissions

	ROG	NOx	PM₁₀ Exhaust	PM_{2.5} Exhaust
Annual Emissions	6.56 tons/year	4.36 tons/year	0.1 tons/year	0.1 tons/year
Average Daily Emissions	35.9 lbs/day	23.9 lbs/day	0.5 lbs/day	0.5 lbs/day
BAAQMD Thresholds	10 tons/year or 54 lbs/day	10 tons/year or 54 lbs/day	15 tons/year or 82 lbs/day	10 tons/year or 54 lbs/day
Significant?	No	No	No	No

Impact AIR-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation? *Less than significant*

As discussed under Impact AIR-2, the project would have emissions less than the significance thresholds adopted by BAAQMD for evaluating impacts to ozone and particulate matter. Therefore, the project would not contribute substantially to existing or projected violations of

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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. There is an ambient air quality monitoring station in Santa Rosa that measures carbon monoxide concentrations. The highest measured level over any 8-hour averaging period during the last 3 years is less than 2 parts per million (ppm), compared to the ambient air quality standard of 9.0 ppm. The project would generate traffic that could affect these levels. However, BAAQMD screening guidance indicates that projects would have a less than significant impact to carbon monoxide levels if project traffic projections indicate traffic levels would not increase at any affected intersection to more than 44,000 vehicles per hour. Because the project would not increase at any affected intersection to more than 44,000 vehicles per hour, this impact is considered *less than significant*.

There are ambient air quality standards for other pollutants that were not addressed in this report. These include nitrogen dioxide (NO₂), sulfur dioxide (SO₂) and lead (Pb). These pollutants are measured at levels well below ambient air quality standards and, with the exception of NO₂, the project is not a source of emissions that would affect ambient levels. The project NO_x emissions could affect NO₂ ambient levels, however, BAAQMD has not recommended thresholds that apply to NO₂ sources. Emissions of NO_x are below the significance thresholds, and therefore, it can be assumed that the project would not cause or contribute to violations of NO₂ levels in the region.

California ambient air quality standards include industry specific contaminants, such as vinyl chloride and hydrogen sulfide. The project would not be a source of these emissions, and therefore, would not affect attainment of those standards.

Impact AIR-3a: Expose project sensitive receptors to substantial pollutant concentrations during operation? *Less-than- significant with mitigation measures*

Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. Construction activity would generate dust and equipment exhausts on a temporary basis. These impacts are addressed under Impact AIR-2 and AIR-3b. The project is located within 1,000 feet of U.S. Highway 101 and Lakeville Road or State Route 116. These are sources of TAC emissions that could affect new residents located at the project site.

Community Risk Significance Thresholds

The BAAQMD adopted “Thresholds of Significance” for local community risk and hazard impacts that apply to both the siting of a new source and to the siting of a new receptor. Local

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community risk and hazard impacts are associated with TACs and PM_{2.5} since emissions of these pollutants may cause significant health impacts at the local level. BAAQMD guidelines recommend:

Project-Level TAC Impacts

The proposed project would result in a significant impact if emissions of TACs or PM_{2.5} exceed any of the following Thresholds of Significance:

- Non-compliance with a qualified risk reduction plan;
- An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e., chronic or acute) hazard index greater than 1.0 would be a cumulatively considerable contribution; or
- An incremental increase greater than 0.3 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) annual average PM_{2.5} would be a cumulatively considerable contribution.

Cumulative Level TAC Impacts

A project would have a cumulative considerable impact if the aggregate total of all past, present, and foreseeable-future sources within a 1,000-foot radius from the fence line of a source, or from the location of a receptor, plus the contribution from the project, exceeds the following:

- Non-compliance with a qualified risk reduction plan;
- An excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0; or
- 0.8 $\mu\text{g}/\text{m}^3$ annual average PM_{2.5}.

Impacts to Project Receptors

Table 4 presents screening level risks for the project site. These are the screening levels risks predicted at portions of the site that would include sensitive receptors. No single source would result in impacts above the significance thresholds that are also shown in Table 4. The cumulative risks are also presented, but these are over predictions, because each source is assumed to result in a maximum impact at the same location within the site. The screening cumulative risks are below the significance thresholds.

The predictions presented in this analysis are based on screening level assessments. Had significant risks been identified, more refined analyses would have been conducted to more accurately assess the health risk impacts. The impacts of each source are described below.

Highways

Busy roadways are a source of TAC emissions that could affect new sensitive receptors developed at the project site. The BAAQMD provides a Google Earth Screening Tool to identify screening community risk levels in terms of cancer risk, PM_{2.5} concentration and acute or chronic hazards⁷. BAAQMD screening modeling of these highways is provided for U.S. 101

⁷ BAAQMD Google Earth Highway and Stationary Source Screening Analysis Tools can be accessed from BAAQMD's website at <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx>

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and State Route 116 (Lakeville Highway). Both highways would be about 200 feet from the closest sensitive receptors (i.e., residences). Both roadways would have excess cancer risks of less than 10.0 chances per million, annual PM_{2.5} concentrations less than 0.3 µg/m³ and the hazard index for chronic risks would be less than 0.01.

Table 4 Screening Community Risk Impacts to the Riverfront Site

Source	Closest Distance (feet)	Maximum Cancer Risk ³ (per million)	Maximum Hazard Index	Maximum Annual PM _{2.5} Concentration (µg/m ³)
Project Sensitive Receptors				
U.S. Highway 101 ¹	~200	4.1	<0.1	0.04
Lakeville Highway (State Route 116) ¹	~200	6.3	<0.1	0.05
Pump Station Generator ²	~400	3.9	0.0	0.01
NCRA and SMART Railroad ³	~100	<6.6	0.0	0.01
BAAQMD Threshold - Single Source		10	1.0	0.3
<i>Significant?</i>		<i>No</i>	<i>No</i>	<i>No</i>
Sum		<22.2	<0.2	<0.11
BAAQMD Threshold - Cumulative		100	10.0	0.8
<i>Significant?</i>		<i>No</i>	<i>No</i>	<i>No</i>
Notes:				
¹ Based on BAAQMD Google Earth Highway TAC Screening Tool.				
² Diesel generator predictions based on emissions data provided by BAAQMD and use of their screening health risk worksheet using the Diesel BUG Distance Multiplier.				
³ Public Draft Environmental Impact Report North Coast Railroad Authority, Russian River Division Freight Rail Project and Sonoma-Marín Area Rail Transit Project Final Environmental Impact Report. Age-sensitivity factors were applied to the cancer risk predictions. These predictions were made at 30 feet from the tracks. Closest residences would be 100 feet or further.				
⁴ The risks reported represent lifetime cancer risks that assume infant and child exposure and annual PM _{2.5} concentrations				

Local Roadways

BAAQMD recommends assessing the risk impacts from local roadways within 1,000 feet that have more than 10,000 average daily traffic trips. There are no local roadways, besides Lakeville Highway that meet these criteria (Lakeville Highway is a local road west of the project site). However, Lakeville Highway was addressed as a Highway in this analysis, using BAAQMD’s Google Earth Screening Tool.

Trains

The Sonoma-Marín Rail Transit (SMART) railroad lies about 100 feet from portions of the site that could include residences. The rail line currently experiences infrequent train activity. Eventually SMART trains and freight trains will be using this rail line on a regular basis. Environmental studies were performed for each proposed use and used to predict risk levels from

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these activities^{8,9}. Both studies predicted maximum risk levels for a position 30 feet from the rail line. Although these predictions are for positions closer than depicted for residential uses of the site, they were used as screening values for this analysis. Both health risk studies for these environmental evaluations were conducted prior to BAAQMD's adoption of age-sensitivity factors, which account for the greater sensitivity of infants and small children to cancer-causing TACs. The levels predicted in each study were increased by a factor of 1.7 to account for the age-sensitivity factors.

Stationary Sources

Stationary sources of TAC emissions in the project area were identified using the BAAQMD Stationary Source Screening Analysis Tool¹⁰. The only operational stationary source that would have a measureable impact upon the site within 1,000 feet is the City of Petaluma Wastewater Pump Station at 950 Hopper Street. This source, Plant 9153, is not identifiable on the BAAQMD's Google Earth Tool. The plant includes an emergency generator that is powered by diesel fuel. Therefore, a request was made to BAAQMD. They provided facility emissions data and a screening workbook to predict community risk. This workbook included the District's Diesel BUG Distance Multiplier that was used to adjust facility screening risk to various distances. The closest sensitive project receptor would be over 400 feet from this source. Emissions data and risk computations are included in Attachment 2.

Impact AIR-3b: Expose existing sensitive receptors to substantial pollutant concentrations during construction? *Less-than- significant with mitigation measures*

Construction of the proposed project would expose nearby sensitive receptors to emissions of TACs due to use of diesel construction equipment. Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. As indicated under Impact AIR-1, these exhaust air pollutant emissions would not be considered to contribute substantially to existing or projected air quality violations.

Impacts to Off-Site Sensitive Receptors

Closest sensitive receptors (residences) are located over 350 feet from the project site, on the opposite side of the Petaluma River. Additional residences are located farther away to the northeast and northwest of the site. Much of the emissions would occur during the grading phase of construction, which would occur over a relatively brief duration. Closest residences to the project site would be exposed to construction emissions, but this brief exposure period would be substantially less than the exposure period typically assumed for health risk analysis, 70-year

⁸ Draft Environmental Impact Report (DEIR) for the North Coast Railroad Authority Project (SCH 2007072052)

⁹ Supplemental Environmental Impact Report (SEIR) for the Sonoma-Marín Area Rail Transit Project (SCH 2002112033)

¹⁰ BAAQMD Google Earth Highway and Stationary Source Screening Analysis Tools can be accessed from BAAQMD's website at <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx>

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exposure period. However, construction activity would be ongoing to some degree over a period of 5 years and possibly longer.

A screening health risk assessment of the construction impacts to nearby existing residences was conducted. This risk assessment focused on modeling on-site construction activity using construction period emissions and were modeled using the CalEEMod model (see Impact AIR-1). Construction of the project was assumed to occur over a 5-year period, beginning in January 2014. The CalEEMod model provided total annual PM_{2.5} exhaust emissions (assumed to be diesel particulate matter) for the off-road construction equipment and for exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles), with total emissions of 1.033 tons (2,065.8 pounds). The on-road emissions are a result of worker travel, and vendor deliveries during building construction. A trip length of 0.3 miles was used to represent vehicle travel while at or near the construction site. It was assumed that these emissions from on-road vehicles traveling at or near the site would occur at the construction site. Fugitive PM_{2.5} dust emissions were calculated by CalEEMod as 0.2834 tons (566.8 pounds) for the overall construction period.

The U.S. EPA ISCST3 dispersion model was used to predict concentrations of DPM at existing sensitive receptors in the vicinity of the project site. The ISCST3 modeling utilized two area sources to represent the on-site construction emissions, one for DPM exhaust emissions and one for fugitive PM_{2.5} dust emissions. To represent the construction equipment exhaust emissions, an emission release height of 6 meters was used for the area source. The elevated source height reflects the height of the equipment exhaust pipes and buoyancy of the exhaust plume. For modeling fugitive PM_{2.5} emissions, a near ground level release height of 2 meters was used for the area source. Emissions from truck travel at the project site were also included in the area source for exhaust emissions. Emissions were modeled as occurring daily between 7 am - 4 pm. The model used a 5-year data set (1990 - 1994) of hourly meteorological data from the Petaluma available from the BAAQMD. Annual DPM concentrations from construction activities were predicted for 2014 through 2018, with the annual average concentrations based on the 5-year average concentrations from modeling 5 years of meteorological data. DPM concentrations were calculated at nearby sensitive receptors at heights of 1.5 meters (4.9 feet) representative of the ground level exposures for the nearby single-family residential buildings.

The maximum-modeled DPM concentration occurred in the residential area on the opposite side of the Petaluma river at a new residence south of Petaluma Boulevard. The location of this receptor is identified on Figure 1. Increased cancer risks were calculated using the modeled annual concentrations and BAAQMD recommended risk assessment methods for both a child exposure (3rd trimester through 2 years of age) and for an adult exposure. Since the modeling was conducted under the conservative assumption that emissions occurred 365 days per year, the default BAAQMD exposure period of 350 days per year was used.

Results of this assessment indicate that, with project construction, the incremental child cancer risk at the maximally exposed individual (MEI) would be 5.3 in one million and the adult incremental cancer risk would be 0.4 in one million. These predicted excess cancer risks are

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below the BAAQMD significance threshold of 10 in one million and be considered a less than significant impact.

The modeled maximum annual PM_{2.5} concentration was 0.05 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) occurring at the same location where the maximum cancer risk occurs. This PM_{2.5} concentration is well below the BAAQMD threshold of $0.3 \mu\text{g}/\text{m}^3$ used to judge the significance of impacts for PM_{2.5}.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. The chronic inhalation reference exposure level (REL) for DPM is $5 \mu\text{g}/\text{m}^3$. The maximum predicted annual DPM concentration was $0.028 \mu\text{g}/\text{m}^3$, which is much lower than the REL. The Hazard Index (HI), which is the ratio of the annual DPM concentration to the REL, is 0.006. This HI is much lower than the BAAQMD significance criterion of a HI greater than 1.0.

Potential Impacts to On-Site Sensitive Receptors

In addition, new residences constructed as part of the project would be much closer to this activity. It is anticipated that much of the grading work that results in the highest emissions would be completed before project sensitive receptors reside at the site. So emissions would be considerably less.

At this time, projections of construction activity and location of project sensitive receptors are not available in detail to allow for the proper prediction of health risk impacts. A credible worst-case scenario for on-site exposure of sensitive receptors to construction impacts would be the construction and occupancy of the single-family portion of the site prior to construction of the mixed use portion. The single-family residences would be generally downwind of the construction activities at the mixed use portions of the site.

Construction emissions were computed for this scenario assuming a two-year build-out of the mixed use portion, beginning in 2016. The CalEEMod model with default assumptions for building construction, interior construction and paving phases were assumed. The interior building construction phase was extended from 30 days to 220 days to represent activity for interior work that includes painting. In addition, a forklift was added to that phase. Crane operation was assumed to occur only during half of the building phase, since tall steel-framed buildings are not proposed.

The U.S. EPA ISCST3 dispersion model was also used to predict concentrations of DPM at these potential on-site sensitive receptors and cancer risk were computed. Figure 2 shows the location of the construction area assumed along with the receptors included in the modeling to represent potential single-family residences.

Results of this assessment indicate that, with this portion of project construction and occupancy of the single-family residences, the incremental child cancer risk at the MEI would be 26.2 in one million and the adult incremental cancer risk would be 1.4 in one million. These predicted

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excess cancer risks are above the BAAQMD significance threshold of 10 in one million and would be considered a significant impact.

The modeled maximum annual PM_{2.5} concentration was 0.23 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) occurring at the same location where the maximum cancer risk occurs. This PM_{2.5} concentration is below the BAAQMD threshold of 0.3 $\mu\text{g}/\text{m}^3$ used to judge the significance of impacts for PM_{2.5}.

