BARRETT RANCH EAST PROJECT

Air Quality Technical Report

Prepared for
Barrett Winn, LLC &
Antelope RBVP, LP

November 2014

BARRETT RANCH EAST PROJECT

Air Quality Technical Report

Prepared for
Barrett Winn, LLC &
Antelope RBVP, LP

November 2014

2600 Capitol Avenue
Sacramento, California 95816
916-231-1266

www.esassoc.com
Oakland
Orlando
Palm Springs
Petaluma
Portland
Sacramento
San Diego
Santa Cruz
San Francisco
Seattle
Tampa
Woodland Hills

Table of Contents

Figures and Tables

Introduction

This air quality technical report has been prepared to evaluate the potential air quality impacts of the Barrett Ranch East Project (Project) located in the northeastern portion of Sacramento County, California. This report describes the existing air quality in the Project area and evaluates potential short- and long-term air quality impacts associated with the Project. The report describes the Project's criteria pollutant, toxic air contaminant (TAC), and greenhouse gas (GHG) impacts. Measures to mitigate or minimize pollutant emissions associated with the proposed Project are included, where applicable.

Project Description

The Project consists of an approximately 128-acre site that would include 495 single-family detached residential units, 196 multi-family homes, a shopping center and parks. Figure 1 shows the general Project location in Sacramento County, while Figure 2 shows the specific Project location.

Environmental Setting

Climate and Topography

The Project site is located in northern Sacramento County within the Sacramento Valley Air Basin (SVAB). The SVAB includes Sacramento County and all or portions of ten other counties including Placer, Shasta, Tehama, Colusa, Yolo, Solano, Butte, Yuba, Sutter, and Glenn.

The SVAB is surrounded by the Coast Range to the west, the Cascade Range to the north, and Sierra Nevada mountains to the east. The winters are wet and cool and the summers are hot and dry.

Air pollution can be transported into the basin, but on smoggy days, air pollution emissions from within the basin are the most significant. The southern portions of the SVAB receive air pollution inflow, transported from the Bay Area or San Joaquin Valley air basins. On many summer days, a "delta breeze" blows toward Sacramento from the ocean through the Carquinez Strait. These winds can transport air pollution from the Bay Area to the SVAB.

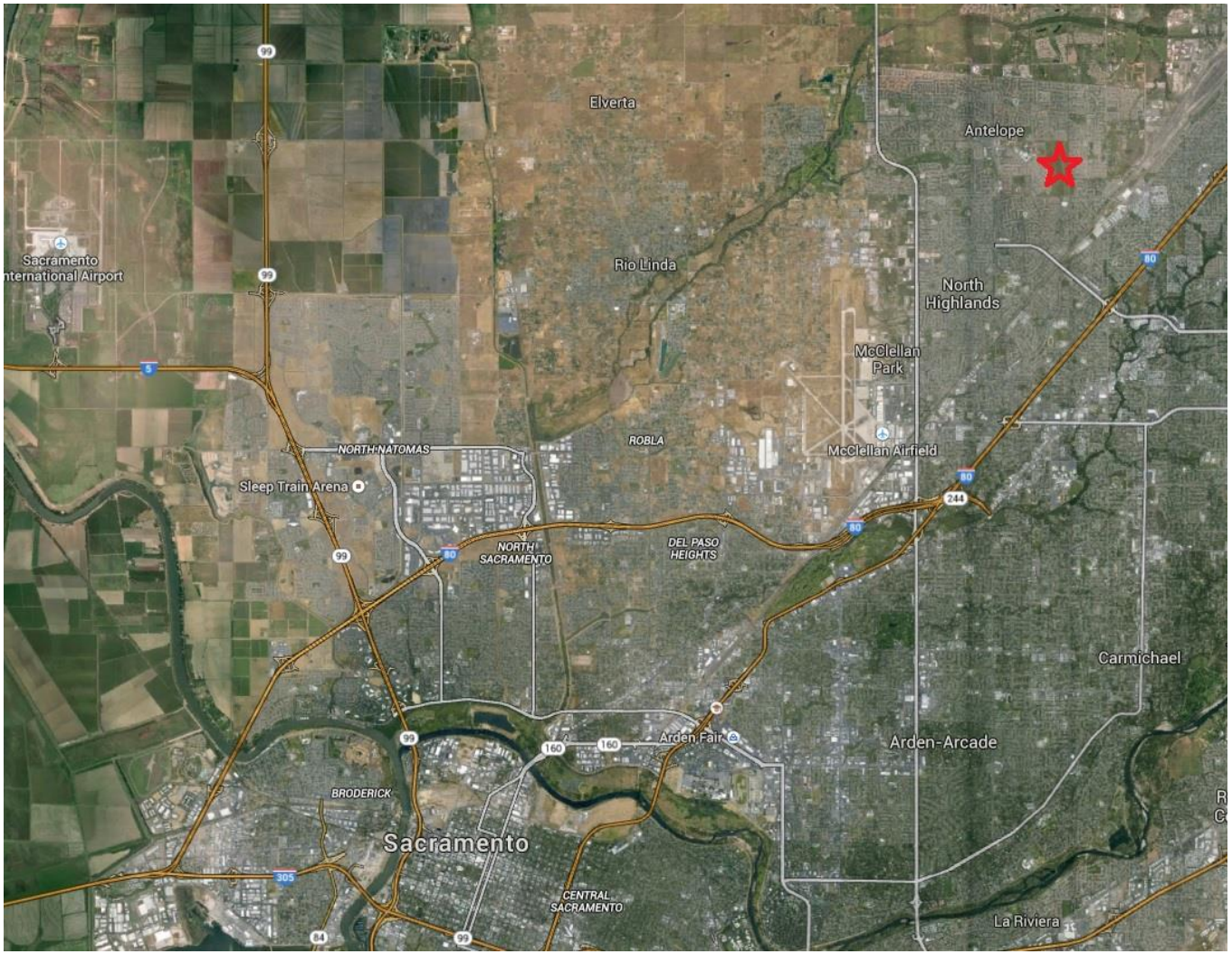


Figure 1. General Location of Barrett Ranch East Project

Figure 2. Specific Location of Barrett Ranch East Project

The delta breeze blows Sacramento's air pollution toward the north end of the Sacramento Valley and east into the Sierra Nevada foothills. On days when wind blows from the north, Sacramento air pollution can be transported to the south into the San Joaquin Valley Air Basin.

Federal and State Ambient Air Quality Standards

Ambient air quality is affected by pollutants emitted from stationary and mobile sources. Stationary sources are often divided into point and area sources. Point sources consist of one or more emission sources at a facility with an identified location and are usually associated with manufacturing and industrial processing plants. Area sources are widely distributed and consist of many small emission sources. Area source examples include lawnmowers and other landscape maintenance equipment, natural gas fired water and space heaters, and consumer products such as paints, hairspray, deodorant, and similar products with evaporative emissions. Mobile sources refer to emissions from motor vehicles, including tailpipe, evaporative, and fugitive emissions.

Air pollutants emitted by stationary and mobile sources are regulated by federal and state law. These regulated pollutants are known as "criteria air pollutants", and are emitted as primary and secondary pollutants.

Primary criteria air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and most forms of particulate matter (PM_{10} and $PM_{2.5}$) are primary air pollutants. Secondary criteria air pollutants are those formed by chemical and photochemical reactions in the atmosphere. Ozone and nitrogen dioxide are the principal secondary pollutants.