Note that this analysis is quite conservative in that it assumed complete occupancy of the residential portions of the project prior to any of the construction of the mixed use portions. These residences were assumed to be downwind of the mixed use construction activity. In addition, the continual presence of an infant/small child was assumed at these new residences for almost the entire construction period. Because the predicted cancer risk associated with this construction would exceed the significance threshold of 10 in one million chances, this impact is considered significant.

The project would have a *less-than-significant* impact with respect to community risk caused by construction activities to off-site receptors, but a potentially significant impact to on-site receptors. Attachment 3 includes the emission calculations used for the area source modeling, dispersion modeling inputs, and the cancer risk calculations.

Mitigation Measure AIR-2: The construction contractor shall implement the following measures at the project sites to reduce construction exhaust when building construction activities occur within 200 feet of residences:

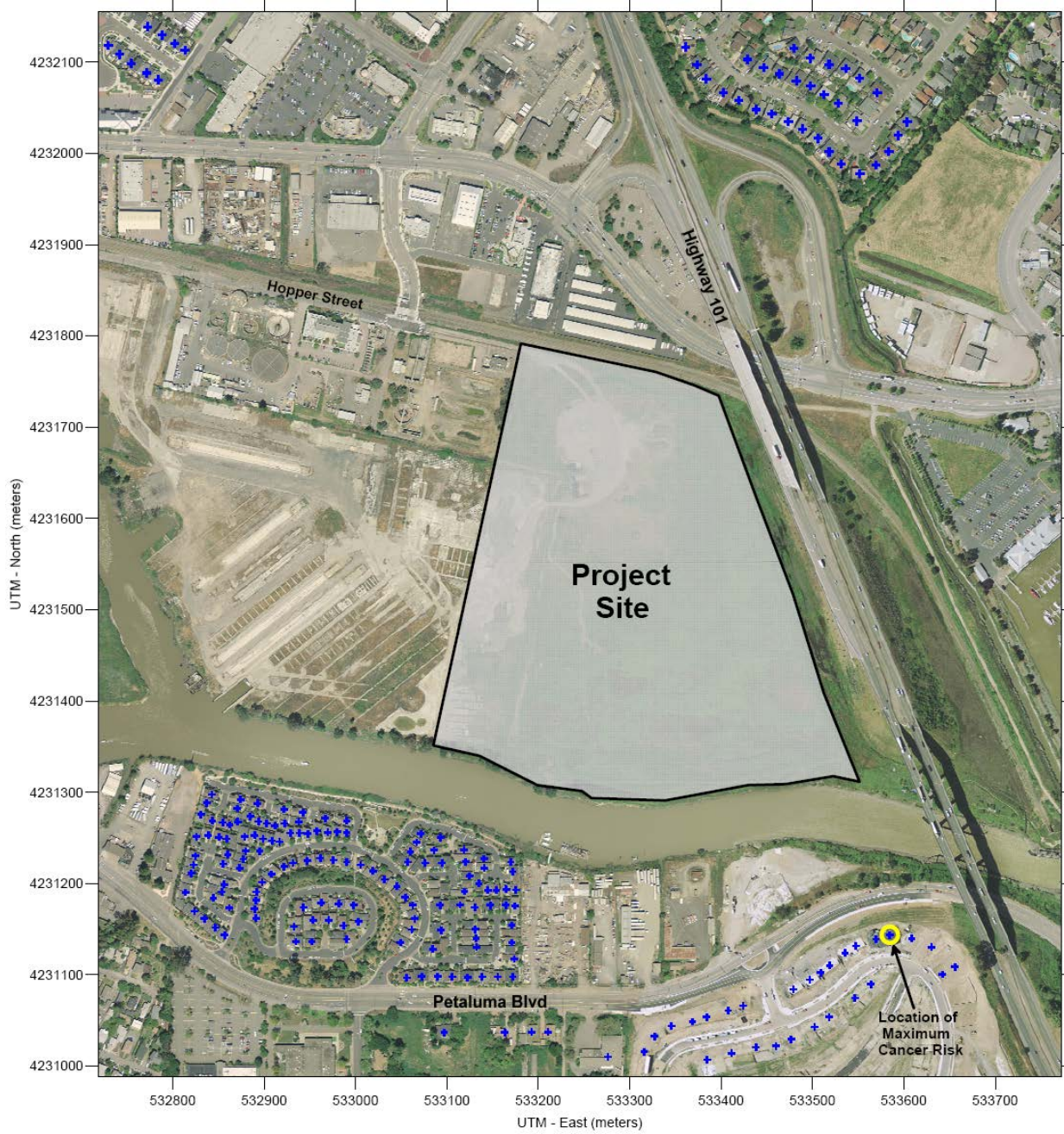
Develop a plan demonstrating that the off-road equipment (more than 50 horsepower and on site for more than 2 consecutive workdays) to be used in project construction would achieve an additional 60 percent reduction in exhaust particulate matter emissions, compared to similar equipment based on CARB statewide average emissions. Based on the CalEEMod modeling, a feasible method to achieve this objective would be the following:

- a. All diesel-powered construction equipment more than 50 horsepower used on-site during all construction phases for more than two days consecutively shall meet or exceed U.S. EPA Tier 2 standards for particulate matter emissions or substituted with alternatively fueled equipment (e.g., LPG fuel).
- b. Prohibit use of diesel-powered generators for more than two days when line power is available.
- c. All non-mobile construction equipment shall be alternatively fueled or meet U.S. EPA Tier 2 standards for particulate matter emissions

Based on the CalEEMod modeling, implementation of this mitigation measure would reduce PM_{2.5} exhaust emissions by 64 percent. This mitigation measure would reduce emissions such that on-site exposures would be less than significant (e.g., not cause significant cancer risk or PM_{2.5} exposures) with a maximum child cancer risk of 9.3 in one million, thereby reducing temporary, construction-related impacts, to a less than significant level.

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Figure 1 – Project Construction Site and Off-Site Residential Receptor Locations



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Figure 2 – Project Mixed-Use Construction Area and On-Site Residential Receptor Locations



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

The project would generate localized emissions of diesel exhaust during equipment operation and truck activity. These emissions may be noticeable from time to time at adjacent land uses.

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However, they would be localized and are not likely to adversely affect people off site in that they would result in confirmed odor complaints.

The project site, which has been undeveloped, is near the City's Hopper Street waste water treatment plant that has been decommissioned several years ago. There is a sewage pump station that remains. Pump stations can be a source of odors. The potential for odors is reduced through soil by soil bed filters. Several site visits were conducted in an attempt to identify any offensive odors from the site. Some odors could barely be detected at the downwind side of the facility, but they were not considered to be offensive. The odors could not be detected on site and at locations where residences could be developed. There may be upset conditions that may result in odors produced by this facility. Given the separation distance these odors would probably not be frequent. However, measures should be included in the event that frequent odor complaints occur. The BAAQMD CEQA Air Quality Guidelines consider five or more confirmed odor complaints per year (averaged over 3 years) as significant. The presence of new sensitive receptors on the site could result in odor complaints. This would be a *significant* impact.

Mitigation Measure AIR-3: If necessary, upgrade odor control equipment at the Primary Influent Pump Station:

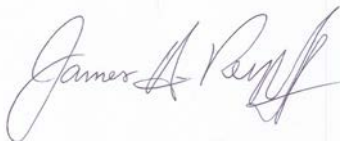
Provide reimbursement to the City for the design and construction of the Primary Influent Pump Station odor control upgrades. This would include either construction of new soil filter beds or a mechanical odor control unit that shall meet current design criteria and be equivalent to the units installed at recent pump station upgrades within the City.

Upgrades would be performed if 3 or more confirmed odor complaints are received by the City or BAAQMD.

* * *

This concludes our assessment of the air quality and greenhouse gas emissions impacts from this project. If you have any questions or comments, please feel free to contact me at (707) 794-0400 x24. We appreciate the opportunity to assist you.

Sincerely,



James A. Reyff
 Project Scientist

Illingworth & Rodkin

Attachment 1: CalEEMod Output for Annual Construction and Operation

Attachment 2: Screening Health Risk Computations

Attachment 3: Construction Health Risk Computations

Riverfront
Sonoma-San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	60.00	1000sqft	2.10	60,000.00	0
Condo/Townhouse	33.00	Dwelling Unit	2.60	33,000.00	94
Hotel	120.00	Room	0.64	174,240.00	0
Strip Mall	30.00	1000sqft	0.18	30,000.00	0
Apartments Low Rise	100.00	Dwelling Unit	1.00	100,000.00	286
Single Family Housing	134.00	Dwelling Unit	12.31	241,200.00	383
Apartments Mid Rise	6.00	Dwelling Unit	0.10	6,000.00	17
City Park	6.20	Acre	6.21	270,072.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	75
Climate Zone	4			Operational Year	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	289	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Using PG&E Rate for 2020 based on CPUC Calculator

Land Use - Land use type and size based on project description

Construction Phase - Construction based on CalEEMod default, but extended out 5 years. No Demolition

Off-road Equipment - Cranes would only be used for mixed use portion - reduced use by 50%

Off-road Equipment - Added forklift

Vehicle Trips - Used TIA rates and adjusted retail to account for internal trips. Weekend rates adjusted based on difference between TIA and CalEEMod rate. Trip rate set to 5.11 miles per STA modeling

Woodstoves - No wood burning. No woodstoves and wood fireplaces assumed to be natural gas fired

Construction Off-road Equipment Mitigation - Tier 2 and BMPs

Off-road Equipment -

Trips and VMT - Set extra phases that model erroneously added to 0

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tblConstEquipMitigation	Tier	No Change	Tier 2

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tblConstructionPhase	PhaseEndDate	11/15/2017	3/9/2016
tblConstructionPhase	PhaseStartDate	3/10/2016	9/27/2017
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tblConstructionPhase	PhaseStartDate	9/27/2017	1/20/2016
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tblOffRoadEquipment	UsageHours	7.00	3.50
tblProjectCharacteristics	CO2IntensityFactor	641.35	289
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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					
2014	0.9998	8.0184	8.4433	0.0109	0.9240	0.4049	1.3289	0.3590	0.3764	0.7354	0.0000	978.1141	978.1141	0.1573	0.0000	981.4164
2015	0.9021	5.4623	8.1407	0.0119	0.5255	0.2856	0.8111	0.1419	0.2683	0.4102	0.0000	1,020.146 3	1,020.146 3	0.0985	0.0000	1,022.214 4
2016	0.8498	5.4228	7.8059	0.0123	0.5279	0.2838	0.8117	0.1425	0.2660	0.4086	0.0000	1,040.177 7	1,040.177 7	0.1058	0.0000	1,042.398 4
2017	1.6994	3.5355	5.3253	9.1600e-003	0.4861	0.1848	0.6709	0.1293	0.1738	0.3030	0.0000	751.3783	751.3783	0.0700	0.0000	752.8482
2018	4.4115	0.5036	0.8114	1.5900e-003	0.3763	0.0362	0.4125	0.0941	0.0348	0.1290	0.0000	121.8111	121.8111	0.0123	0.0000	122.0703
Total	8.8626	22.9425	30.5264	0.0459	2.8397	1.1953	4.0350	0.8667	1.1193	1.9861	0.0000	3,911.627 5	3,911.627 5	0.4438	0.0000	3,920.947 7

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.1814	0.0235	2.0359	1.1000e-004		0.0122	0.0122		0.0122	0.0122	0.0000	17.3824	17.3824	3.5100e-003	2.6000e-004	17.5361
Energy	0.0862	0.7646	0.5181	4.7000e-003		0.0596	0.0596		0.0596	0.0596	0.0000	1,456.4625	1,456.4625	0.0769	0.0282	1,466.8090
Mobile	2.2924	3.5574	17.8771	0.0369	2.5036	0.0481	2.5517	0.6720	0.0444	0.7164	0.0000	2,587.2219	2,587.2219	0.1099	0.0000	2,589.5299
Waste						0.0000	0.0000		0.0000	0.0000	76.7976	0.0000	76.7976	4.5386	0.0000	172.1083
Water						0.0000	0.0000		0.0000	0.0000	10.6969	36.2293	46.9262	1.1023	0.0267	78.3501
Total	6.5600	4.3455	20.4311	0.0417	2.5036	0.1198	2.6234	0.6720	0.1161	0.7881	87.4945	4,097.2961	4,184.7906	5.8312	0.0551	4,324.3333

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.1814	0.0235	2.0359	1.1000e-004		0.0122	0.0122		0.0122	0.0122	0.0000	17.3824	17.3824	3.5100e-003	2.6000e-004	17.5361
Energy	0.0862	0.7646	0.5181	4.7000e-003		0.0596	0.0596		0.0596	0.0596	0.0000	1,456.4625	1,456.4625	0.0769	0.0282	1,466.8090
Mobile	2.2924	3.5574	17.8771	0.0369	2.5036	0.0481	2.5517	0.6720	0.0444	0.7164	0.0000	2,587.2219	2,587.2219	0.1099	0.0000	2,589.5299
Waste						0.0000	0.0000		0.0000	0.0000	76.7976	0.0000	76.7976	4.5386	0.0000	172.1083
Water						0.0000	0.0000		0.0000	0.0000	10.6969	36.2293	46.9262	1.1021	0.0267	78.3330
Total	6.5600	4.3455	20.4311	0.0417	2.5036	0.1198	2.6234	0.6720	0.1161	0.7881	87.4945	4,097.2961	4,184.7906	5.8310	0.0551	4,324.3162

	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
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	2/12/2014	3/12/2014	5	21	
2	Grading	Grading	3/12/2014	7/15/2014	5	90	
3	Building Construction	Building Construction	5/14/2014	9/26/2017	5	880	
4	Paving	Paving	1/20/2016	3/9/2016	5	36	
5	Interior building construction	Architectural Coating	9/27/2017	12/25/2018	5	325	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 225

Acres of Paving: 0

Residential Indoor: 769,905; Residential Outdoor: 256,635; Non-Residential Indoor: 801,468; Non-Residential Outdoor: 267,156 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Interior building construction	Air Compressors	1	6.00	78	0.48
Interior building construction	Forklifts	1	8.00	89	0.20
Building Construction	Cranes	1	3.50	226	0.29
Grading	Excavators	2	8.00	162	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	174	0.41
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

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
Interior building construction	2	73.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	364.00	117.00	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
Paving	6	15.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2014

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					0.1897	0.0000	0.1897	0.1043	0.0000	0.1043	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0556	0.6050	0.4511	4.1000e-004		0.0330	0.0330		0.0303	0.0303	0.0000	39.5867	39.5867	0.0117	0.0000	39.8324
Total	0.0556	0.6050	0.4511	4.1000e-004	0.1897	0.0330	0.2227	0.1043	0.0303	0.1346	0.0000	39.5867	39.5867	0.0117	0.0000	39.8324

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	1.0400e-003	1.4100e-003	0.0140	2.0000e-005	1.7000e-003	2.0000e-005	1.7200e-003	4.5000e-004	2.0000e-005	4.7000e-004	0.0000	1.6571	1.6571	1.1000e-004	0.0000	1.6594
Total	1.0400e-003	1.4100e-003	0.0140	2.0000e-005	1.7000e-003	2.0000e-005	1.7200e-003	4.5000e-004	2.0000e-005	4.7000e-004	0.0000	1.6571	1.6571	1.1000e-004	0.0000	1.6594

3.2 Site Preparation - 2014**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0171	0.0000	0.0171	9.3800e-003	0.0000	9.3800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0129	0.3615	0.2457	4.1000e-004		0.0101	0.0101		0.0101	0.0101	0.0000	39.5867	39.5867	0.0117	0.0000	39.8323
Total	0.0129	0.3615	0.2457	4.1000e-004	0.0171	0.0101	0.0272	9.3800e-003	0.0101	0.0195	0.0000	39.5867	39.5867	0.0117	0.0000	39.8323

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0400e-003	1.4100e-003	0.0140	2.0000e-005	1.7000e-003	2.0000e-005	1.7200e-003	4.5000e-004	2.0000e-005	4.7000e-004	0.0000	1.6571	1.6571	1.1000e-004	0.0000	1.6594
Total	1.0400e-003	1.4100e-003	0.0140	2.0000e-005	1.7000e-003	2.0000e-005	1.7200e-003	4.5000e-004	2.0000e-005	4.7000e-004	0.0000	1.6571	1.6571	1.1000e-004	0.0000	1.6594

3.3 Grading - 2014**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					0.3903	0.0000	0.3903	0.1618	0.0000	0.1618	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3082	3.6325	2.3212	2.7800e-003		0.1746	0.1746		0.1606	0.1606	0.0000	267.5900	267.5900	0.0791	0.0000	269.2506
Total	0.3082	3.6325	2.3212	2.7800e-003	0.3903	0.1746	0.5649	0.1618	0.1606	0.3224	0.0000	267.5900	267.5900	0.0791	0.0000	269.2506

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	4.9600e-003	6.7300e-003	0.0668	1.0000e-004	8.1100e-003	9.0000e-005	8.2000e-003	2.1600e-003	8.0000e-005	2.2400e-003	0.0000	7.8910	7.8910	5.2000e-004	0.0000	7.9020
Total	4.9600e-003	6.7300e-003	0.0668	1.0000e-004	8.1100e-003	9.0000e-005	8.2000e-003	2.1600e-003	8.0000e-005	2.2400e-003	0.0000	7.8910	7.8910	5.2000e-004	0.0000	7.9020

3.3 Grading - 2014

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0351	0.0000	0.0351	0.0146	0.0000	0.0146	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0852	2.2926	1.7074	2.7800e-003		0.0620	0.0620		0.0620	0.0620	0.0000	267.5897	267.5897	0.0791	0.0000	269.2503
Total	0.0852	2.2926	1.7074	2.7800e-003	0.0351	0.0620	0.0972	0.0146	0.0620	0.0766	0.0000	267.5897	267.5897	0.0791	0.0000	269.2503

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.9600e-003	6.7300e-003	0.0668	1.0000e-004	8.1100e-003	9.0000e-005	8.2000e-003	2.1600e-003	8.0000e-005	2.2400e-003	0.0000	7.8910	7.8910	5.2000e-004	0.0000	7.9020
Total	4.9600e-003	6.7300e-003	0.0668	1.0000e-004	8.1100e-003	9.0000e-005	8.2000e-003	2.1600e-003	8.0000e-005	2.2400e-003	0.0000	7.8910	7.8910	5.2000e-004	0.0000	7.9020

3.4 Building Construction - 2014

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	0.2933	2.2641	1.4567	2.0200e-003		0.1698	0.1698		0.1602	0.1602	0.0000	184.2799	184.2799	0.0460	0.0000	185.2468
Total	0.2933	2.2641	1.4567	2.0200e-003		0.1698	0.1698		0.1602	0.1602	0.0000	184.2799	184.2799	0.0460	0.0000	185.2468

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	0.1703	1.2827	1.8904	2.3000e-003	0.0620	0.0246	0.0866	0.0178	0.0226	0.0404	0.0000	212.2169	212.2169	2.2200e-003	0.0000	212.2635
Worker	0.1665	0.2260	2.2429	3.2600e-003	0.2722	2.9400e-003	0.2751	0.0724	2.6600e-003	0.0751	0.0000	264.8925	264.8925	0.0176	0.0000	265.2617
Total	0.3368	1.5087	4.1334	5.5600e-003	0.3342	0.0275	0.3617	0.0902	0.0252	0.1155	0.0000	477.1094	477.1094	0.0198	0.0000	477.5252

3.4 Building Construction - 2014**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0845	1.7731	1.3696	2.0200e-003		0.0711	0.0711		0.0711	0.0711	0.0000	184.2797	184.2797	0.0460	0.0000	185.2466
Total	0.0845	1.7731	1.3696	2.0200e-003		0.0711	0.0711		0.0711	0.0711	0.0000	184.2797	184.2797	0.0460	0.0000	185.2466

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1703	1.2827	1.8904	2.3000e-003	0.0620	0.0246	0.0866	0.0178	0.0226	0.0404	0.0000	212.2169	212.2169	2.2200e-003	0.0000	212.2635
Worker	0.1665	0.2260	2.2429	3.2600e-003	0.2722	2.9400e-003	0.2751	0.0724	2.6600e-003	0.0751	0.0000	264.8925	264.8925	0.0176	0.0000	265.2617
Total	0.3368	1.5087	4.1334	5.5600e-003	0.3342	0.0275	0.3617	0.0902	0.0252	0.1155	0.0000	477.1094	477.1094	0.0198	0.0000	477.5252

3.4 Building Construction - 2015

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	0.4351	3.4159	2.2711	3.1800e-003		0.2533	0.2533		0.2386	0.2386	0.0000	287.7319	287.7319	0.0707	0.0000	289.2173
Total	0.4351	3.4159	2.2711	3.1800e-003		0.2533	0.2533		0.2386	0.2386	0.0000	287.7319	287.7319	0.0707	0.0000	289.2173

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	0.2374	1.7325	2.7742	3.6100e-003	0.0975	0.0281	0.1256	0.0280	0.0258	0.0538	0.0000	329.7914	329.7914	2.9500e-003	0.0000	329.8534
Worker	0.2296	0.3140	3.0955	5.1300e-003	0.4280	4.2200e-003	0.4322	0.1139	3.8400e-003	0.1177	0.0000	402.6229	402.6229	0.0248	0.0000	403.1437
Total	0.4670	2.0464	5.8696	8.7400e-003	0.5255	0.0323	0.5578	0.1419	0.0297	0.1716	0.0000	732.4144	732.4144	0.0278	0.0000	732.9971

3.4 Building Construction - 2015**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1328	2.7878	2.1533	3.1800e-003		0.1119	0.1119		0.1119	0.1119	0.0000	287.7316	287.7316	0.0707	0.0000	289.2169
Total	0.1328	2.7878	2.1533	3.1800e-003		0.1119	0.1119		0.1119	0.1119	0.0000	287.7316	287.7316	0.0707	0.0000	289.2169

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2374	1.7325	2.7742	3.6100e-003	0.0975	0.0281	0.1256	0.0280	0.0258	0.0538	0.0000	329.7914	329.7914	2.9500e-003	0.0000	329.8534
Worker	0.2296	0.3140	3.0955	5.1300e-003	0.4280	4.2200e-003	0.4322	0.1139	3.8400e-003	0.1177	0.0000	402.6229	402.6229	0.0248	0.0000	403.1437
Total	0.4670	2.0464	5.8696	8.7400e-003	0.5255	0.0323	0.5578	0.1419	0.0297	0.1716	0.0000	732.4144	732.4144	0.0278	0.0000	732.9971

3.4 Building Construction - 2016

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	0.4034	3.2330	2.2447	3.1800e-003		0.2346	0.2346		0.2209	0.2209	0.0000	285.6467	285.6467	0.0692	0.0000	287.1002
Total	0.4034	3.2330	2.2447	3.1800e-003		0.2346	0.2346		0.2209	0.2209	0.0000	285.6467	285.6467	0.0692	0.0000	287.1002

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	0.2052	1.5066	2.5485	3.6000e-003	0.0975	0.0225	0.1200	0.0280	0.0207	0.0486	0.0000	325.8376	325.8376	2.6100e-003	0.0000	325.8923
Worker	0.2024	0.2787	2.7305	5.1200e-003	0.4280	3.9300e-003	0.4319	0.1139	3.5900e-003	0.1175	0.0000	388.6595	388.6595	0.0224	0.0000	389.1297
Total	0.4076	1.7852	5.2790	8.7200e-003	0.5255	0.0264	0.5519	0.1419	0.0242	0.1661	0.0000	714.4970	714.4970	0.0250	0.0000	715.0219

3.4 Building Construction - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1328	2.7878	2.1533	3.1800e-003		0.1119	0.1119		0.1119	0.1119	0.0000	285.6463	285.6463	0.0692	0.0000	287.0999
Total	0.1328	2.7878	2.1533	3.1800e-003		0.1119	0.1119		0.1119	0.1119	0.0000	285.6463	285.6463	0.0692	0.0000	287.0999

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2052	1.5066	2.5485	3.6000e-003	0.0975	0.0225	0.1200	0.0280	0.0207	0.0486	0.0000	325.8376	325.8376	2.6100e-003	0.0000	325.8923
Worker	0.2024	0.2787	2.7305	5.1200e-003	0.4280	3.9300e-003	0.4319	0.1139	3.5900e-003	0.1175	0.0000	388.6595	388.6595	0.0224	0.0000	389.1297
Total	0.4076	1.7852	5.2790	8.7200e-003	0.5255	0.0264	0.5519	0.1419	0.0242	0.1661	0.0000	714.4970	714.4970	0.0250	0.0000	715.0219

3.4 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2706	2.2118	1.6246	2.3400e-003		0.1566	0.1566		0.1474	0.1474	0.0000	207.9062	207.9062	0.0498	0.0000	208.9529
Total	0.2706	2.2118	1.6246	2.3400e-003		0.1566	0.1566		0.1474	0.1474	0.0000	207.9062	207.9062	0.0498	0.0000	208.9529

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	0.1284	0.9928	1.7107	2.6400e-003	0.0717	0.0143	0.0860	0.0206	0.0131	0.0337	0.0000	235.4930	235.4930	1.8200e-003	0.0000	235.5312
Worker	0.1297	0.1815	1.7590	3.7600e-003	0.3148	2.7200e-003	0.3175	0.0838	2.5000e-003	0.0863	0.0000	274.9494	274.9494	0.0149	0.0000	275.2620
Total	0.2582	1.1743	3.4697	6.4000e-003	0.3865	0.0170	0.4035	0.1044	0.0156	0.1200	0.0000	510.4424	510.4424	0.0167	0.0000	510.7931

3.4 Building Construction - 2017**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0977	2.0508	1.5841	2.3400e-003		0.0823	0.0823		0.0823	0.0823	0.0000	207.9059	207.9059	0.0498	0.0000	208.9526
Total	0.0977	2.0508	1.5841	2.3400e-003		0.0823	0.0823		0.0823	0.0823	0.0000	207.9059	207.9059	0.0498	0.0000	208.9526

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1284	0.9928	1.7107	2.6400e-003	0.0717	0.0143	0.0860	0.0206	0.0131	0.0337	0.0000	235.4930	235.4930	1.8200e-003	0.0000	235.5312
Worker	0.1297	0.1815	1.7590	3.7600e-003	0.3148	2.7200e-003	0.3175	0.0838	2.5000e-003	0.0863	0.0000	274.9494	274.9494	0.0149	0.0000	275.2620
Total	0.2582	1.1743	3.4697	6.4000e-003	0.3865	0.0170	0.4035	0.1044	0.0156	0.1200	0.0000	510.4424	510.4424	0.0167	0.0000	510.7931

3.5 Paving - 2016**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	0.0376	0.4030	0.2667	4.0000e-004		0.0227	0.0227		0.0209	0.0209	0.0000	37.8249	37.8249	0.0114	0.0000	38.0645
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0376	0.4030	0.2667	4.0000e-004		0.0227	0.0227		0.0209	0.0209	0.0000	37.8249	37.8249	0.0114	0.0000	38.0645

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	1.1500e-003	1.5800e-003	0.0155	3.0000e-005	2.4300e-003	2.0000e-005	2.4500e-003	6.5000e-004	2.0000e-005	6.7000e-004	0.0000	2.2091	2.2091	1.3000e-004	0.0000	2.2118
Total	1.1500e-003	1.5800e-003	0.0155	3.0000e-005	2.4300e-003	2.0000e-005	2.4500e-003	6.5000e-004	2.0000e-005	6.7000e-004	0.0000	2.2091	2.2091	1.3000e-004	0.0000	2.2118

3.5 Paving - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0164	0.3546	0.3047	4.0000e-004		0.0118	0.0118		0.0118	0.0118	0.0000	37.8248	37.8248	0.0114	0.0000	38.0644
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0164	0.3546	0.3047	4.0000e-004		0.0118	0.0118		0.0118	0.0118	0.0000	37.8248	37.8248	0.0114	0.0000	38.0644

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1500e-003	1.5800e-003	0.0155	3.0000e-005	2.4300e-003	2.0000e-005	2.4500e-003	6.5000e-004	2.0000e-005	6.7000e-004	0.0000	2.2091	2.2091	1.3000e-004	0.0000	2.2118
Total	1.1500e-003	1.5800e-003	0.0155	3.0000e-005	2.4300e-003	2.0000e-005	2.4500e-003	6.5000e-004	2.0000e-005	6.7000e-004	0.0000	2.2091	2.2091	1.3000e-004	0.0000	2.2118

3.6 Interior 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					
Archit. Coating	1.1429					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0185	0.1364	0.1060	1.5000e-004		0.0110	0.0110		0.0106	0.0106	0.0000	13.5006	13.5006	2.3900e-003	0.0000	13.5509
Total	1.1614	0.1364	0.1060	1.5000e-004		0.0110	0.0110		0.0106	0.0106	0.0000	13.5006	13.5006	2.3900e-003	0.0000	13.5509

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.2200e-003	0.0129	0.1249	2.7000e-004	0.0996	1.9000e-004	0.0998	0.0249	1.8000e-004	0.0251	0.0000	19.5291	19.5291	1.0600e-003	0.0000	19.5513
Total	9.2200e-003	0.0129	0.1249	2.7000e-004	0.0996	1.9000e-004	0.0998	0.0249	1.8000e-004	0.0251	0.0000	19.5291	19.5291	1.0600e-003	0.0000	19.5513