The U.S. Environmental Protection Agency has developed National Ambient Air Quality Standards (NAAQS) for the criteria air pollutants. At the state level, the California Air Resources Board has developed California Ambient Air Quality Standards (CAAQS). Table 1 shows the NAAQS and CAAQS. Areas that do not meet the NAAQS and/or CAAQS are classified as nonattainment areas.

Table 1. State and National Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour 8 hours	0.09 ppm 0.07 ppm	--- 0.075 ppm	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when ROG and NO_X react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
Carbon Monoxide (CO)	1 hour 8 hours	20 ppm 9.0 ppm	35 ppm 9 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
Nitrogen Dioxide (NO_2)	1 hour Annual Arithmetic Mean	0.18 ppm 0.030 ppm	0.100 ppm 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
Sulfur Dioxide (SO_2)	1 hour 3 hours 24 hours Annual Arithmetic Mean	0.25 ppm --- 0.04 ppm ---	75 ppb 0.50 ppm 0.14 ppm 0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Respirable Particulate Matter (PM_{10})	24 hours Annual Arithmetic Mean	50 µg/m^3 20 µg/m^3	150 µg/m^3 ---	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
Fine Particulate Matter ($PM_{2.5}$)	24 hours Annual Arithmetic Mean	--- 12 µg/m^3	35 µg/m^3 12.0 µg/m^3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
Lead (Pb)	30 Day Average Calendar Quarter Rolling 3-Month Average	1.5 µg/m^3 --- ---	--- 1.5 µg/m^3 0.15 µg/m^3	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction (in severe cases).	*Present source:* lead smelters, battery manufacturing and recycling facilities. Past source: combustion of leaded gasoline.
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations)	Geothermal power plants, petroleum production and refining
Sulfates (SO_4)	24 hour	25 µg/m^3	No National Standard	Decrease in ventilatory functions; aggravation of asthmatic symptoms; aggravation of cardio-pulmonary disease; vegetation damage; degradation of visibility; property damage.	Industrial processes.
Visibility Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduced airport safety, lower real estate value, and discourages tourism.	See $PM_{2.5}$.

NOTE: ppm = parts per million; ppb = parts per billion; µg/m^3 = micrograms per cubic meter.

SOURCE: CARB, 2013a.

The SVAB is nonattainment for the federal and state ozone standards, the state PM_{10} standards, and the state and federal $PM_{2.5}$ standards. The Sacramento County portion of the SVAB is in attainment for the federal PM10 standards, and the state and federal CO standards (Table 2).

Table 2. State and National Ambient Air Quality Attainment Status for Sacramento County

Air Pollutant	Attainment Status – SVAB
Ozone (O_3)	Nonattainment for NAAQS 8–hour; nonattainment for CAAQS 1-hour and 8-hour
Carbon monoxide (CO)	Attainment/maintenance for federal standards; unclassified for state standards
Nitrogen dioxide (NO_2)	Attainment
Sulfur dioxide (SO_2)	Attainment
Particulate matter (PM_{10})	Attainment for NAAQS; nonattainment for CAAQS
Particulate matter ($PM_{2.5}$)	Nonattainment for NAAQS; nonattainment for CAAQS
Sulfates	Attainment
Lead (Pb)	Attainment
Hydrogen sulfide	Unclassified

Source: California Air Resources Board, 2014a.

Ozone

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials. Ozone is a severe eye, nose, and throat irritant. Ozone also attacks synthetic rubber, textiles, plants, and other materials; it causes extensive damage to plants, such as leaf discoloration and cell damage.

State standards for ozone have been set for a 1-hour averaging time. The state 1-hour ozone standard is 0.09 ppm, not to be exceeded. EPA recently replaced the 1-hour federal ozone standard with an 8-hour standard of 0.075 ppm, while ARB recently enacted a state 8-hour standard of 0.07 ppm.

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors, including reactive organic gases (ROGs) and oxides of nitrogen (NO_x), react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer pollution problem. ROG and NO_x are emitted by mobile sources, area sources, and stationary combustion equipment.

Table 3 shows monitoring results for the ozone monitoring station closest to the proposed Project. This station shows several violations of the state and federal ozone standards during the most recent three years of available monitoring data.

Table 3. Ozone Monitoring Results

Ozone (O_3)	2011	2012	2013
Highest 8-hour average, ppm	**0.078**	**0080**	**0.072**
Days > state 8-hour standard	2	7	2
Days > federal 8-hour standard	1	4	0
Percent of year covered	90	92	87

Underlined values represent those in excess of applicable NAAQS. **Bold values** represent those in excess of the applicable CAAQS. Monitoring results for Sacramento – Goldenland Court monitoring station
Source: California Air Resources Board 2014b.

Carbon Monoxide

CO is inert to plants and materials but can significantly affect human health. CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. Effects on humans range from slight headaches and nausea to death.

State and federal CO standards have been set for both 1- and 8-hour averaging times. The state 1-hour standard is 20 ppm, and the federal 1-hour standard is 35 ppm. Both the state and federal standards for the 8-hour averaging period are 9 ppm.

Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter when light winds combine with the formation of ground-level temperature inversions typically from evening through early morning. These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

The results from the last three years of CO monitoring are shown in Table 4. No violations of either the state or federal CO standards were recorded at this monitoring station during the most three recent years.

Table 4. Carbon Monoxide Monitoring Results

Carbon Monoxide (CO)	2011	2012	2013
Highest 1-hour average, ppm	1.9	1.9	1.9
Highest 8-hour average, ppm	1.6	1.6	1.7

Notes: Monitoring results for Sacramento - Goldenland Court monitoring station.
Source: U.S. Environmental Protection Agency, 2014.

Oxides of Nitrogen

NO_x contributes to smog and can injure plants and animals and affect human health. NO_x also contributes to acidic deposition and reacts with ROG in the presence of sunlight to form

photochemical smog. NO_x concentrations result in a brownish color because they absorb the blue-green area of the visible spectrum, greatly affecting visibility.

NO_x is emitted primarily by combustion sources, including both mobile and stationary sources. NO_x also is emitted by a variety of area sources, ranging from wildfires and prescribed fires to water-heating and space-heating systems powered by fossil fuels.

The state NO_x standard is 0.18 ppm for the 1-hour average and 0.03 ppm for the annual average. The federal NO_x standard is 0.053 ppm on an annual average and 0.100 ppm for the 1-hour average. No violations of the NOx standard were recorded in the SVAB during the three most recent years of available monitoring data.

PM_{10} and $PM_{2.5}$

Health concerns associated with suspended particulate matter (PM) focus on those particles small enough to reach the lungs when inhaled. PM can damage human health and retard plant growth, as well as reduce visibility, soil buildings and other structures, and corrode materials.

The state PM_{10} standards are 50 $\mu g/m^3$ as a 24-hour average and 20 $\mu g/m^3$ as an annual geometric mean. The federal PM_{10} standard is 150 $\mu g/m^3$ as a 24-hour average.

The federal $PM_{2.5}$ standards are 35 $\mu g/m^3$ as a 24-hour average and 12 $\mu g/m^3$ as an annual average. The state $PM_{2.5}$ standard equals 12 $\mu g/m^3$ on an annual average.

PM_{10} and $PM_{2.5}$ emissions are generated by a wide variety of sources, including agriculture, industrial activities, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere.