3.6 Interior building construction - 2017**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.1429					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.3300e-003	0.1307	0.1018	1.5000e-004		5.2800e-003	5.2800e-003		5.2800e-003	5.2800e-003	0.0000	13.5006	13.5006	2.3900e-003	0.0000	13.5509
Total	1.1493	0.1307	0.1018	1.5000e-004		5.2800e-003	5.2800e-003		5.2800e-003	5.2800e-003	0.0000	13.5006	13.5006	2.3900e-003	0.0000	13.5509

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.2200e-003	0.0129	0.1249	2.7000e-004	0.0996	1.9000e-004	0.0998	0.0249	1.8000e-004	0.0251	0.0000	19.5291	19.5291	1.0600e-003	0.0000	19.5513
Total	9.2200e-003	0.0129	0.1249	2.7000e-004	0.0996	1.9000e-004	0.0998	0.0249	1.8000e-004	0.0251	0.0000	19.5291	19.5291	1.0600e-003	0.0000	19.5513

3.6 Interior 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					
Archit. Coating	4.3196					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0613	0.4601	0.3939	5.8000e-004		0.0355	0.0355		0.0342	0.0342	0.0000	50.7369	50.7369	8.7000e-003	0.0000	50.9196
Total	4.3808	0.4601	0.3939	5.8000e-004		0.0355	0.0355		0.0342	0.0342	0.0000	50.7369	50.7369	8.7000e-003	0.0000	50.9196

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0307	0.0435	0.4174	1.0100e-003	0.3763	7.0000e-004	0.3770	0.0941	6.4000e-004	0.0948	0.0000	71.0742	71.0742	3.6500e-003	0.0000	71.1508
Total	0.0307	0.0435	0.4174	1.0100e-003	0.3763	7.0000e-004	0.3770	0.0941	6.4000e-004	0.0948	0.0000	71.0742	71.0742	3.6500e-003	0.0000	71.1508

3.6 Interior building construction - 2018**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.3196					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0239	0.4939	0.3847	5.8000e-004		0.0200	0.0200		0.0200	0.0200	0.0000	50.7368	50.7368	8.7000e-003	0.0000	50.9195
Total	4.3435	0.4939	0.3847	5.8000e-004		0.0200	0.0200		0.0200	0.0200	0.0000	50.7368	50.7368	8.7000e-003	0.0000	50.9195

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0307	0.0435	0.4174	1.0100e-003	0.3763	7.0000e-004	0.3770	0.0941	6.4000e-004	0.0948	0.0000	71.0742	71.0742	3.6500e-003	0.0000	71.1508
Total	0.0307	0.0435	0.4174	1.0100e-003	0.3763	7.0000e-004	0.3770	0.0941	6.4000e-004	0.0948	0.0000	71.0742	71.0742	3.6500e-003	0.0000	71.1508

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.2924	3.5574	17.8771	0.0369	2.5036	0.0481	2.5517	0.6720	0.0444	0.7164	0.0000	2,587.2219	2,587.2219	0.1099	0.0000	2,589.5299
Unmitigated	2.2924	3.5574	17.8771	0.0369	2.5036	0.0481	2.5517	0.6720	0.0444	0.7164	0.0000	2,587.2219	2,587.2219	0.1099	0.0000	2,589.5299

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	665.00	716.00	607.00	1,096,847	1,096,847
Apartments Mid Rise	59.70	64.26	54.48	98,461	98,461
City Park	310.00	310.00	310.00	421,604	421,604
Condo/Townhouse	191.73	208.23	176.55	317,026	317,026
Hotel	980.40	982.80	714.00	1,184,940	1,184,940
Office Park	660.60	98.40	45.60	785,954	785,954
Single Family Housing	1,282.38	1,350.72	1175.18	2,109,164	2,109,164
Strip Mall	810.00	810.00	393.90	771,935	771,935
Total	4,959.81	4,540.41	3,476.71	6,785,930	6,785,930

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	5.11	5.11	5.11	26.10	29.10	44.80	86	11	3
Apartments Mid Rise	5.11	5.11	5.11	26.10	29.10	44.80	86	11	3
City Park	5.11	5.11	5.11	33.00	48.00	19.00	66	28	6
Condo/Townhouse	5.11	5.11	5.11	26.10	29.10	44.80	86	11	3
Hotel	5.11	5.11	5.11	19.40	61.60	19.00	58	38	4
Office Park	5.11	5.11	5.11	33.00	48.00	19.00	82	15	3
Single Family Housing	5.11	5.11	5.11	26.10	29.10	44.80	86	11	3
Strip Mall	5.11	5.11	5.11	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.471814	0.077320	0.181313	0.151940	0.061685	0.009120	0.019075	0.010399	0.002651	0.002510	0.008802	0.000509	0.002861

5.0 Energy Detail

5.1 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	603.3543	603.3543	0.0605	0.0125	608.5089
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	603.3543	603.3543	0.0605	0.0125	608.5089
NaturalGas Mitigated	0.0862	0.7646	0.5181	4.7000e-003		0.0596	0.0596		0.0596	0.0596	0.0000	853.1081	853.1081	0.0164	0.0156	858.3000
NaturalGas Unmitigated	0.0862	0.7646	0.5181	4.7000e-003		0.0596	0.0596		0.0596	0.0596	0.0000	853.1081	853.1081	0.0164	0.0156	858.3000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	48765.7	2.6000e-004	2.2500e-003	9.6000e-004	1.0000e-005		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004	0.0000	2.6023	2.6023	5.0000e-005	5.0000e-005	2.6182
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	642662	3.4700e-003	0.0296	0.0126	1.9000e-004		2.3900e-003	2.3900e-003		2.3900e-003	2.3900e-003	0.0000	34.2949	34.2949	6.6000e-004	6.3000e-004	34.5036
Hotel	8.08125e+006	0.0436	0.3961	0.3328	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	431.2463	431.2463	8.2700e-003	7.9100e-003	433.8708
Office Park	1.3332e+006	7.1900e-003	0.0654	0.0549	3.9000e-004		4.9700e-003	4.9700e-003		4.9700e-003	4.9700e-003	0.0000	71.1446	71.1446	1.3600e-003	1.3000e-003	71.5776
Single Family Housing	4.72792e+006	0.0255	0.2179	0.0927	1.3900e-003		0.0176	0.0176		0.0176	0.0176	0.0000	252.2996	252.2996	4.8400e-003	4.6300e-003	253.8351
Strip Mall	74700	4.0000e-004	3.6600e-003	3.0800e-003	2.0000e-005		2.8000e-004	2.8000e-004		2.8000e-004	2.8000e-004	0.0000	3.9863	3.9863	8.0000e-005	7.0000e-005	4.0105
Apartments Low Rise	1.07815e+006	5.8100e-003	0.0497	0.0211	3.2000e-004		4.0200e-003	4.0200e-003		4.0200e-003	4.0200e-003	0.0000	57.5340	57.5340	1.1000e-003	1.0500e-003	57.8842
Total		0.0862	0.7645	0.5181	4.7000e-003		0.0596	0.0596		0.0596	0.0596	0.0000	853.1081	853.1081	0.0164	0.0156	858.3000

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	642662	3.4700e-003	0.0296	0.0126	1.9000e-004		2.3900e-003	2.3900e-003		2.3900e-003	2.3900e-003	0.0000	34.2949	34.2949	6.6000e-004	6.3000e-004	34.5036
Hotel	8.08125e+006	0.0436	0.3961	0.3328	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	431.2463	431.2463	8.2700e-003	7.9100e-003	433.8708
Office Park	1.3332e+006	7.1900e-003	0.0654	0.0549	3.9000e-004		4.9700e-003	4.9700e-003		4.9700e-003	4.9700e-003	0.0000	71.1446	71.1446	1.3600e-003	1.3000e-003	71.5776
Single Family Housing	4.72792e+006	0.0255	0.2179	0.0927	1.3900e-003		0.0176	0.0176		0.0176	0.0176	0.0000	252.2996	252.2996	4.8400e-003	4.6300e-003	253.8351
Strip Mall	74700	4.0000e-004	3.6600e-003	3.0800e-003	2.0000e-005		2.8000e-004	2.8000e-004		2.8000e-004	2.8000e-004	0.0000	3.9863	3.9863	8.0000e-005	7.0000e-005	4.0105
Apartments Low Rise	1.07815e+006	5.8100e-003	0.0497	0.0211	3.2000e-004		4.0200e-003	4.0200e-003		4.0200e-003	4.0200e-003	0.0000	57.5340	57.5340	1.1000e-003	1.0500e-003	57.8842
Apartments Mid Rise	48765.7	2.6000e-004	2.2500e-003	9.6000e-004	1.0000e-005		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004	0.0000	2.6023	2.6023	5.0000e-005	5.0000e-005	2.6182
Total		0.0862	0.7645	0.5181	4.7000e-003		0.0596	0.0596		0.0596	0.0596	0.0000	853.1081	853.1081	0.0164	0.0156	858.3000

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	368171	48.2629	4.8400e-003	1.0000e-003	48.6752
Apartments Mid Rise	21159.4	2.7737	2.8000e-004	6.0000e-005	2.7974
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	142270	18.6499	1.8700e-003	3.9000e-004	18.8092
Hotel	1.47059e+006	192.7764	0.0193	4.0000e-003	194.4234
Office Park	1.302e+006	170.6768	0.0171	3.5400e-003	172.1350
Single Family Housing	947774	124.2420	0.0125	2.5800e-003	125.3034
Strip Mall	350700	45.9726	4.6100e-003	9.5000e-004	46.3654
Total		603.3543	0.0605	0.0125	608.5090

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	368171	48.2629	4.8400e-003	1.0000e-003	48.6752
Apartments Mid Rise	21159.4	2.7737	2.8000e-004	6.0000e-005	2.7974
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	142270	18.6499	1.8700e-003	3.9000e-004	18.8092
Hotel	1.47059e+006	192.7764	0.0193	4.0000e-003	194.4234
Office Park	1.302e+006	170.6768	0.0171	3.5400e-003	172.1350
Single Family Housing	947774	124.2420	0.0125	2.5800e-003	125.3034
Strip Mall	350700	45.9726	4.6100e-003	9.5000e-004	46.3654
Total		603.3543	0.0605	0.0125	608.5090

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	4.1814	0.0235	2.0359	1.1000e-004		0.0122	0.0122		0.0122	0.0122	0.0000	17.3824	17.3824	3.5100e-003	2.6000e-004	17.5361
Unmitigated	4.1814	0.0235	2.0359	1.1000e-004		0.0122	0.0122		0.0122	0.0122	0.0000	17.3824	17.3824	3.5100e-003	2.6000e-004	17.5361

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.5463					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.5716					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.4200e-003	0.0000	8.0000e-005	0.0000		9.8000e-004	9.8000e-004		9.7000e-004	9.7000e-004	0.0000	14.0674	14.0674	2.7000e-004	2.6000e-004	14.1530
Landscaping	0.0621	0.0235	2.0358	1.1000e-004		0.0112	0.0112		0.0112	0.0112	0.0000	3.3150	3.3150	3.2400e-003	0.0000	3.3831
Total	4.1814	0.0235	2.0359	1.1000e-004		0.0122	0.0122		0.0122	0.0122	0.0000	17.3824	17.3824	3.5100e-003	2.6000e-004	17.5361

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.5463					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.5716					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.4200e-003	0.0000	8.0000e-005	0.0000		9.8000e-004	9.8000e-004		9.7000e-004	9.7000e-004	0.0000	14.0674	14.0674	2.7000e-004	2.6000e-004	14.1530
Landscaping	0.0621	0.0235	2.0358	1.1000e-004		0.0112	0.0112		0.0112	0.0112	0.0000	3.3150	3.3150	3.2400e-003	0.0000	3.3831
Total	4.1814	0.0235	2.0359	1.1000e-004		0.0122	0.0122		0.0122	0.0122	0.0000	17.3824	17.3824	3.5100e-003	2.6000e-004	17.5361

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	46.9262	1.1021	0.0267	78.3330
Unmitigated	46.9262	1.1023	0.0267	78.3501

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	6.5154 / 4.10754	8.5731	0.2130	5.1500e-003	14.6411
Apartments Mid Rise	0.390924 / 0.246452	0.5144	0.0128	3.1000e-004	0.8785
City Park	0 / 7.38718	3.3893	3.4000e-004	7.0000e-005	3.4183
Condo/Townhouse	2.15008 / 1.35549	2.8291	0.0703	1.7000e-003	4.8316
Hotel	3.04401 / 0.338224	3.2801	0.0994	2.3900e-003	6.1089
Office Park	10.664 / 6.53602	13.9462	0.3486	8.4200e-003	23.8772
Single Family Housing	8.73064 / 5.5041	11.4880	0.2854	6.9000e-003	19.6191
Strip Mall	2.22218 / 1.36198	2.9061	0.0726	1.7600e-003	4.9755
Total		46.9262	1.1023	0.0267	78.3501

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	6.5154 / 4.10754	8.5731	0.2129	5.1400e-003	14.6378
Apartments Mid Rise	0.390924 / 0.246452	0.5144	0.0128	3.1000e-004	0.8783
City Park	0 / 7.38718	3.3893	3.4000e-004	7.0000e-005	3.4183
Condo/Townhouse	2.15008 / 1.35549	2.8291	0.0703	1.7000e-003	4.8305
Hotel	3.04401 / 0.338224	3.2801	0.0994	2.3900e-003	6.1073
Office Park	10.664 / 6.53602	13.9462	0.3485	8.4100e-003	23.8718
Single Family Housing	8.73064 / 5.5041	11.4880	0.2853	6.8900e-003	19.6147
Strip Mall	2.22218 / 1.36198	2.9061	0.0726	1.7500e-003	4.9744
Total		46.9262	1.1021	0.0267	78.3330

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	76.7976	4.5386	0.0000	172.1083
Unmitigated	76.7976	4.5386	0.0000	172.1083

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	46	9.3376	0.5518	0.0000	20.9261
Apartments Mid Rise	2.76	0.5603	0.0331	0.0000	1.2556
City Park	0.53	0.1076	6.3600e-003	0.0000	0.2411
Condo/Townhouse	15.18	3.0814	0.1821	0.0000	6.9056
Hotel	65.7	13.3365	0.7882	0.0000	29.8880
Office Park	55.8	11.3269	0.6694	0.0000	25.3843
Single Family Housing	160.86	32.6531	1.9297	0.0000	73.1778
Strip Mall	31.5	6.3942	0.3779	0.0000	14.3299
Total		76.7976	4.5386	0.0000	172.1083

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	46	9.3376	0.5518	0.0000	20.9261
Apartments Mid Rise	2.76	0.5603	0.0331	0.0000	1.2556
City Park	0.53	0.1076	6.3600e-003	0.0000	0.2411
Condo/Townhouse	15.18	3.0814	0.1821	0.0000	6.9056
Hotel	65.7	13.3365	0.7882	0.0000	29.8880
Office Park	55.8	11.3269	0.6694	0.0000	25.3843
Single Family Housing	160.86	32.6531	1.9297	0.0000	73.1778
Strip Mall	31.5	6.3942	0.3779	0.0000	14.3299
Total		76.7976	4.5386	0.0000	172.1083

9.0 Operational Offroad

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

Attachment 2: Screening Health Risk Computations

Plant# 9153 City of Petaluma
 950 Hopper Street
 Petaluma, CA 94952

[C]urrent, [A]rchive, or [F]uture? c
 [P]lant, [S]ource, [A]bate. device, or [E]mis. Point? p

CURRENT Sources:

- 1 Emergency Standby Diesel Generator Set
 Standby Diesel engine, 2152.9 hp, Caterpillar S/N 6WN00523, 3518 cu in
 C22BG098 /,P1,

No CURRENT Abatement Devices

CURRENT Emission Points:

- 1 train: ,S1,/

City of Petaluma (P# 9153) Approved emissions (2013)

S#	SOURCE NAME	MATERIAL	SOURCE CODE	THROUGHPUT	DATE	POLLUTANT	CODE	LBS/DAY
1	Emergency Standby Diesel Generator Set		C22BG098					
	Benzene			41				4.84E-04
	Formaldehyde			124				4.00E-05
	Organics (part not spec el			990				2.34E-02
	Arsenic (all)			1030				4.21E-07
	Beryllium (all) pollutant			1040				2.47E-07
	Cadmium			1070				1.05E-06
	Chromium (hexavalent)			1095				2.18E-08
	Lead (all) pollutant			1140				8.93E-07
	Manganese			1160				1.40E-06
	Nickel pollutant			1180				1.70E-05
	Mercury (all) pollutant			1190				2.98E-07
	Diesel Engine Exhaust Part			1350				2.43E-02
	PAH's (non-speciated)			1840				2.22E-06
	Nitrous Oxide (N2O)			2030				1.30E-04
	Nitrogen Oxides (part not			2990				3.41E-01
	Sulfur Dioxide (SO2)			3990				1.58E-04
	Carbon Monoxide (CO) pollu			4990				7.41E-02
	Carbon Dioxide, non-biogen			6960				1.62E+01
	Methane (CH4)			6970				6.48E-04

APPENDIX C-1

Plant #: 9153
 Plant Name: Petaluma Pump Station
 Number of Sources: 1 Generator

Pollutant Name	Emissions/lbs per day	Cancer Risk (in millions)
ACETALDEHYDE		0.00E+00
ACETAMIDE		0.00E+00
ACRYLAMIDE		0.00E+00
ACRYLONITRILE		0.00E+00
ALLYL CHLORIDE		0.00E+00
2-AMINOANTHRAQUINONE		0.00E+00
ANILINE		0.00E+00
ARSENIC AND COMPOUNDS (INORGANIC) ^{1,2}		0.00E+00
ASBESTOS ³		0.00E+00
BENZENE ¹		0.00E+00
BENZIDINE (AND ITS SALTS) - values also apply to: <i>Benzidine based dyes</i>		0.00E+00
<i>Direct Black 38</i>		0.00E+00
<i>Direct Blue 6</i>		0.00E+00
<i>Direct Brown 95 (technical grade)</i>		0.00E+00
BENZYL CHLORIDE		0.00E+00
BERYLLIUM AND COMPOUNDS ²		0.00E+00
BIS(2-CHLOROETHYL)ETHER (Dichloroethyl ether)		0.00E+00
BIS(CHLOROMETHYL)ETHER		0.00E+00
POTASSIUM BROMATE		0.00E+00
1,3-BUTADIENE		0.00E+00
CADMIUM AND COMPOUNDS ²		0.00E+00
CARBON TETRACHLORIDE ¹ (Tetrachloromethane)		0.00E+00
CHLORINATED PARAFFINS		0.00E+00
4-CHLORO-O-PHENYLENEDIAMINE		0.00E+00
CHLOROFORM ¹		0.00E+00
PENTACHLOROPHENOL		0.00E+00
2,4,6-TRICHLOROPHENOL		0.00E+00
p-CHLORO-o-TOLUIDINE		0.00E+00
CHROMIUM 6+2		0.00E+00
<i>Barium chromate2</i>		0.00E+00
<i>Calcium chromate2</i>		0.00E+00
<i>Lead chromate2</i>		0.00E+00
<i>Sodium dichromate2</i>		0.00E+00
<i>Strontium chromate2</i>		0.00E+00
CHROMIC TRIOXIDE (as chromic acid mist)		0.00E+00
p-CRESIDINE		0.00E+00
CUPFERRON		0.00E+00
2,4-DIAMINOANISOLE		0.00E+00
2,4-DIAMINOTOLUENE		0.00E+00
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)		0.00E+00
1,4-DICHLOROBENZENE		0.00E+00
3,3-DICHLOROBENZIDINE		0.00E+00
1,1-DICHLOROETHANE (Ethylidene dichloride)		0.00E+00
DI(2-ETHYLHEXYL)PHTHALATE (DEHP)		0.00E+00
p-DIMETHYLAMINOAZOBENZENE		0.00E+00
2,4-DINITROTOLUENE		0.00E+00
1,4-DIOXANE (1,4-Diethylene dioxide)		0.00E+00
EPICHLOROHYDRIN (1-Chloro-2,3-epoxypropane)		0.00E+00
ETHYL BENZENE		0.00E+00
ETHYLENE DIBROMIDE (1,2-Dibromoethane)		0.00E+00
ETHYLENE DICHLORIDE (1,2-Dichloroethane)		0.00E+00
ETHYLENE OXIDE (1,2-Epoxyethane)		0.00E+00
ETHYLENE THIOUREA		0.00E+00
FORMALDEHYDE		0.00E+00
HEXACHLOROBENZENE		0.00E+00
HEXACHLOROCYCLOHEXANES (mixed or technical grade)		0.00E+00
alpha-HEXACHLOROCYCLOHEXANE		0.00E+00
beta-HEXACHLOROCYCLOHEXANE		0.00E+00
gamma-HEXACHLOROCYCLOHEXANE (Lindane)		0.00E+00
HYDRAZINE		0.00E+00
LEAD AND COMPOUNDS 2,4 (inorganic) values also apply to: <i>Lead acetate2</i>		0.00E+00
<i>Lead phosphate2</i>		0.00E+00
<i>Lead subacetate2</i>		0.00E+00
METHYL tertiary-BUTYL ETHER		0.00E+00
4,4'-METHYLENE BIS (2-CHLOROANILINE) (MOCA)		0.00E+00
METHYLENE CHLORIDE (Dichloromethane)		0.00E+00
4,4'-METHYLENE DIANILINE (AND ITS DICHLORIDE)		0.00E+00
MICHLER'S KETONE (4,4'-Bis(dimethylamino)benzophenone)		0.00E+00
N-NITROSODI-n-BUTYLAMINE		0.00E+00
N-NITROSODI-n-PROPYLAMINE		0.00E+00
N-NITROSODIETHYLAMINE		0.00E+00
N-NITROSODIMETHYLAMINE		0.00E+00
N-NITROSODIPHENYLAMINE		0.00E+00
N-NITROSO-N-METHYLETHYLAMINE		0.00E+00
N-NITROSOMORPHOLINE		0.00E+00
N-NITROSOPIPERIDINE		0.00E+00
N-NITROSOPIRROLIDINE		0.00E+00
NICKEL AND COMPOUNDS ² (values also apply to): <i>Nickel acetate2</i>		0.00E+00
<i>Nickel carbonate2</i>		0.00E+00
<i>Nickel carbonyl2</i>		0.00E+00
<i>Nickel hydroxide2</i>		0.00E+00
<i>Nickelocene2</i>		0.00E+00
NICKEL OXIDE ² <i>Nickel refinery dust from the pyrometallurgical process2</i>		0.00E+00
<i>Nickel subsulfide2</i>		0.00E+00
p-NITROSODIPHENYLAMINE		0.00E+00
PARTICULATE EMISSIONS FROM DIESEL-FUELED ENGINES	2.43E-02	2.58E-05
PERCHLOROETHYLENE (Tetrachloroethylene)		0.00E+00
PCB (POLYCHLORINATED BIPHENYLS) [low risk] 2,6		0.00E+00
PCB (POLYCHLORINATED BIPHENYLS) [high risk] 2,6		0.00E+00
POLYCHLORINATED DIBENZO-P-DIOXINS (PCDD)(AS 2,3,7,8-PCDD EQUIV) 2,7		0.00E+00
2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN2,7		0.00E+00
POLYCHLORINATED DIBENZOFURANS (PCDF)(AS 2,3,7,8-PCDD EQUIV) 2,7		0.00E+00
2,3,7,8-TETRACHLORODIBENZOFURAN2,7		0.00E+00
POLYCYCLIC AROMATIC HYDROCARBON2 (PAH) (AS B(a)P-EQUIV)5		0.00E+00
BENZO(A)PYRENE2,5		0.00E+00
NAPHTHALENE		0.00E+00
1,3-PROPANE SULFONE		0.00E+00
PROPYLENE OXIDE		0.00E+00
1,1,2,2-TETRACHLOROETHANE		0.00E+00
THIOACETAMIDE		0.00E+00
<i>Toluene diisocyanates</i>		0.00E+00
TOLUENE-2,4-DIISOCYANATE		0.00E+00
TOLUENE-2,6-DIISOCYANATE		0.00E+00
1,1,2-TRICHLOROETHANE (Vinyl trichloride)		0.00E+00
TRICHLOROETHYLENE		0.00E+00
URETHANE (Ethyl carbamate)		0.00E+00
VINYL CHLORIDE (Chloroethylene)		0.00E+00
TOTAL:		2.58E-05

APPENDIX C-1

Plant #: 9153
Plant Name: Petaluma Pump Station
Number of Sources: 1 Generator

Diesel PM Concentrations	Emissions (lbs/day)	12.5 Concentration (ug/m3)
	2.43E-02	0.046919655
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
TOTAL:		0.046919655

APPENDIX C-1

Plant #: 9153
Plant Name: Petaluma Pump Station
Number of Sources: 1 Generator

Distance meters	Distance feet	Distance adjustment multiplier	Enter Risk or Hazard	Adjusted Risk or Hazard	Enter PM2.5 Concentration	Adjusted PM2.5 Concentration
25	82	0.85		0		0
30	98	0.73		0.00E+00		0
35	115	0.64		0		0
40	131	0.58		0		0
50	164	0.5		0		0
60	197	0.41		0		0
70	230	0.31	2.57975E-05	7.99722E-06		0
80	262	0.28	2.57975E-05	7.22329E-06		0
90	295	0.25	2.57975E-05	6.44937E-06		0
100	328	0.22	2.57975E-05	5.67544E-06		0
110	361	0.18	2.57975E-05	4.64355E-06		0
120	394	0.16	2.57975E-05	4.1276E-06		0
130	426	0.15	2.57975E-05	3.86962E-06	0.046919655	0.007037948
140	459	0.14	2.57975E-05	3.61165E-06		0
150	492	0.12		0		0
160	525	0.1		0		0
180	590	0.09		0		0
200	656	0.08		0		0
220	722	0.07		0		0
240	787	0.06		0		0
260	853	0.05		0		0
280	918	0.04		0		0

0.00E+00

Riverfront Construction TAC Analysis

Sonoma-San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	60.00	1000sqft	2.10	60,000.00	0
Condo/Townhouse	33.00	Dwelling Unit	2.60	33,000.00	94
Hotel	120.00	Room	0.64	174,240.00	0
Strip Mall	30.00	1000sqft	0.18	30,000.00	0
Apartments Low Rise	100.00	Dwelling Unit	1.00	100,000.00	286
Single Family Housing	134.00	Dwelling Unit	12.31	241,200.00	383
Apartments Mid Rise	6.00	Dwelling Unit	0.10	6,000.00	17
City Park	6.20	Acre	6.21	270,072.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	75
Climate Zone	4			Operational Year	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	289	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Using PG&E Rate for 2020 based on CPUC Calculator

Land Use - Land use type and size based on project description

Construction Phase - Construction based on CalEEMod default, but extended out 5 years. No Demolition

Off-road Equipment - Cranes would only be used for mixed use portion - reduced use by 50%

APPENDIX C-1

tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstructionPhase	NumDays	35.00	325.00
tblConstructionPhase	NumDays	440.00	880.00
tblConstructionPhase	NumDays	45.00	90.00
tblConstructionPhase	NumDays	35.00	36.00
tblConstructionPhase	NumDays	20.00	21.00
tblConstructionPhase	PhaseEndDate	6/7/2017	12/25/2018
tblConstructionPhase	PhaseEndDate	11/28/2017	9/26/2017
tblConstructionPhase	PhaseEndDate	7/16/2014	7/15/2014
tblConstructionPhase	PhaseEndDate	11/15/2017	3/9/2016
tblConstructionPhase	PhaseStartDate	3/10/2016	9/27/2017
tblConstructionPhase	PhaseStartDate	7/16/2014	5/14/2014
tblConstructionPhase	PhaseStartDate	3/13/2014	3/12/2014
tblConstructionPhase	PhaseStartDate	9/27/2017	1/20/2016
tblFireplaces	FireplaceWoodMass	92.40	0.00
tblFireplaces	FireplaceWoodMass	92.40	0.00
tblFireplaces	FireplaceWoodMass	92.40	0.00
tblFireplaces	FireplaceWoodMass	215.60	0.00
tblFireplaces	NumberGas	55.00	69.00
tblFireplaces	NumberGas	3.30	4.14
tblFireplaces	NumberGas	18.15	23.00
tblFireplaces	NumberGas	73.70	134.00
tblLandUse	LotAcreage	1.38	2.10
tblLandUse	LotAcreage	2.06	2.60
tblLandUse	LotAcreage	4.00	0.64
tblLandUse	LotAcreage	0.69	0.18
tblLandUse	LotAcreage	6.25	1.00
tblLandUse	LotAcreage	43.51	12.31

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tblLandUse	LotAcreage	0.16	0.10
tblLandUse	LotAcreage	6.20	6.21
tblOffRoadEquipment	UsageHours	7.00	3.50
tblProjectCharacteristics	CO2IntensityFactor	641.35	289
tblProjectCharacteristics	OperationalYear	2014	2020
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripNumber	73.00	0.00
tblTripsAndVMT	WorkerTripNumber	73.00	0.00
tblTripsAndVMT	WorkerTripNumber	73.00	0.00
tblTripsAndVMT	WorkerTripNumber	73.00	0.00
tblVehicleTrips	CC_TL	7.30	5.11
tblVehicleTrips	CC_TL	7.30	5.11
tblVehicleTrips	CC_TL	7.30	5.11
tblVehicleTrips	CC_TL	7.30	5.11