Table 5 shows the most recent three years of monitoring results for PM_{10} and $PM_{2.5}$ at the Del Paso Manor monitoring station. Violations of the PM_{10} and $PM_{2.5}$ air quality standards were recorded during 2011, 2012 and 2013.

Sulfur Dioxide

The major health concerns associated with inhalation of SO_2 include effects on breathing, respiratory illness, alterations in pulmonary defenses, and aggravation of existing cardiovascular disease. Children, the elderly, and people with asthma, cardiovascular disease, or chronic lung diseases—such as bronchitis or emphysema—are most susceptible to adverse health effects from exposure to SO_2. SO_2 is a precursor to sulfates, which are associated with acidification of lakes and streams, accelerated corrosion of buildings and monuments, reduced visibility, and other adverse health effects.

Table 5. Particulate Matter Monitoring Results

Particulate Matter (PM_{10})	**2011**	**2012**	**2013**
Highest 24-hour average, µg/m^3	**66.0**	43	**63.5**
Days > state standard[a]	2.0	0.0	4.0
Days > federal standard[a]	0.0	0.0	0.0
Percent of year covered	100	100	92
Particulate Matter ($PM_{2.5}$)	**2011**	**2012**	**2013**
Highest 24-hour average, µg/m^3	54.3	35.3	53.8
Days > federal standard[a]	9.5	0.0	13.0
Percent of year covered	95	100	93

Note: Underlined values represent those in excess of applicable NAAQS. **Bold values** represent those in excess of the applicable CAAQS. Based on Sacramento – Del Paso Manor monitoring station.
Source: California Air Resources Board, 2014b.
[a]Days over state or federal standards are estimated days.

EPA's health-based NAAQS for SO_2 is 0.03 ppm measured as an annual arithmetic mean concentration, 0.14 ppm measured over a 24-hour period, and 0.5 ppm measured over a 3-hour average period. California's SO_2 standard is 0.04 ppm measured over a 24-hour average period and 0.25 ppm measured over 1-hour.

SO_2 belongs to the family of gases called sulfur oxides (SO_x). These gases are formed when fuel containing sulfur (mainly coal and oil) is burned, and during metal smelting and other industrial processes. SO_x emissions are typically not a concern for land use development projects.

Toxic Air Contaminants

Concentrations of toxic air contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs), are also used as indicators of ambient air quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to The California Almanac of Emissions and Air Quality (CARB, 2009), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines (diesel PM or DPM). DPM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances.

Sensitive Receptors

Some receptors are considered more sensitive than others to air pollutants. The reasons for greater than average sensitivity include health problems, proximity to emission sources, or duration of

exposure to air pollutants. Sensitive receptors are typically defined as locations where human populations, especially children, seniors, or sick persons, are found, and there is reasonable expectation of continuous human exposure. Examples of land uses considered sensitive receptors are residences, hospitals, day cares, and schools.

The proposed Project outer boundary is surrounded by single-family residential homes. In addition to the single-family homes, other nearby sensitive receptors includes the Antelope Community Park, Antelope High School and Barrett Ranch Elementary School.

Greenhouse Gases and Climate Change

Global climate change results from greenhouse gas (GHG) emissions, which are caused by several activities, including combustion of fossil fuels, deforestation, and land use change.

GHGs play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface, which could have otherwise escaped to space. Prominent GHGs contributing to this process include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and certain refrigerants that include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs). This phenomenon, known as the "greenhouse effect", keeps the Earth's atmosphere near the surface warmer than it would be otherwise and allows for successful habitation by humans and other forms of life.

Global warming potential (GWP) is a measure of how much a given mass of GHG is estimated to contribute to global warming. A relative scale compares the gas in question to that of the same mass of carbon dioxide (whose GWP is by definition 1). In this analysis, CH_4 is assumed to have a GWP of 21 and N_2O has a GWP of 310. Refrigerants have GWP's that range from 76 up to 12,240. Consequently, using each pollutant's GWP, emissions of CO_2, CH_4, N_2O, CFCs, HCFCs, and HFCs can be converted into CO_2 equivalence, also denoted as CO_2e (California Climate Action Registry, 2009).

Fossil fuel combustion removes carbon stored underground and releases it into the active carbon cycle, thus increasing concentrations of GHGs in the atmosphere. Emissions of GHGs in excess of natural ambient concentrations are theorized to be responsible for the enhancement of the greenhouse effect and contribute to what is termed "global warming", a trend of unnatural warming of the Earth's natural climate. Increases in these gases lead to more absorption of radiation and warm the lower atmosphere further, thereby increasing evaporation rates and temperatures near the surface. Climate change is a global problem, and GHGs are global pollutants, unlike criteria pollutants (such as ozone, carbon monoxide, and particulate matter) and TACs, which are pollutants of regional and local concern.

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Programme. IPCC's mission is to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, including the potential impacts and options for adaptation and mitigation. IPCC predicts substantial increases in global temperatures of between 1.1 to 6.4 degrees Celsius, depending on the scenario (Intergovernmental Panel on Climate Change 2013).

Climate change could affect California's natural environment in the following ways (California Energy Commission 2012):

- Rising sea levels along the California coastline, particularly in San Francisco and the Sacramento-San Joaquin River Delta due to ocean expansion;
- Extreme heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent;
- An increase in heat-related human deaths and infectious diseases and a higher risk of respiratory problems caused by deteriorating air quality;
- Reduced snow pack and stream flow in the Sierra Nevada mountains, affecting winter recreation and water supplies;
- Potential increase in the severity of winter storms, affecting peak stream flows and flooding;
- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield; and
- Changes in distribution of plant and wildlife species due to changes in temperature, competition of colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects.

These changes in California's climate and ecosystems could occur at a time when California's population is expected to increase from 34 million to 59 million by the year 2040 (California Energy Commission 2012).

Air Quality Regulatory Setting

Federal

Federal air quality laws regulate air pollutants, primarily through industry-specific standards and planning requirements. The primary legislation that governs federal air quality regulations is the Clean Air Act Amendments of 1990. Federal air quality laws regulate criteria, toxic, and nuisance air pollutant emissions from industrial sources.

As mentioned earlier, criteria pollutants are substances for which the U.S. Environmental Protection Agency (EPA) has established the NAAQS. Noncriteria air pollutants, also known as toxic air contaminants (TACs), are airborne substances capable of causing adverse health effects as a result of short-term (acute) or long-term (chronic) exposure.

Nuisance pollutants are substances that can result in complaints from the population about adverse impacts on quality of life. The nuisance pollutants regulated by the air districts are odors and visible plumes (smoke).

State

Criteria Pollutants

The California Air Resources Board (ARB), which is part of the California Environmental Protection Agency (Cal-EPA), develops air quality regulations at the state level. The state regulations mirror federal regulations by establishing industry-specific pollution controls for criteria, toxic, and nuisance pollutants. California also requires areas to develop plans and strategies for attaining California ambient air quality standards (CAAQS) as set forth in the California Clean Air Act of 1988. As described above, California has developed ambient standards for the criteria pollutants equal to or more stringent than the federal standards.

Air Toxics

State requirements specifically address air toxics issues through Assembly Bill (AB) 1807 (known as the Tanner Bill), which established the state air toxics program, and AB 2588, the Air Toxics Hot Spots Information and Assessment Act. The Air Toxics Hot Spots Information and Assessment Act (AB 2588, 1987, Connelly) (Hot Spots Act) was enacted in September 1987. Under this bill, stationary sources of emissions are required to report the types and quantities of certain substances that their facilities routinely release into the air.