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tblVehicleTrips	CNW_TL	7.30	5.11
tblVehicleTrips	CNW_TL	7.30	5.11
tblVehicleTrips	CNW_TL	7.30	5.11
tblVehicleTrips	CNW_TL	7.30	5.11
tblVehicleTrips	CW_TL	9.50	5.11
tblVehicleTrips	CW_TL	9.50	5.11
tblVehicleTrips	CW_TL	9.50	5.11
tblVehicleTrips	CW_TL	9.50	5.11
tblVehicleTrips	HO_TL	5.40	5.11
tblVehicleTrips	HO_TL	5.40	5.11
tblVehicleTrips	HO_TL	5.40	5.11
tblVehicleTrips	HO_TL	5.40	5.11
tblVehicleTrips	HS_TL	4.30	5.11
tblVehicleTrips	HS_TL	4.30	5.11
tblVehicleTrips	HS_TL	4.30	5.11
tblVehicleTrips	HS_TL	4.30	5.11
tblVehicleTrips	HW_TL	12.40	5.11
tblVehicleTrips	HW_TL	12.40	5.11
tblVehicleTrips	HW_TL	12.40	5.11
tblVehicleTrips	HW_TL	12.40	5.11
tblVehicleTrips	ST_TR	7.16	10.71
tblVehicleTrips	ST_TR	1.59	50.00
tblVehicleTrips	ST_TR	7.16	6.31
tblVehicleTrips	ST_TR	42.04	27.00
tblVehicleTrips	SU_TR	6.07	9.08
tblVehicleTrips	SU_TR	1.59	50.00
tblVehicleTrips	SU_TR	6.07	5.35
tblVehicleTrips	SU_TR	20.43	13.13
tblVehicleTrips	WD_TR	6.59	6.65
tblVehicleTrips	WD_TR	6.59	9.95

tblVehicleTrips	WD_TR	1.59	50.00
tblVehicleTrips	WD_TR	6.59	5.81
tblVehicleTrips	WD_TR	11.42	11.01
tblVehicleTrips	WD_TR	44.32	27.00
tblWoodstoves	WoodstoveWoodMass	954.80	0.00
tblWoodstoves	WoodstoveWoodMass	954.80	0.00
tblWoodstoves	WoodstoveWoodMass	954.80	0.00
tblWoodstoves	WoodstoveWoodMass	1,355.20	0.00

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					
2014	0.8846	6.7988	6.1381	5.6600e-003	0.5899	0.3800	0.9699	0.2689	0.3535	0.6224	0.0000	528.6005	528.6005	0.1392	0.0000	531.5245
2015	0.7557	3.8418	5.0683	3.8700e-003	0.0152	0.2565	0.2716	4.2300e-003	0.2415	0.2457	0.0000	344.3745	344.3745	0.0740	0.0000	345.9286
2016	0.7264	4.0268	5.0938	4.2700e-003	0.0152	0.2599	0.2751	4.2400e-003	0.2441	0.2483	0.0000	379.0758	379.0758	0.0836	0.0000	380.8304
2017	1.6200	2.6171	3.4801	3.0000e-003	0.0136	0.1693	0.1828	3.7200e-003	0.1595	0.1632	0.0000	262.1194	262.1194	0.0543	0.0000	263.2592
2018	4.4033	0.4654	0.4714	6.3000e-004	9.1900e-003	0.0356	0.0448	2.3100e-003	0.0343	0.0366	0.0000	54.2131	54.2131	9.0600e-003	0.0000	54.4033
Total	8.3899	17.7499	20.2517	0.0174	0.6431	1.1012	1.7443	0.2834	1.0329	1.3162	0.0000	1,568.3833	1,568.3833	0.3602	0.0000	1,575.9461

Mitigated Construction

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	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					
2014	0.4101	4.7244	5.2317	5.6600e-003	0.0621	0.1459	0.2080	0.0267	0.1457	0.1724	0.0000	528.5999	528.5999	0.1392	0.0000	531.5239
2015	0.4533	3.2137	4.9506	3.8700e-003	0.0152	0.1150	0.1302	4.2300e-003	0.1147	0.1190	0.0000	344.3742	344.3742	0.0740	0.0000	345.9283
2016	0.4345	3.5333	5.0404	4.2700e-003	0.0152	0.1262	0.1414	4.2400e-003	0.1259	0.1302	0.0000	379.0754	379.0754	0.0836	0.0000	380.8301
2017	1.4349	2.4504	3.4354	3.0000e-003	0.0136	0.0892	0.1028	3.7200e-003	0.0891	0.0928	0.0000	262.1191	262.1191	0.0543	0.0000	263.2590
2018	4.3660	0.4992	0.4622	6.3000e-004	9.1900e-003	0.0201	0.0293	2.3100e-003	0.0201	0.0224	0.0000	54.2131	54.2131	9.0600e-003	0.0000	54.4033
Total	7.0988	14.4210	19.1203	0.0174	0.1153	0.4964	0.6117	0.0412	0.4955	0.5367	0.0000	1,568.3816	1,568.3816	0.3602	0.0000	1,575.9445

	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
Percent Reduction	15.39	18.75	5.59	0.00	82.07	54.92	64.93	85.46	52.03	59.23	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	2/12/2014	3/12/2014	5	21	
2	Grading	Grading	3/12/2014	7/15/2014	5	90	
3	Building Construction	Building Construction	5/14/2014	9/26/2017	5	880	
4	Paving	Paving	11/20/2016	3/9/2016	5	36	
5	Interior building construction	Architectural Coating	9/27/2017	12/25/2018	5	325	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 225

Acres of Paving: 0

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Residential Indoor: 769,905; Residential Outdoor: 256,635; Non-Residential Indoor: 801,468; Non-Residential Outdoor: 267,156

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Interior building construction	Air Compressors	1	6.00	78	0.48
Interior building construction	Forklifts	1	8.00	89	0.20
Building Construction	Cranes	1	3.50	226	0.29
Grading	Excavators	2	8.00	162	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	174	0.41
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

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
Interior building construction	2	73.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	0.30	7.30	0.30	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Building Construction	9	364.00	117.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

- Use Cleaner Engines for Construction Equipment
- Use Soil Stabilizer
- Replace Ground Cover
- Water Exposed Area
- Reduce Vehicle Speed on Unpaved Roads
- Clean Paved Roads

3.2 Site Preparation - 2014

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					0.1897	0.0000	0.1897	0.1043	0.0000	0.1043	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0556	0.6050	0.4511	4.1000e-004		0.0330	0.0330		0.0303	0.0303	0.0000	39.5867	39.5867	0.0117	0.0000	39.8324
Total	0.0556	0.6050	0.4511	4.1000e-004	0.1897	0.0330	0.2227	0.1043	0.0303	0.1346	0.0000	39.5867	39.5867	0.0117	0.0000	39.8324

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
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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
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	1.7000e-004	2.4300e-003	0.0000	4.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0809	0.0809	1.0000e-005	0.0000	0.0811
Total	6.5000e-004	1.7000e-004	2.4300e-003	0.0000	4.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0809	0.0809	1.0000e-005	0.0000	0.0811

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0171	0.0000	0.0171	9.3800e-003	0.0000	9.3800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0129	0.3615	0.2457	4.1000e-004		0.0101	0.0101		0.0101	0.0101	0.0000	39.5867	39.5867	0.0117	0.0000	39.8323
Total	0.0129	0.3615	0.2457	4.1000e-004	0.0171	0.0101	0.0272	9.3800e-003	0.0101	0.0195	0.0000	39.5867	39.5867	0.0117	0.0000	39.8323

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-004	1.7000e-004	2.4300e-003	0.0000	4.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0809	0.0809	1.0000e-005	0.0000	0.0811

Total	6.5000e-004	1.7000e-004	2.4300e-003	0.0000	4.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0809	0.0809	1.0000e-005	0.0000	0.0811
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3.3 Grading - 2014

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					0.3903	0.0000	0.3903	0.1618	0.0000	0.1618	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3082	3.6325	2.3212	2.7800e-003		0.1746	0.1746		0.1606	0.1606	0.0000	267.5900	267.5900	0.0791	0.0000	269.2506
Total	0.3082	3.6325	2.3212	2.7800e-003	0.3903	0.1746	0.5649	0.1618	0.1606	0.3224	0.0000	267.5900	267.5900	0.0791	0.0000	269.2506

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	3.0800e-003	8.2000e-004	0.0116	0.0000	2.0000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.3852	0.3852	6.0000e-005	0.0000	0.3864
Total	3.0800e-003	8.2000e-004	0.0116	0.0000	2.0000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.3852	0.3852	6.0000e-005	0.0000	0.3864

Mitigated Construction On-Site

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	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					0.0351	0.0000	0.0351	0.0146	0.0000	0.0146	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0852	2.2926	1.7074	2.7800e-003		0.0620	0.0620		0.0620	0.0620	0.0000	267.5897	267.5897	0.0791	0.0000	269.2503
Total	0.0852	2.2926	1.7074	2.7800e-003	0.0351	0.0620	0.0972	0.0146	0.0620	0.0766	0.0000	267.5897	267.5897	0.0791	0.0000	269.2503

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0800e-003	8.2000e-004	0.0116	0.0000	2.0000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.3852	0.3852	6.0000e-005	0.0000	0.3864
Total	3.0800e-003	8.2000e-004	0.0116	0.0000	2.0000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.3852	0.3852	6.0000e-005	0.0000	0.3864

3.4 Building Construction - 2014

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					

APPENDIX C-1

Off-Road	0.2933	2.2641	1.4567	2.0200e-003		0.1698	0.1698		0.1602	0.1602	0.0000	184.2799	184.2799	0.0460	0.0000	185.2468
Total	0.2933	2.2641	1.4567	2.0200e-003		0.1698	0.1698		0.1602	0.1602	0.0000	184.2799	184.2799	0.0460	0.0000	185.2468

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	0.1206	0.2687	1.5059	2.8000e-004	2.7800e-003	2.3200e-003	5.0900e-003	8.2000e-004	2.1100e-003	2.9300e-003	0.0000	23.7470	23.7470	4.3000e-004	0.0000	23.7561
Worker	0.1033	0.0276	0.3891	1.6000e-004	6.8800e-003	3.6000e-004	7.2400e-003	1.8700e-003	3.3000e-004	2.1900e-003	0.0000	12.9308	12.9308	1.9200e-003	0.0000	12.9710
Total	0.2239	0.2962	1.8950	4.4000e-004	9.6600e-003	2.6800e-003	0.0123	2.6900e-003	2.4400e-003	5.1200e-003	0.0000	36.6778	36.6778	2.3500e-003	0.0000	36.7272

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0845	1.7731	1.3696	2.0200e-003		0.0711	0.0711		0.0711	0.0711	0.0000	184.2797	184.2797	0.0460	0.0000	185.2466
Total	0.0845	1.7731	1.3696	2.0200e-003		0.0711	0.0711		0.0711	0.0711	0.0000	184.2797	184.2797	0.0460	0.0000	185.2466

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1206	0.2687	1.5059	2.8000e-004	2.7800e-003	2.3200e-003	5.0900e-003	8.2000e-004	2.1100e-003	2.9300e-003	0.0000	23.7470	23.7470	4.3000e-004	0.0000	23.7561
Worker	0.1033	0.0276	0.3891	1.6000e-004	6.8800e-003	3.6000e-004	7.2400e-003	1.8700e-003	3.3000e-004	2.1900e-003	0.0000	12.9308	12.9308	1.9200e-003	0.0000	12.9710
Total	0.2239	0.2962	1.8950	4.4000e-004	9.6600e-003	2.6800e-003	0.0123	2.6900e-003	2.4400e-003	5.1200e-003	0.0000	36.6778	36.6778	2.3500e-003	0.0000	36.7272

3.4 Building Construction - 2015

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	0.4351	3.4159	2.2711	3.1800e-003		0.2533	0.2533		0.2386	0.2386	0.0000	287.7319	287.7319	0.0707	0.0000	289.2173
Total	0.4351	3.4159	2.2711	3.1800e-003		0.2533	0.2533		0.2386	0.2386	0.0000	287.7319	287.7319	0.0707	0.0000	289.2173

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
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APPENDIX C-1

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
Vendor	0.1723	0.3874	2.2513	4.4000e-004	4.3600e-003	2.6500e-003	7.0100e-003	1.2900e-003	2.4000e-003	3.6900e-003	0.0000	36.9722	36.9722	6.3000e-004	0.0000	36.9854
Worker	0.1482	0.0385	0.5459	2.6000e-004	0.0108	5.3000e-004	0.0113	2.9400e-003	4.8000e-004	3.4200e-003	0.0000	19.6704	19.6704	2.6400e-003	0.0000	19.7260
Total	0.3205	0.4259	2.7972	7.0000e-004	0.0152	3.1800e-003	0.0184	4.2300e-003	2.8800e-003	7.1100e-003	0.0000	56.6426	56.6426	3.2700e-003	0.0000	56.7114

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1328	2.7878	2.1533	3.1800e-003		0.1119	0.1119		0.1119	0.1119	0.0000	287.7316	287.7316	0.0707	0.0000	289.2169
Total	0.1328	2.7878	2.1533	3.1800e-003		0.1119	0.1119		0.1119	0.1119	0.0000	287.7316	287.7316	0.0707	0.0000	289.2169

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1723	0.3874	2.2513	4.4000e-004	4.3600e-003	2.6500e-003	7.0100e-003	1.2900e-003	2.4000e-003	3.6900e-003	0.0000	36.9722	36.9722	6.3000e-004	0.0000	36.9854
Worker	0.1482	0.0385	0.5459	2.6000e-004	0.0108	5.3000e-004	0.0113	2.9400e-003	4.8000e-004	3.4200e-003	0.0000	19.6704	19.6704	2.6400e-003	0.0000	19.7260

Total	0.3205	0.4259	2.7972	7.0000e-004	0.0152	3.1800e-003	0.0184	4.2300e-003	2.8800e-003	7.1100e-003	0.0000	56.6426	56.6426	3.2700e-003	0.0000	56.7114
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3.4 Building Construction - 2016

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	0.4034	3.2330	2.2447	3.1800e-003		0.2346	0.2346		0.2209	0.2209	0.0000	285.6467	285.6467	0.0692	0.0000	287.1002
Total	0.4034	3.2330	2.2447	3.1800e-003		0.2346	0.2346		0.2209	0.2209	0.0000	285.6467	285.6467	0.0692	0.0000	287.1002

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	0.1488	0.3565	2.0913	4.3000e-004	4.3600e-003	2.0200e-003	6.3800e-003	1.2900e-003	1.8300e-003	3.1200e-003	0.0000	36.4928	36.4928	5.9000e-004	0.0000	36.5051
Worker	0.1357	0.0342	0.4884	2.5000e-004	0.0108	5.1000e-004	0.0113	2.9400e-003	4.7000e-004	3.4000e-003	0.0000	19.0035	19.0035	2.3300e-003	0.0000	19.0524
Total	0.2846	0.3907	2.5796	6.8000e-004	0.0152	2.5300e-003	0.0177	4.2300e-003	2.3000e-003	6.5200e-003	0.0000	55.4962	55.4962	2.9200e-003	0.0000	55.5575