Local

At the local level, air quality is managed through land use and development planning practices. These practices are implemented through general planning processes.

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws. Specifically, the SMAQMD is responsible for monitoring air quality and planning, implementing, and enforcing programs designed to attain and maintain state and federal ambient air quality standards in the area. Programs developed include air quality rules and regulations that regulate stationary source emissions, including area and point sources and certain mobile source emissions.

The SMAQMD is also responsible for establishing permitting requirements and issuing permits for stationary sources and ensuring that new, modified, or relocated stationary sources do not create net emissions increases. The SMAQMD enforces air quality rules and regulations through a variety of means, including inspections, educational and training programs, and fines.

Climate Change and Greenhouse Gas Regulatory Setting

Several recent state-level actions have been taken to limit greenhouse gas (GHG) emissions implicated in global warming. Those actions are described below.

Executive Order S-3-05

On June 1, 2005, California Governor Arnold Schwarzenegger issued Executive Order S-3-05. It included the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80% below 1990 levels. To meet the targets, the governor directed several state agencies to cooperate in the development of a climate action plan. The secretary of Cal-EPA leads the Climate Action Team (CAT), whose goal is to implement global warming emission reduction programs identified in the climate action plan and to report on the progress made toward meeting the emission reduction targets established in the executive order.

California Global Warming Solutions Act (Assembly Bill 32)

In 2006, the California state legislature adopted the California Global Warming Solutions Act of 2006 (AB 32). AB 32 establishes a cap on statewide GHG emissions and sets forth the regulatory framework to achieve the corresponding reduction in statewide emission levels. Under AB 32, GHGs are defined as carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

AB 32 requires that ARB:

- adopt early action measures to reduce GHGs.;
- establish a statewide GHG emissions cap for 2020 based on 1990 emissions;
- adopt mandatory report rules for significant GHG sources;
- adopt a scoping plan indicating how emission reductions will be achieved via regulations, market mechanisms, and other actions; and
- adopt regulations needed to achieve the maximum technologically feasible and cost-effective reductions in GHGs.

California's Scoping Plan and GHG Emissions Cap

Pursuant to AB 32, the CARB adopted a *Climate Change Scoping Plan* in December 2008 (CARB, 2008) outlining measures to meet the 2020 GHG reduction goals. In order to meet these goals, California must reduce its GHG emissions by 30 percent below projected 2020 business-as-usual emissions levels or about 15 percent from today's levels. The Scoping Plan recommends measures that are worth studying further, and that the State of California may implement, such as new fuel regulations. It estimates that a reduction of 174 million metric tons of CO_2e (about 191 million U.S. tons) from the transportation, energy, agriculture, forestry, and other sources could be achieved should the state implement all of the measures in the Scoping Plan. The Scoping Plan relies on the requirements of Senate Bill (SB) 375 (discussed below) to implement the carbon emission reductions anticipated from land use decisions.

SB 375

This regulation, enacted in September 2008, is designed to control GHGs by limiting urban sprawl. It requires metropolitan planning organizations (MPOs) to include sustainable communities strategies (SCS), as defined, in their regional transportation plans (RTPs) for reducing greenhouse gas emissions. SB 375 also aligns planning for transportation and housing, and creates specified incentives for the implementation of the strategies.

Senate Bill 97

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under the California Environmental Quality Act (CEQA). The bill directs the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, by July 1, 2009. The Resources Agency certified those guidelines prior to January 1, 2010.

Actions Taken by the California Natural Resources Agency

On February 16, 2010, the Office of Administrative Law approved the GHG CEQA Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations.

On March 18, 2010, the Natural Resources Agency adopted the proposed CEQA Guideline amendments as proposed by OPR. The adopted CEQA Guideline amendments require lead agencies to:

- Calculate or estimate the amount of GHGs produced by a project using either a quantitative modeling approach or a qualitative approach that includes performance standards,
- Use one or more of several approaches to determine the significance of emissions, including the amount of the project's emissions increase over existing conditions, the level of emissions compared to a significance threshold, and/or whether the project complies with an existing statewide, regional, or local plan to mitigate GHG emissions.

Significance Thresholds

Project Specific Thresholds - Criteria Pollutants, Toxic Air Contaminants, and Odors

The SMAQMD regulates and oversees air quality within Sacramento County and has recommended the following thresholds to determine if a project will result in a significant impact to air quality (SMAQMD, 2013a):

- Conflict with or obstruct implementation of an applicable air quality plan;
- Result in short-term (construction) emissions of NOx above 85 pounds per day;
- Result in long-term (operational) emissions of NOx or ROG above 65 pounds per day;
- Result in PM10 concentrations equal to or greater than five percent of the state ambient air quality standard (i.e., 50 micrograms/cubic meter for 24 hours) in areas where there is evidence of existing or projected violations of this standard. Further, the SMAQMD holds that if project emissions of NOx and ROG are below the emission thresholds given above, then the project would not threaten violations of the PM_{10} ambient air quality standards;
- Result in CO concentrations that exceed the 1-hour state ambient air quality standard (i.e., 20.0 ppm) or the 8-hour state ambient standard (i.e., 9.0 ppm);
- Create objectionable odors affecting a substantial number of people;
- TAC exposures create a lifetime cancer risk exceeding 10 in 1 million for stationary sources, or substantially increase the lifetime cancer risk because of increased exposure to TACs from mobile sources.

GHGs are considered cumulative pollutants. Consequently, the threshold for GHGs is discussed below under cumulative thresholds.

Cumulative Thresholds - Criteria Pollutants

The SMAQMD's approach for cumulative impacts is that if a project's emissions would be less than the individual project thresholds of significance, then the project would not be expected to result in a cumulatively considerable contribution to significant cumulative impacts.

Cumulative Thresholds - Greenhouse Gases

Sacramento County has developed significance thresholds for GHG emissions. For residential energy, the threshold is 1.33 metric tons of CO_2e per year and for transportation, the threshold is 2.64 metric tons of CO_2e per capita (Inman, J., 2014). Although SMAQMD has recently developed GHG thresholds, this analysis uses Sacramento County's energy and transportation thresholds.

Approach and Methodology

Construction Emissions Methodology

The CalEEMod2013.2.2 model was used to estimate emissions resulting from construction of the Project. Construction of the Project will likely proceed in phases based on economic conditions. As a worst case for construction emissions, this analysis assumes that construction would begin in 2016 and to be completed by the end of 2019, with 2020 representing the first full year of Project

operation. Emissions were estimated for each year of construction. The CalEEMod model is recommended by the SMAQMD. A detailed list of the assumptions used to estimate construction emissions is included in Appendix A.

Toxic Air Contaminants

The California Air Resources Board has identified diesel particulate matter (DPM) as a TAC. DPM is generated during construction by on- and off-road construction vehicles. DPM is also generated in substantial quantities by high volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic.

Health risks from TACs are a function of the concentration of emissions and the duration of exposure. The primary source of TACs during construction is DPM from construction equipment exhaust. The evaluation of TACs from construction is conducted qualitatively due to the short-term nature of construction and the distance of construction from the closest sensitive receptors.

Operational Emissions Methodology

Criteria Pollutant Emissions

The Project would generate operational emissions of the criteria pollutants, including ozone precursors (ROG and NO_x), CO, PM_{10}, $PM_{2.5}$, and SO_x. SO_x emissions are typically a minor source of emissions and are not considered a concern with land use development projects. Therefore, SO_x emissions are not discussed further in this report.

On-road vehicle emissions generated by the Project were estimated using CalEEMod. Trip generation information was provided by the traffic consultant (Kimley-Horn and Associates, Inc. 2014). The CalEEMod model was also used to estimate area source emissions. Area sources include emissions associated with burning natural gas for space and water heating, gasoline combustion to operate landscape maintenance machinery, and evaporative emissions from the use of architectural coatings.

Toxic Air Contaminants

The Project would not be a generator of significant levels of TACs. The SMAQMD's *Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways* was used to evaluate whether the Proposed Project would expose residents to significant levels of TACs (SMAQMD, 2011).

Odors

Odor analyses typically evaluate the potential for a proposed project to generate odors and for the proposed project to be affected by odors from nearby sources of odors. The Project is not considered an odor source. Consequently, the focus of the odor analysis is on the potential for existing sources of odors to affect future residents.

Potential odor impacts were evaluated by examining the distances from existing and proposed odor sources (areas designated for industrial land uses) to the Project. The analysis also considers prevailing wind direction and policies designed to minimize odor impacts. Odor sources typically include industrial land uses, such as fiberglass manufacturing, coating operations, foundries, refineries, sewage treatment plants, landfills, and recycling facilities.

Greenhouse Gas Emissions Methodology

For this analysis, construction-related GHG emissions were estimated using the CalEEMod model. Although neither SMAQMD nor Sacramento County identify significance thresholds for construction GHGs, SMAQMD has identified mitigation measures that they recommend for construction activities. Measures that are applicable to this Project are specified in the GHG construction impact analysis.

Sacramento County has developed operational GHG thresholds and methodologies that were used in this analysis (Sacramento County, 2012). Sacramento County has residential project GHG thresholds for transportation emissions and for residential energy use. Sacramento County guidance requires that the comparison of project emissions to thresholds be conducted for 2020. Although the Project is not expected to be built out by 2020, emissions were estimated for 2020 assuming full buildout.

For transportation-related GHG emissions, project specific vehicle miles traveled (VMT) were provided by speed bin (Kimley-Horn Associates, Inc., 2014b). CO_2 vehicle emission rates for Sacramento County in 2020 were developed using the California Air Resources Board's EMFAC2011 model (California Air Resources Board, 2013b). Using the EMFAC2011 emission rates, individual rates were estimated by speed bin. Then, for each speed bin, VMT estimates were multiplied by the speed bin specific emission rates, and the results were converted to annual metric tons of CO_2. Finally, emissions were totaled for all speed bins to obtain total CO_2 emissions.

EMFAC2011 does not include emission rates for CH_4 or N_2O. Consequently, CH_4 emissions were estimated by taking the ratio of CH_4 to CO_2 estimated for vehicle emissions by CalEEMod, and that ratio was then multiplied by the EMFAC2011 estimated CO_2 to estimate CH_4 emissions. Emissions of N_2O were assumed negligible because CalEEMod does not show N_2O emissions for vehicles.

Total CO_{2e} emissions were estimated (assuming a global warming potential of 21 for CH_4), and the total CO_{2e} was divided by the Project's estimated population to obtain an emissions per capita value. The Project's total population was estimated at 1,805 using CalEEMod. The emissions per capita value was then compared to Sacramento County's emissions per capita threshold of 2.64.

For energy emissions, CaleeMod was used to estimate annual Project's 2020 residential and elementary school GHG emissions from electricity and natural gas consumption. This year represents the earliest year that buildout would occur. Actual buildout could take longer, depending on market conditions. SMUD's 2020 GHG emission factors in pounds per megawatt-hour were also entered into the model (E3, 2010). The Project's building energy use estimates were divided by the estimated Project population to obtain energy-related GHG emissions per

capita. This value was compared to Sacramento County's emissions per capita energy threshold to determine significance.

Project Impacts

Construction Impacts

Criteria Pollutant Emissions

Construction activities associated with the proposed Project would generate pollutant emissions from the following construction activities: (1) site preparation, (2) grading, (3) trenching, (4) internal road construction, (5) building construction; and 6) application of architectural coatings. These construction activities would temporarily create emissions of dust, fumes, equipment exhaust, and other air contaminants. The amount of emissions generated on a daily basis would vary, depending on the intensity and types of construction activities occurring simultaneously at the time. The Project will be constructed from 2016 through 2019. This four-year period represents a worst-case estimate from an emissions standard. Actual construction could take longer, depending on market conditions.

The maximum daily construction emissions for the proposed Project during each year of construction were estimated using CalEEMod, which is designed to model construction emissions for land use development projects. Project emissions of criteria air pollutants were modeled based on Project-specific information as well as model defaults. The modeled worst-case daily emissions of criteria air pollutants associated with the proposed Project's construction activities are summarized in Table 6 (refer to Appendix A for a detailed summary of the CalEEMod modeling assumptions, inputs, and outputs). The construction emissions estimates shown in Table 6 assume full build out of the Project's residences, shopping center and parks.

Table 6. Maximum Daily Construction Emissions (unmitigated)

	ROG (ppd)	NO_x (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)
Maximum Daily – 2016	7.3	75.8	94.6	13.6
Maximum Daily – 2017	6.5	38.9	94.3	11.9
Maximum Daily – 2018	5.6	34.5	94.0	11.6
Maximum Daily – 2019	337.1	31.2	93.8	11.4
Construction Significance Threshold	N/A	85	N/A	N/A
Exceed Construction Threshold?	No	No	No	No

Unmitigated emissions estimated using CalEEMod2013.2.2. Detailed CalEEMod results found in Appendix A.

As shown in Table 6, the maximum daily construction emissions generated by the proposed Project would not exceed SMAQMD's significance thresholds for NO_x in 2016 through 2019. **Thus, NO_x-related air quality impacts from construction are less than significant.**

In addition to the mass emission estimates shown in Table 6, Project construction would result in the daily disturbance of more than 15 acres per day. Total disturbance could consist of up to 75 acres per day, or 25% of total Project acreage. **This is a significant impact.**

Mitigation Measure Air – 1. Reduce Construction Emissions

The following mitigation measures are recommended by the SMAQMD to reduce construction emissions.

Mitigation Measures

Approval of any grading or improvement plans shall include the following SMAQMD Basic Construction Emission Control Practices, including:

- *Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and access roads.*
- *Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways shall be covered.*
- *Use wet power vacuum street sweepers to remove any visible trackout mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited.*
- *Limit vehicle speeds on unpaved roads to 15 miles per hour.*
- *All roadways, driveways, sidewalks, parking lots shall be paved as soon as possible. In addition, building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.*
- *Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, Section 2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site.*
- *Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment shall be checked by a certified mechanic and determine to be running in proper condition before it is operated.*

Approval of any grading or improvement plans shall include the following SMAQMD Enhanced Exhaust Control Practices, including:

- *Provide a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours during any portion of the Proposed Project to the City and the SMAQMD. The inventory shall include the horsepower rating, engine model year, and projected hours of use for each piece of equipment. The construction contractor shall provide the anticipated construction timeline including start date, and name and phone number of the project manager and on-site foreman. This information shall be submitted at least four business days prior to the use of subject heavy-duty off-road equipment. The inventory shall be updated and submitted monthly throughout the duration of the Proposed Project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs.*