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1328	2.7878	2.1533	3.1800e-003		0.1119	0.1119		0.1119	0.1119	0.0000	285.6463	285.6463	0.0692	0.0000	287.0999
Total	0.1328	2.7878	2.1533	3.1800e-003		0.1119	0.1119		0.1119	0.1119	0.0000	285.6463	285.6463	0.0692	0.0000	287.0999

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1488	0.3565	2.0913	4.3000e-004	4.3600e-003	2.0200e-003	6.3800e-003	1.2900e-003	1.8300e-003	3.1200e-003	0.0000	36.4928	36.4928	5.9000e-004	0.0000	36.5051
Worker	0.1357	0.0342	0.4884	2.5000e-004	0.0108	5.1000e-004	0.0113	2.9400e-003	4.7000e-004	3.4000e-003	0.0000	19.0035	19.0035	2.3300e-003	0.0000	19.0524
Total	0.2846	0.3907	2.5796	6.8000e-004	0.0152	2.5300e-003	0.0177	4.2300e-003	2.3000e-003	6.5200e-003	0.0000	55.4962	55.4962	2.9200e-003	0.0000	55.5575

3.4 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					

APPENDIX C-1

Off-Road	0.2706	2.2118	1.6246	2.3400e-003		0.1566	0.1566		0.1474	0.1474	0.0000	207.9062	207.9062	0.0498	0.0000	208.9529
Total	0.2706	2.2118	1.6246	2.3400e-003		0.1566	0.1566		0.1474	0.1474	0.0000	207.9062	207.9062	0.0498	0.0000	208.9529

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	0.0904	0.2450	1.4057	3.2000e-004	3.2100e-003	1.2500e-003	4.4600e-003	9.5000e-004	1.1400e-003	2.0800e-003	0.0000	26.3103	26.3103	4.3000e-004	0.0000	26.3193
Worker	0.0911	0.0223	0.3210	1.9000e-004	7.9500e-003	3.7000e-004	8.3200e-003	2.1600e-003	3.4000e-004	2.5000e-003	0.0000	13.4472	13.4472	1.5100e-003	0.0000	13.4788
Total	0.1815	0.2673	1.7267	5.1000e-004	0.0112	1.6200e-003	0.0128	3.1100e-003	1.4800e-003	4.5800e-003	0.0000	39.7575	39.7575	1.9400e-003	0.0000	39.7981

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0977	2.0508	1.5841	2.3400e-003		0.0823	0.0823		0.0823	0.0823	0.0000	207.9059	207.9059	0.0498	0.0000	208.9526
Total	0.0977	2.0508	1.5841	2.3400e-003		0.0823	0.0823		0.0823	0.0823	0.0000	207.9059	207.9059	0.0498	0.0000	208.9526

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0904	0.2450	1.4057	3.2000e-004	3.2100e-003	1.2500e-003	4.4600e-003	9.5000e-004	1.1400e-003	2.0800e-003	0.0000	26.3103	26.3103	4.3000e-004	0.0000	26.3193
Worker	0.0911	0.0223	0.3210	1.9000e-004	7.9500e-003	3.7000e-004	8.3200e-003	2.1600e-003	3.4000e-004	2.5000e-003	0.0000	13.4472	13.4472	1.5100e-003	0.0000	13.4788
Total	0.1815	0.2673	1.7267	5.1000e-004	0.0112	1.6200e-003	0.0128	3.1100e-003	1.4800e-003	4.5800e-003	0.0000	39.7575	39.7575	1.9400e-003	0.0000	39.7981

3.5 Paving - 2016

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	0.0376	0.4030	0.2667	4.0000e-004		0.0227	0.0227		0.0209	0.0209	0.0000	37.8249	37.8249	0.0114	0.0000	38.0645
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0376	0.4030	0.2667	4.0000e-004		0.0227	0.0227		0.0209	0.0209	0.0000	37.8249	37.8249	0.0114	0.0000	38.0645

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
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APPENDIX C-1

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
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	7.7000e-004	1.9000e-004	2.7800e-003	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1080	0.1080	1.0000e-005	0.0000	0.1083
Total	7.7000e-004	1.9000e-004	2.7800e-003	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1080	0.1080	1.0000e-005	0.0000	0.1083

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0164	0.3546	0.3047	4.0000e-004		0.0118	0.0118		0.0118	0.0118	0.0000	37.8248	37.8248	0.0114	0.0000	38.0644
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0164	0.3546	0.3047	4.0000e-004		0.0118	0.0118		0.0118	0.0118	0.0000	37.8248	37.8248	0.0114	0.0000	38.0644

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.7000e-004	1.9000e-004	2.7800e-003	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1080	0.1080	1.0000e-005	0.0000	0.1083

Total	7.7000e-004	1.9000e-004	2.7800e-003	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1080	0.1080	1.0000e-005	0.0000	0.1083
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3.6 Interior 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					
Archit. Coating	1.1429					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0185	0.1364	0.1060	1.5000e-004		0.0110	0.0110		0.0106	0.0106	0.0000	13.5006	13.5006	2.3900e-003	0.0000	13.5509
Total	1.1614	0.1364	0.1060	1.5000e-004		0.0110	0.0110		0.0106	0.0106	0.0000	13.5006	13.5006	2.3900e-003	0.0000	13.5509

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	6.4700e-003	1.5800e-003	0.0228	1.0000e-005	2.4300e-003	3.0000e-005	2.4600e-003	6.1000e-004	2.0000e-005	6.4000e-004	0.0000	0.9551	0.9551	1.1000e-004	0.0000	0.9574
Total	6.4700e-003	1.5800e-003	0.0228	1.0000e-005	2.4300e-003	3.0000e-005	2.4600e-003	6.1000e-004	2.0000e-005	6.4000e-004	0.0000	0.9551	0.9551	1.1000e-004	0.0000	0.9574

Mitigated Construction On-Site

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	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	1.1429					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.3300e-003	0.1307	0.1018	1.5000e-004		5.2800e-003	5.2800e-003		5.2800e-003	5.2800e-003	0.0000	13.5006	13.5006	2.3900e-003	0.0000	13.5509
Total	1.1493	0.1307	0.1018	1.5000e-004		5.2800e-003	5.2800e-003		5.2800e-003	5.2800e-003	0.0000	13.5006	13.5006	2.3900e-003	0.0000	13.5509

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.4700e-003	1.5800e-003	0.0228	1.0000e-005	2.4300e-003	3.0000e-005	2.4600e-003	6.1000e-004	2.0000e-005	6.4000e-004	0.0000	0.9551	0.9551	1.1000e-004	0.0000	0.9574
Total	6.4700e-003	1.5800e-003	0.0228	1.0000e-005	2.4300e-003	3.0000e-005	2.4600e-003	6.1000e-004	2.0000e-005	6.4000e-004	0.0000	0.9551	0.9551	1.1000e-004	0.0000	0.9574

3.6 Interior 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					

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Archit. Coating	4.3196					0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	0.0613	0.4601	0.3939	5.8000e-004		0.0355	0.0355			0.0342	0.0342	0.0000	50.7369	50.7369	8.7000e-003	0.0000	50.9196
Total	4.3808	0.4601	0.3939	5.8000e-004		0.0355	0.0355			0.0342	0.0342	0.0000	50.7369	50.7369	8.7000e-003	0.0000	50.9196

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0225	5.3200e-003	0.0774	5.0000e-005	9.1900e-003	1.0000e-004	9.2900e-003	2.3100e-003	9.0000e-005	2.4000e-003	0.0000	3.4763	3.4763	3.6000e-004	0.0000	3.4838
Total	0.0225	5.3200e-003	0.0774	5.0000e-005	9.1900e-003	1.0000e-004	9.2900e-003	2.3100e-003	9.0000e-005	2.4000e-003	0.0000	3.4763	3.4763	3.6000e-004	0.0000	3.4838

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e	
Category	tons/yr										MT/yr						
Archit. Coating	4.3196						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	0.0239	0.4939	0.3847	5.8000e-004		0.0200	0.0200			0.0200	0.0200	0.0000	50.7368	50.7368	8.7000e-003	0.0000	50.9195
Total	4.3435	0.4939	0.3847	5.8000e-004		0.0200	0.0200			0.0200	0.0200	0.0000	50.7368	50.7368	8.7000e-003	0.0000	50.9195

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0225	5.3200e-003	0.0774	5.0000e-005	9.1900e-003	1.0000e-004	9.2900e-003	2.3100e-003	9.0000e-005	2.4000e-003	0.0000	3.4763	3.4763	3.6000e-004	0.0000	3.4838
Total	0.0225	5.3200e-003	0.0774	5.0000e-005	9.1900e-003	1.0000e-004	9.2900e-003	2.3100e-003	9.0000e-005	2.4000e-003	0.0000	3.4763	3.4763	3.6000e-004	0.0000	3.4838

**Riverfront - Partial Construction
Sonoma-San Francisco County, Annual**

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	60.00	1000sqft	2.10	60,000.00	0
Condo/Townhouse	33.00	Dwelling Unit	2.60	33,000.00	94
Hotel	120.00	Room	0.64	174,240.00	0
Strip Mall	30.00	1000sqft	0.18	30,000.00	0
Apartments Low Rise	100.00	Dwelling Unit	1.00	100,000.00	286
Apartments Mid Rise	6.00	Dwelling Unit	0.10	6,000.00	17
City Park	6.20	Acre	6.21	270,072.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	75
Climate Zone	4			Operational Year	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	289	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Using PG&E Rate for 2020 based on CPUC Calculator

Land Use - Land use type and size based on project description

Construction Phase - Construction based on CalEEMod default, but extended out 2 years. No Demolition, site preparation or grading

Off-road Equipment - Crane would operate 50% of the days

Off-road Equipment - Added forklift

Vehicle Trips -

Woodstoves - No wood burning. No woodstoves and wood fireplaces assumed to be natural gas fired

Construction Off-road Equipment Mitigation - Tier 2 and BMPs - Alternatively fuel generators

Off-road Equipment -

Trips and VMT - Set extra phases that model erroneously added to 0. Trip length set to 0.3 mi for TAC analysis

Off-road Equipment -

On-road Fugitive Dust - Fix error in model - repeated phases

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	20.00	220.00
tblConstructionPhase	PhaseEndDate	12/1/2017	12/28/2017
tblConstructionPhase	PhaseEndDate	3/23/2017	1/27/2017
tblConstructionPhase	PhaseStartDate	1/28/2017	2/24/2017

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tblConstructionPhase	PhaseStartDate	2/24/2017	1/1/2017
tblLandUse	LotAcreage	1.38	2.10
tblLandUse	LotAcreage	2.06	2.60
tblLandUse	LotAcreage	4.00	0.64
tblLandUse	LotAcreage	0.69	0.18
tblLandUse	LotAcreage	6.25	1.00
tblLandUse	LotAcreage	0.16	0.10
tblLandUse	LotAcreage	6.20	6.21
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	UsageHours	7.00	3.50
tblOnRoadDust	HaulingPercentPave	100.00	0.00
tblOnRoadDust	HaulingPercentPave	100.00	0.00
tblOnRoadDust	HaulingPercentPave	100.00	0.00
tblOnRoadDust	HaulingPercentPave	100.00	0.00
tblOnRoadDust	VendorPercentPave	100.00	0.00
tblOnRoadDust	VendorPercentPave	100.00	0.00
tblOnRoadDust	VendorPercentPave	100.00	0.00
tblOnRoadDust	VendorPercentPave	100.00	0.00
tblOnRoadDust	WorkerPercentPave	100.00	0.00
tblOnRoadDust	WorkerPercentPave	100.00	0.00
tblOnRoadDust	WorkerPercentPave	100.00	0.00
tblOnRoadDust	WorkerPercentPave	100.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	289
tblProjectCharacteristics	OperationalYear	2014	2020
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30

tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripNumber	63.00	0.00
tblTripsAndVMT	WorkerTripNumber	63.00	0.00
tblTripsAndVMT	WorkerTripNumber	63.00	0.00
tblTripsAndVMT	WorkerTripNumber	63.00	0.00

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					
2016	0.6506	3.5734	4.4905	3.7800e-003	0.0132	0.2368	0.2500	3.6700e-003	0.2229	0.2266	0.0000	333.9062	333.9062	0.0717	0.0000	335.4128
2017	3.9489	1.1453	1.1906	1.3200e-003	9.7280	0.0792	9.8072	0.9713	0.0751	1.0463	0.0000	116.3503	116.3503	0.0249	0.0000	116.8722
Total	4.5995	4.7187	5.6810	5.1000e-003	9.7412	0.3160	10.0572	0.9750	0.2979	1.2729	0.0000	450.2564	450.2564	0.0966	0.0000	452.2850

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.3547	2.7510	4.3991	3.7800e-003	0.0132	0.0805	0.0936	3.6700e-003	0.0803	0.0840	0.0000	333.9058	333.9058	0.0717	0.0000	335.4125

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2017	3.8542	0.8896	1.1908	1.3200e-003	1.1944	0.0257	1.2201	0.1196	0.0256	0.1453	0.0000	116.3501	116.3501	0.0249	0.0000	116.8721
Total	4.2089	3.6406	5.5899	5.1000e-003	1.2076	0.1061	1.3137	0.1233	0.1059	0.2292	0.0000	450.2560	450.2560	0.0966	0.0000	452.2845

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	8.49	22.85	1.60	0.00	87.60	66.41	86.94	87.35	64.45	81.99	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	1/1/2016	2/23/2017	5	300	
2	Paving	Paving	1/1/2017	1/27/2017	5	20	
3	Interior building construction	Architectural Coating	12/24/2017	12/28/2017	5	220	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 281,475; Residential Outdoor: 93,825; Non-Residential Indoor: 801,468; Non-Residential Outdoor: 267,156

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Interior building construction	Air Compressors	1	6.00	78	0.48
Interior building construction	Forklifts	1	8.00	89	0.20
Building Construction	Cranes	1	3.50	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	125	0.42

Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

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
Interior building construction	2	63.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Interior building construction	2	0.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	315.00	102.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

- Use Cleaner Engines for Construction Equipment
- Use Soil Stabilizer
- Replace Ground Cover
- Water Exposed Area
- Reduce Vehicle Speed on Unpaved Roads
- Clean Paved Roads

3.2 Building Construction - 2016

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
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Category	tons/yr										MT/yr					
	0.4034	3.2330	2.2447	3.1800e-003		0.2346	0.2346		0.2209	0.2209	0.0000	285.6467	285.6467	0.0692	0.0000	287.1002
Off-Road	0.4034	3.2330	2.2447	3.1800e-003		0.2346	0.2346		0.2209	0.2209	0.0000	285.6467	285.6467	0.0692	0.0000	287.1002
Total	0.4034	3.2330	2.2447	3.1800e-003		0.2346	0.2346		0.2209	0.2209	0.0000	285.6467	285.6467	0.0692	0.0000	287.1002