- *Provide a plan in conjunction with the equipment inventory, approved by the SMAQMD, demonstrating that the heavy-duty (50 horsepower or more) off-road vehicles to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project wide fleet-average 20% NOx reduction and 45% particulate reduction compared to the most recent CARB fleet average[1]. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.*
- *Emissions from all off-road diesel powered equipment used on the Project site shall not exceed 40% opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately, and the City and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual survey results shall be submitted throughout the duration of the Project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this measure shall supercede other SMAQMD or state rules or regulations.*
- *If at the time of granting of each building permit, the SMAQMD has adopted a regulation applicable to construction emissions, compliance with the regulation may completely or partially replace this mitigation. Consultation with the SMAQMD prior to construction will be necessary to make this determination.*

Impact Significance After Mitigation: Onsite PM_{10} concentrations from construction were estimated using Project specific mitigated emissions from CalEEMod. Those emissions were used as inputs to the AERMOD dispersion model to estimate the Project's contribution to PM_{10} concentrations. The dispersion modeling found that the Project's worst-case daily PM_{10} emissions during site preparation and grading would result in a maximum concentration of 1.6 $\mu g/m^3$ at the maximally exposed receptor, which would not exceed SMAQMD's threshold of 2.5 $\mu g/m^3$ for the 24-hour average (five percent of the 50 $\mu g/m^3$ PM_{10} 24-hour standard). In addition, the dispersion modeling found that the Project's worst-case annual PM_{10} emissions would result in a maximum concentration of 0.25 $\mu g/m^3$ at the maximally exposed receptor, which would not exceed SMAQMD's threshold of 1.0 $\mu g/m^3$ for the annual average (five percent of the 20 $\mu g/m^3$ annual PM_{10} standard). These modeling results are based on emissions that have been mitigated as described in Mitigation Measure Air-1. Details of this modeling analysis, including modeling assumptions, are included in Appendix A. **With implementation of Mitigation Measure Air-1, PM10 impacts would be less than significant.**

Toxic Air Contaminant Emissions

Project construction would result in short-term emissions of DPM, which is a TAC. Off-road heavy-duty diesel equipment would emit diesel PM during site preparation (e.g., excavation and

[1] Although NOx emissions during construction are shown to be less than significant, changes in the construction schedule or equipment use could potentially result in higher levels of emissions than those estimated here. Therefore, the NOx mitigation recommended by SMAQMD has not been removed from this measure.

grading); paving; installation of utilities, materials transport and handling; building construction; and other miscellaneous activities. Construction hours are assumed to take place for eight hours a day, Monday through Friday for four years. No construction activities are expected to take place during the weekends and major holidays. Although construction is conservatively estimated to last four years, exposure of sensitive receptors to DPM would be for only brief periods when excavation and grading activities are being conducted near individual residents.

The Project would not result in significant construction-related health risks for the following reasons:

- the intermittent nature of construction activities,
- the relatively short-term construction period in any one location, and
- the Mitigation Measure Air-1 requirement that substantially reduces DPM emissions.

This is a less than significant impact.

Odors

Construction activities could generate odors associated with diesel equipment exhaust. However, such odors would be temporary, intermittent, and would not occur in the same location for more than a few days at a time. **This impact is less than significant.**

Operational Impacts

Criteria Pollutant Emissions

Implementation of the proposed Project would result in long-term regional emissions of criteria air pollutants associated with area sources, such as natural gas consumption, landscaping, in addition to operational mobile emissions. Operational emissions associated with the Project were modeled using CalEEMod and the results are presented in Table 7 **(**refer to Appendix A for a detailed summary of the CalEEMod modeling assumptions, inputs, and outputs). As shown in Table 7, implementation of the proposed Project would result in long-term regional emissions of ROG that exceeds SMAQMD's ROG significance threshold. **Therefore, the Project's operational emissions of ROG would result in a significant impact.**

Mitigation Measure Air-2: Implement Air Quality Mitigation Plan Measures

When operational emissions exceed significance thresholds, the SMAQMD recommends the development of an Air Quality Mitigation Plan (AQMP) to minimize emission impacts (SMAQMD, 2013b). The SMAQMD notes that an AQMP should focus on feasible mitigation. SMAQMD considers that all feasible mitigation has been implemented if the AQMP reduces ozone precursors below unmitigated levels by 15 percent for projects considered part of the State Implementation Plan (SIP) and by 35 percent for projects not considered part of the SIP. The

project is included as part of the SIP (Dubose, R., 2014). Therefore, the AQMP must demonstrate that the project can meet a 15 percent reduction.

Table 7. Daily Operational Emissions (pounds per day)

	Unmitigated			Mitigated		
	ROG	NOx	NO_xe	ROG	NOx	NO_xe
Operational: Maximum Event	75.4	58.3	83.4	68.1	31.8	54.5 (34.4% below unmitigated)
Operational Significance Threshold	65	65	N/A	65	65	(15% below unmitigated)
Exceed Operational Threshold?	Yes	No	N/A	Yes	No	No
NO_xe emissions equal total NOx plus 1/3 of ROG emissions.						

The AQMP is included as Appendix C. As shown in Table 7, the AQMP would reduce operational emissions of ROG and NOx. The mitigated measures include reductions in vehicle trips and vehicle miles traveled resulting from the Project's density, its proximity to adjacent land uses and job centers, and its transit, bicycle, and walkability characteristics. In addition, an energy efficiency measure was included that would reduce natural gas combustion emissions from the project's land uses:

- All buildings shall be constructed to exceed California Title 24 building energy standards by a minimum of 20%.

Impact Significance After Mitigation: Even with these mitigation measures, the Project's ROG emissions would exceed SMAQMD's significance threshold. However, as shown in the AQMP, the Project's NOxe emissions would be reduce by 34.3%. This reduction would exceed the SMAQMD's minimum emission reduction requirements of 15% for projects located in an area covered by the SIP. Details of this modeling analysis, including modeling assumptions, are included in Appendix C. The implementation of the AQMD would reduce NOxe emissions by more than 15%. Consequently, all feasible mitigation has been included. However, ROG emissions would still exceed the SMAQMD's significance threshold. **Therefore, this impact is significant.**

Project Operations – TACs

The Project would not include any new stationary source of TACs. In addition, there are no nearby sources of TACs that represent a health concern to future residents. The project would not locate any residences or other sensitive receptors within 500 feet of a roadway with traffic volumes exceeding 100,000 vehicles per day. Don Julio Boulevard would be the highest volume roadway adjacent to the project site. However, Don Julio Boulevard's average daily traffic volumes would not approach 100,000 vehicles per day (Kimley-Horn and Associates, Inc. 2014). Consequently, the Project would meet SMAQMD's roadway protocol guidance (SMAQMD, 2011). **This impact is less than significant**.

Objectionable Odors

The Project is not considered a source of objectionable odors. Although diesel emissions would be generated during construction, they would be short-term and would be located at a distance from sensitive receptors that they would not be detectable. During operation, the project would not generate objectionable odors.

In addition, Project residents would not be exposed to objectionable odors from nearby land uses. Land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. No significant generators of odor are located near the Project. Thus, the Project's residents would not be exposed to objectionable odors. **Impacts associated with objectionable odors would be less than significant.**

Cumulative Impacts

Criteria Air Pollutants, Toxic Air Contaminants, and Odors

A cumulative impact arises when two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant impacts, meaning that the Project's incremental effects must be viewed in connection with the effects of past, current, and probable future projects.

As described earlier, SMAQMD uses the project specific thresholds to assess whether a project would have a cumulatively significant contribution to air pollution. With construction Mitigation Measure Air-1, PM_{10} emissions during construction are less than significant with implementation of all feasible mitigation. **Consequently, the Project's construction activities would result in a less than significant cumulative criteria pollutant impact. Since the Project's operational emissions of criteria pollutants would be significant, the Project would result in a significant cumulative criteria pollutant impact.**

The Project would not have significant odor impacts during project construction or operation. **Therefore, the Project would not cause or contribute to significant cumulative odor impacts.** Similarly, the Project would not result in significant TAC impacts or health risks during Project construction or operation. **Therefore, the Project would not cause or contribute to significant cumulative health risk impacts.**

Greenhouse Gas Emissions

Construction GHG Emissions

Neither SMAQMD nor Sacramento County has established thresholds for construction GHG emissions (construction-related GHGs are summarized in Appendix B). However, SMAQMD has developed the following measures that should be considered to be best management practices (BMP) for reducing GHG emissions from construction projects. Those BMPs are as follows:

- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to no more than 3 minutes (5 minute limit is required by the state airborne toxics control measure [Title 13, sections 2449(d)(3) and 2485 of the California Code of Regulations]).
- Provide clear signage that posts this requirement for workers at the entrances to the site.
- Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.
- Train equipment operators in proper use of equipment.
- Use the proper size of equipment for the job.
- Use equipment with new technologies (repowered engines, electric drive trains).
- Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines).
- Use alternative fuels for generators at construction sites such as propane or solar, or use electrical power.
- Use an ARB approved low carbon fuel for construction equipment. (NOx emissions from the use of low carbon fuel must be reviewed and increases mitigated.)
- Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes.
- Reduce electricity use in the construction office by using compact fluorescent bulbs, powering off computers every day, and replacing heating and cooling units with more efficient ones.
- Recycle or salvage non-hazardous construction and demolition debris (goal of at least 75% by weight).
- Use locally sourced or recycled materials for construction materials (goal of at least 20% based on costs for building materials, and based on volume for roadway, parking lot, sidewalk and curb materials). Wood products utilized should be certified through a sustainable forestry program.
- Minimize the amount of concrete for paved surfaces or utilize a low carbon concrete option.
- Produce concrete on-site if determined to be less emissive than transporting ready mix.
- Use SmartWay certified trucks for deliveries and equipment transport.
- Develop a plan to use efficiently water for adequate dust control.

Operational GHG Emissions

Table 8 summarizes the Project's mitigated operational GHG emissions. With the exception of mobile sources, the emissions for each category were estimated using CalEEMod2013.2.2. Mobile source emissions were estimated using procedures recommended by Sacramento County as described above in the methodology section and in Appendix B.

Table 8. Operational GHG Emissions (metric tons per year, mitigated)

Category	CO_2	CH_4	N_2O	CO_2e
Area	11.6	0.0	0.0	11.9
Energy	2,123.0	0.1	0.0	2,133.1
Mobile	2,820.0	0.1	0.0	2,961.0
Waste	138.3	8.2	0.0	309.8
Water	129.6	0.1	0.0	144.1
Total	5,222.5	8.5	0.0	5,559.9

Notes:

CO_2e based on a global warming potential of 21 for CH_4 and 310 for N_2O. All emission estimates based on CalEEMod2013.2.2 results except for mobile source emissions. Mobile source emissions based on VMT estimates by speed bin (Weir, M. 2014) and vehicle emission rates generated using EMFAC2011. CalEEMod GHG output file included in the Appendix B.

Table 9 compares the Project's energy and mobile source emissions to Sacramento County's applicable thresholds. As Table 9 shows, the Project's GHG emissions would be less than the energy and mobile source significance thresholds established by Sacramento County. **Consequently, the Project's GHG emissions are less than significant.**

Table 9. Comparison of Operational Energy and Mobile Source GHG Emissions

Category	CO_2e	CO_2e/Capita	Threshold	Exceed Threshold?
Energy	2,133	1.15	1.33	No
Mobile	2,961	1.60	2.64	No

Notes: Project population estimated at 1,845 based on CalEEMod results.

References

California Air Resources Board (CARB). 2014a. *Area Designation Maps/State and National*. http://www.arb.ca.gov/desig/desig.htm. Last revised August 22, 2014. Accessed November 12, 2014.

California Air Resources Board (CARB). 2014b. *Aerometric Data Analysis and Management System*. Available: http://www.arb.ca.gov/adam/welcome.html Accessed: November 12, 2014.

California Air Resources Board (CARB). 2013a. *Ambient Air Quality Standards*. Last revised: June 4, 2013. Available: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed: November 12, 2014.

California Air Resources Board (CARB). 2013b. Mobile Source Emission Inventory – Current Methods and Data, EMFAC2011. Available: http://www.arb.ca.gov/msei/modeling.htm. Accessed: May 2, 2014.

California Air Resources Board (CARB). 2009. *The California Almanac of Emissions and Air Quality – 2009 Edition*. Available: http://www.arb.ca.gov/aqd/almanac/almanac09/almanac09.htm.

California Air Resources Board, 2008. Climate Change Scoping Plan. Adopted December 11, 2008, re-approved by the CARB on August 24, 2011. pp. ES-1 and 17.

California Climate Action Registry. 2009. General Reporting Protocol 3.1

California Energy Commission, 2012. Our Changing Climate, Vulnerability and Adaptation to the Increasing Risks from Climate Change in California.

Dubose, R, 2014. November 6, 2014, e-mail from Rachel Dubose, Sacramento Metropolitan Air Quality Management District to Tim Rimpo, ESA, regarding Barrett Ranch East's inclusion in the SIP.

E3 (Energy+Environmental Economics), 2010. Greenhouse Gas Calculator for the California Electricity Sector. Version: GHG Calculator v3b. CO_2 Allocations tab. Available: https://ethree.com/public_projects/cpuc2.php.

Intergovernmental Panel on Climate Change, 2013. Climate Change 2013: The Physical Science Basis.

Inman, J., 2014. March 19, 2014 e-mail from Joelle Inman, Associated Environmental Analysis, Sacramento County Department of Community Development – Planning and Environmental Review to Tim Rimpo, ESA, regarding Sacramento County's GHG thresholds.

Kimley-Horn and Associates, Inc. 2014. Traffic Impact Analysis, Barrett Ranch East, Sacramento County, California. Draft. October 14, 2014.

Sacramento County. 2012. Sacramento County Greenhouse Gas Thresholds: Guidance on Application.

Sacramento Metropolitan Air Quality Management District. 2013a. Guide to Air Quality Assessment in Sacramento County. December 2009. Revised September 2010, April 2011, May 2011, and April 2013.

Sacramento Metropolitan Air Quality Management District, 2013b. Recommended Guidance for Land Use Emission Reductions Version 3.0 (for Operational Emissions). July 2013

Sacramento Metropolitan Air Quality Management District, 2011. Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways. March 2011, version 2.4.

U.S. EPA. 2014. *AirData, Monitor Values Report.* Last Revised: October 8, 2014. Available: http://www.epa.gov/airdata/ad_rep_mon.html. Accessed: November 12, 2014.

Weir, M. September 25, 2014, e-mail from Matt Weir, Kimley-Horn to Tim Rimpo, ESA, regarding Barrett Ranch East VMT.