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	0.1298	0.3108	1.8231	3.8000e-004	3.8000e-003	1.7600e-003	5.5600e-003	1.1200e-003	1.6000e-003	2.7200e-003	0.0000	31.8142	31.8142	5.1000e-004	0.0000	31.8249
Worker	0.1175	0.0296	0.4226	2.2000e-004	9.3600e-003	4.4000e-004	9.8000e-003	2.5400e-003	4.0000e-004	2.9500e-003	0.0000	16.4453	16.4453	2.0200e-003	0.0000	16.4877
Total	0.2472	0.3404	2.2458	6.0000e-004	0.0132	2.2000e-003	0.0154	3.6600e-003	2.0000e-003	5.6700e-003	0.0000	48.2595	48.2595	2.5300e-003	0.0000	48.3126

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1075	2.4106	2.1533	3.1800e-003		0.0783	0.0783		0.0783	0.0783	0.0000	285.6463	285.6463	0.0692	0.0000	287.0999
Total	0.1075	2.4106	2.1533	3.1800e-003		0.0783	0.0783		0.0783	0.0783	0.0000	285.6463	285.6463	0.0692	0.0000	287.0999

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1298	0.3108	1.8231	3.8000e-004	3.8000e-003	1.7600e-003	5.5600e-003	1.1200e-003	1.6000e-003	2.7200e-003	0.0000	31.8142	31.8142	5.1000e-004	0.0000	31.8249
Worker	0.1175	0.0296	0.4226	2.2000e-004	9.3600e-003	4.4000e-004	9.8000e-003	2.5400e-003	4.0000e-004	2.9500e-003	0.0000	16.4453	16.4453	2.0200e-003	0.0000	16.4877
Total	0.2472	0.3404	2.2458	6.0000e-004	0.0132	2.2000e-003	0.0154	3.6600e-003	2.0000e-003	5.6700e-003	0.0000	48.2595	48.2595	2.5300e-003	0.0000	48.3126

3.2 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0550	0.4493	0.3300	4.7000e-004		0.0318	0.0318		0.0299	0.0299	0.0000	42.2309	42.2309	0.0101	0.0000	42.4436
Total	0.0550	0.4493	0.3300	4.7000e-004		0.0318	0.0318		0.0299	0.0299	0.0000	42.2309	42.2309	0.0101	0.0000	42.4436

Unmitigated Construction Off-Site

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	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	0.0160	0.0434	0.2489	6.0000e-005	5.7000e-004	2.2000e-004	7.9000e-004	1.7000e-004	2.0000e-004	3.7000e-004	0.0000	4.6591	4.6591	8.0000e-005	0.0000	4.6607
Worker	0.0160	3.9100e-003	0.0564	3.0000e-005	1.4000e-003	6.0000e-005	1.4600e-003	3.8000e-004	6.0000e-005	4.4000e-004	0.0000	2.3638	2.3638	2.6000e-004	0.0000	2.3693
Total	0.0320	0.0473	0.3054	9.0000e-005	1.9700e-003	2.8000e-004	2.2500e-003	5.5000e-004	2.6000e-004	8.1000e-004	0.0000	7.0229	7.0229	3.4000e-004	0.0000	7.0300

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0161	0.3602	0.3218	4.7000e-004		0.0117	0.0117		0.0117	0.0117	0.0000	42.2309	42.2309	0.0101	0.0000	42.4435
Total	0.0161	0.3602	0.3218	4.7000e-004		0.0117	0.0117		0.0117	0.0117	0.0000	42.2309	42.2309	0.0101	0.0000	42.4435

Mitigated Construction Off-Site

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

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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	0.0160	0.0434	0.2489	6.0000e-005	5.7000e-004	2.2000e-004	7.9000e-004	1.7000e-004	2.0000e-004	3.7000e-004	0.0000	4.6591	4.6591	8.0000e-005	0.0000	4.6607
Worker	0.0160	3.9100e-003	0.0564	3.0000e-005	1.4000e-003	6.0000e-005	1.4600e-003	3.8000e-004	6.0000e-005	4.4000e-004	0.0000	2.3638	2.3638	2.6000e-004	0.0000	2.3693
Total	0.0320	0.0473	0.3054	9.0000e-005	1.9700e-003	2.8000e-004	2.2500e-003	5.5000e-004	2.6000e-004	8.1000e-004	0.0000	7.0229	7.0229	3.4000e-004	0.0000	7.0300

3.3 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	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8266
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8266

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	3.9000e-004	1.0000e-004	1.3800e-003	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0577	0.0577	1.0000e-005	0.0000	0.0579
Total	3.9000e-004	1.0000e-004	1.3800e-003	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0577	0.0577	1.0000e-005	0.0000	0.0579

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.1200e-003	0.1970	0.1693	2.2000e-004		6.5400e-003	6.5400e-003		6.5400e-003	6.5400e-003	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8265
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	9.1200e-003	0.1970	0.1693	2.2000e-004		6.5400e-003	6.5400e-003		6.5400e-003	6.5400e-003	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8265

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.9000e-004	1.0000e-004	1.3800e-003	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0577	0.0577	1.0000e-005	0.0000	0.0579
Total	3.9000e-004	1.0000e-004	1.3800e-003	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0577	0.0577	1.0000e-005	0.0000	0.0579

3.4 Interior building construction - 2017

Unmitigated Construction On-Site

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Off-Road	0.0139	0.2806	0.3293	4.9000e-004		7.0700e-003	7.0700e-003		7.0700e-003	7.0700e-003	0.0000	43.6785	43.6785	7.7400e-003	0.0000	43.8411
Total	3.7785	0.2806	0.3293	4.9000e-004		7.0700e-003	7.0700e-003		7.0700e-003	7.0700e-003	0.0000	43.6785	43.6785	7.7400e-003	0.0000	43.8411

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0181	4.4200e-003	0.0637	4.0000e-005	1.1924	7.0000e-005	1.1925	0.1191	7.0000e-005	0.1192	0.0000	2.6668	2.6668	3.0000e-004	0.0000	2.6731
Total	0.0181	4.4200e-003	0.0637	4.0000e-005	1.1924	7.0000e-005	1.1925	0.1191	7.0000e-005	0.1192	0.0000	2.6668	2.6668	3.0000e-004	0.0000	2.6731

Riverfront - Petaluma, CA - Construction Health impacts Summary

Maximum Impacts at Off-Site Residential Receptors

Construction Year	UNMITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index (-)	Maximum Annual PM2.5 Concentration (µg/m ³)
	Exhaust PM2.5/DPM (µg/m ³)	Fugitive PM2.5 (µg/m ³)	Child	Adult		
	2014	0.0277	0.0214	2.4	0.1	0.006
2015	0.0190	0.0003	1.7	0.1	0.004	0.019
2016	0.0191	0.0003	0.8	0.1	0.004	0.019
2017	0.0125	0.0003	0.3	0.1	0.003	0.013
Total	-	-	5.3	0.4	-	-
Maximum Annual	0.0277	0.0214	-	-	0.006	0.049

Maximum Impacts at On-Site Residential Receptors

Construction Year	UNMITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index (-)	Maximum Annual PM2.5 Concentration (µg/m ³)
	Exhaust PM2.5/DPM (µg/m ³)	Fugitive PM2.5 (µg/m ³)	Child	Adult		
	2016	0.2240	0.0051	19.6	1.0	0.045
2017	0.0755	0.0051	6.6	0.3	0.015	0.081
Total	-	-	26.2	1.4	-	-
Maximum Annual	0.2240	0.0051	-	-	0.045	0.229

Construction Year	MITIGATED (Tier 2 & Tier 4 Equipment)					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index (-)	Maximum Annual PM2.5 Concentration (µg/m ³)
	Exhaust PM2.5/DPM (µg/m ³)	Fugitive PM2.5 (µg/m ³)	Child	Adult		
	2016	0.0805	0.0051	7.0	0.4	0.016
2017	0.0257	0.0051	2.2	0.1	0.005	0.031
Total	-	-	9.3	0.5	-	-
Maximum Annual	0.0805	0.0051	-	-	0.016	0.086

**Riverfront - Petaluma, CA - Without Mitigation
DPM Construction Emissions and Modeling Emission Rates**

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions			Modeled Area (m ²)	DPM Emission Rate (g/s/m ²)
				(lb/yr)	(lb/hr)	(g/s)		
2014	Construction	0.3535	CON_DPM	707.0	0.21522	2.71E-02	153,204	1.77E-07
2015	Construction	0.2415	CON_DPM	483.0	0.14703	1.85E-02	153,204	1.21E-07
2016	Construction	0.2441	CON_DPM	488.2	0.14861	1.87E-02	153,204	1.22E-07
2017	Construction	0.1595	CON_DPM	319.0	0.09711	1.22E-02	153,204	7.99E-08
2018	Construction	0.0343	CON_DPM	68.6	0.02088	2.63E-03	153,204	1.72E-08
Total		1.0329		2066	0.6289	0.0792		

Notes:

Emissions assumed to be evenly distributed over each construction areas

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

**Riverfront - Petaluma, CA - Without Mitigation
PM2.5 Fugitive Dust Construction Emissions for Modeling**

Construction Year	Activity	Area Source	Area (ton/year)	PM2.5 Emissions			Modeled Area (m ²)	DPM Emission Rate g/s/m ²
				(lb/yr)	(lb/hr)	(g/s)		
2014	Construction	CON_FUG	0.2689	537.8	0.16371	2.06E-02	153,204	1.35E-07
2015	Construction	CON_FUG	0.0042	8.5	0.00258	3.24E-04	153,204	2.12E-09
2016	Construction	CON_FUG	0.0042	8.5	0.00258	3.25E-04	153,204	2.12E-09
2017	Construction	CON_FUG	0.0037	7.4	0.00226	2.85E-04	153,204	1.86E-09
2018	Construction	CON_FUG	0.0023	4.6	0.00141	1.77E-04	153,204	1.16E-09
Total				566.8	0.1725	0.0217		

Notes:

Emissions assumed to be evenly distributed over each construction areas

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

**Riverfront - Petaluma, CA - Mixed-Use Construction Without Mitigation
DPM Construction Emissions and Modeling Emission Rates**

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions			Modeled Area (m ²)	DPM Emission Rate (g/s/m ²)
				(lb/yr)	(lb/hr)	(g/s)		
2016	Construction	0.2229	CON_DPM	445.8	0.13571	1.71E-02	47,620	3.59E-07
2017	Construction	0.0751	CON_DPM	150.2	0.04572	5.76E-03	47,620	1.21E-07
Total		0.2980		596	0.1814	0.0229		

Notes:

Emissions assumed to be evenly distributed over each construction areas

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

**Riverfront - Petaluma, CA - Mixed-Use Construction Without Mitigation
PM2.5 Fugitive Dust Construction Emissions for Modeling**

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	PM2.5 Emissions			Modeled Area (m ²)	DPM Emission Rate g/s/m ²
				(lb/yr)	(lb/hr)	(g/s)		
2016	Construction	CON_FUG	0.0037	7.3	0.00223	2.82E-04	47,620	5.91E-09
2017	Construction	CON_FUG	0.0037	7.3	0.00223	2.82E-04	47,620	5.91E-09
Total				15	0.0045	0.0006		

Notes:

Emissions assumed to be evenly distributed over each construction areas

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

**Riverfront - Petaluma, CA - Mixed-Use Construction With Mitigation (Tier 2 + Tier 4)
DPM Construction Emissions and Modeling Emission Rates**

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions			Modeled Area (m ²)	DPM Emission Rate (g/s/m ²)
				(lb/yr)	(lb/hr)	(g/s)		
2016	Construction	0.0803	CON_DPM	160.6	0.04889	6.16E-03	47,620	1.29E-07
2017	Construction	0.0256	CON_DPM	51.2	0.01559	1.96E-03	47,620	4.12E-08
Total		0.1059		212	0.0645	0.0081		

Notes:

Emissions assumed to be evenly distributed over each construction areas

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

**Riverfront - Petaluma, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.5 meters**

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

Where: CPF = Cancer potency factor (mg/kg-day)⁻¹

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

Where: C_{air} = concentration in air (µg/m³)

DBR = daily breathing rate (L/kg body weight-day)

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

AT = Averaging time period over which exposure is averaged.

10⁻⁶ = Conversion factor

Values

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

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information			Child Cancer Risk (per million)	Adult - Exposure Information			Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
		DPM Conc (µg/m ³)		Adjust Factor		Modeled		Adjust Factor			
		Year	Annual			Year	Annual				
1	1	2014	0.0277	10	2.43	2014	0.0277	1	0.13	0.0214	0.049
2	1	2015	0.0190	10	1.66	2015	0.0190	1	0.09	0.0003	0.019
3	1	2016	0.0191	4.75	0.79	2016	0.0191	1	0.09	0.0003	0.019
4	1	2017	0.0125	3	0.33	2017	0.0125	1	0.06	0.0003	0.013
5	1	2018	0.0027	3	0.07	2018	0.0027	1	0.01	0.0002	0.003
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					5.28				0.37		

**Riverfront - Petaluma, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
On-Site Residential Receptor Locations - 1.5 meters**

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

Where: CPF = Cancer potency factor (mg/kg-day)⁻¹

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

Where: C_{air} = concentration in air (µg/m³)

DBR = daily breathing rate (L/kg body weight-day)

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

AT = Averaging time period over which exposure is averaged.

10⁻⁶ = Conversion factor

Values

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

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information			Child Cancer Risk (per million)	Adult - Exposure Information			Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
		DPM Conc (ug/m3)		Exposure Adjust Factor		Modeled		Exposure Adjust Factor			
		Year	Annual			Year	Annual				
		Year	Annual	Year		Annual	Year	Annual			
1	1	2016	0.2240	10	19.61	2016	0.2240	1	1.02	0.0051	0.229
2	1	2017	0.0755	10	6.61	2017	0.0755	1	0.34	0.0051	0.081
3	1		0.0000		0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					26.22				1.36		

**Riverfront - Petaluma, CA - Construction Impacts - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
On-Site Residential Receptor Locations - 1.5 meters**

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

Where: CPF = Cancer potency factor (mg/kg-day)⁻¹

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

Where: C_{air} = concentration in air (µg/m³)

DBR = daily breathing rate (L/kg body weight-day)

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

AT = Averaging time period over which exposure is averaged.

10⁻⁶ = Conversion factor

Values

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

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information			Child Cancer Risk (per million)	Adult - Exposure Information			Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
		DPM Conc (ug/m3)		Exposure Adjust Factor		Modeled		Exposure Adjust Factor			
		Year	Annual			Year	Annual				
		Year	Annual	Factor		Year	Annual	Factor			
1	1	2016	0.0805	10	7.05	2016	0.0805	1	0.37	0.0051	0.086
2	1	2017	0.0257	10	2.25	2017	0.0257	1	0.12	0.0051	0.031
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.00004	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					9.30				0.48		