Appendix A – Criteria Pollutant Emissions

Table of Contents

Unmitigated CalEEMod Criteria Pollutant Daily Emission Estimates

Barrett Ranch East

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	27.20	1000sqft	0.62	27,200.00	0
City Park	7.80	Acre	7.80	339,768.00	0
Apartments Low Rise	196.00	Dwelling Unit	10.50	196,000.00	523
Single Family Housing	495.00	Dwelling Unit	95.50	891,000.00	1322
Regional Shopping Center	108.90	1000sqft	6.40	108,900.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2020
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Land use, unit amount and ot acreage infomation was provided by the Applicant.

Construction Phase - Assumed construction schedule

On-road Fugitive Dust - Percent paved road are based on the assumption that 0.09 miles will be unpaved.

Grading - Assumed a total of 5,000 CY of soil be removed from the site during construction.

Vehicle Trips -

Energy Use - Change default Ttle 24 Energy to incoprate 2013 Title 24 energy construction standards.

Construction Off-road Equipment Mitigation - Construction Off-road Equipment Mitigation - 75% reduction represents Enhanced Construction Emission Control

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	55	75
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	55	75
tblConstructionPhase	NumDays	220.00	59.00
tblConstructionPhase	NumDays	3,100.00	815.00
tblConstructionPhase	NumDays	310.00	83.00
tblConstructionPhase	NumDays	220.00	58.00
tblConstructionPhase	NumDays	120.00	31.00
tblConstructionPhase	PhaseEndDate	1/3/2020	12/31/2019
tblConstructionPhase	PhaseEndDate	2/12/2016	2/14/2016
tblEnergyUse	T24E	348.18	261.14
tblEnergyUse	T24E	3.98	2.99
tblEnergyUse	T24E	729.62	547.22
tblEnergyUse	T24NG	11,068.06	8,301.05
tblEnergyUse	T24NG	4.72	3.54
tblEnergyUse	T24NG	26,218.01	19,663.51

tblGrading	AcresOfGrading	207.50	128.00
tblGrading	AcresOfGrading	0.00	128.00
tblGrading	MaterialImported	0.00	2,500.00
tblGrading	MaterialImported	0.00	2,500.00
tblLandUse	LotAcreage	12.25	10.50
tblLandUse	LotAcreage	160.71	95.50
tblLandUse	LotAcreage	2.50	6.40
tblOnRoadDust	HaulingPercentPave	100.00	99.60
tblOnRoadDust	HaulingPercentPave	100.00	99.60
tblOnRoadDust	VendorPercentPave	100.00	98.60
tblOnRoadDust	WorkerPercentPave	100.00	99.10
tblOnRoadDust	WorkerPercentPave	100.00	99.10
tblOnRoadDust	WorkerPercentPave	100.00	99.10
tblProjectCharacteristics	OperationalYear	2014	2020

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					

2016	7.2786	75.8133	64.4410	0.1080	92.3658	3.5998	94.5617	10.8464	3.3118	13.5863	0.0000	9,903.8997	9,903.8997	1.9446	0.0000	9,944.7367
2017	6.5012	38.8547	59.2565	0.1079	92.3660	1.9773	94.3433	10.0152	1.8532	11.8684	0.0000	9,660.8346	9,660.8346	0.8520	0.0000	9,678.7255
2018	5.6133	34.4817	54.0656	0.1078	92.3658	1.6761	94.0419	10.0151	1.5721	11.5872	0.0000	9,426.1915	9,426.1915	0.8261	0.0000	9,443.5393
2019	337.0643	31.1878	51.0012	0.1075	92.3660	1.4550	93.8210	10.0152	1.3647	11.3799	0.0000	9,195.3890	9,195.3890	0.8032	0.0000	9,212.2564
Total	**356.4574**	**180.3375**	**228.7644**	**0.4313**	**369.4636**	**8.7082**	**376.7679**	**40.8918**	**8.1018**	**48.4218**	**0.0000**	**38,186.3148**	**38,186.3148**	**4.4259**	**0.0000**	**38,279.2578**

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	lb/day										lb/day					
2016	7.2786	75.8133	64.4410	0.1080	58.3827	3.5998	60.5786	6.6168	3.3118	8.6751	0.0000	9,903.8997	9,903.8997	1.9446	0.0000	9,944.7367
2017	6.5012	38.8547	59.2565	0.1079	58.3829	1.9773	60.3602	6.6169	1.8532	8.4700	0.0000	9,660.8346	9,660.8346	0.8520	0.0000	9,678.7255
2018	5.6133	34.4817	54.0656	0.1078	58.3827	1.6761	60.0589	6.6168	1.5721	8.1889	0.0000	9,426.1915	9,426.1915	0.8261	0.0000	9,443.5393
2019	337.0643	31.1878	51.0012	0.1075	58.3830	1.4550	59.8379	6.6169	1.3647	7.9816	0.0000	9,195.3890	9,195.3890	0.8032	0.0000	9,212.2564
Total	**356.4574**	**180.3375**	**228.7644**	**0.4313**	**233.5313**	**8.7082**	**240.8356**	**26.4673**	**8.1018**	**33.3156**	**0.0000**	**38,186.3148**	**38,186.3148**	**4.4259**	**0.0000**	**38,279.2578**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**36.79**	**0.00**	**36.08**	**35.27**	**0.00**	**31.20**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	40.6278	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146	0.0000	102.6812	102.6812	0.1002	0.0000	104.7849
Energy	0.4513	3.8643	1.6986	0.0246		0.3118	0.3118		0.3118	0.3118		4,923.1412	4,923.1412	0.0944	0.0903	4,953.1026
Mobile	34.3299	53.8082	297.4092	0.7672	50.8910	0.8429	51.7339	13.5953	0.7777	14.3729		58,217.4520	58,217.4520	2.0910		58,261.3621
Total	**75.4089**	**58.3342**	**356.3205**	**0.7949**	**50.8910**	**1.4693**	**52.3603**	**13.5953**	**1.4040**	**14.9993**	**0.0000**	**63,243.2743**	**63,243.2743**	**2.2855**	**0.0903**	**63,319.2496**

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	lb/day										lb/day					
Area	40.6278	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146	0.0000	102.6812	102.6812	0.1002	0.0000	104.7849
Energy	0.4513	3.8643	1.6986	0.0246		0.3118	0.3118		0.3118	0.3118		4,923.1412	4,923.1412	0.0944	0.0903	4,953.1026
Mobile	34.3299	53.8082	297.4092	0.7672	50.8910	0.8429	51.7339	13.5953	0.7777	14.3729		58,217.4520	58,217.4520	2.0910		58,261.3621
Total	**75.4089**	**58.3342**	**356.3205**	**0.7949**	**50.8910**	**1.4693**	**52.3603**	**13.5953**	**1.4040**	**14.9993**	**0.0000**	**63,243.2743**	**63,243.2743**	**2.2855**	**0.0903**	**63,319.2496**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2016	2/14/2016	5	31	
2	Grading	Grading	2/15/2016	6/8/2016	5	83	
3	Building Construction	Building Construction	6/9/2016	7/24/2019	5	815	
4	Paving	Paving	7/25/2019	10/14/2019	5	58	
5	Architectural Coating	Architectural Coating	10/15/2019	12/31/2019	5	59	

Acres of Grading (Site Preparation Phase): 128

Acres of Grading (Grading Phase): 128

Acres of Paving: 0

Residential Indoor: 2,201,175; Residential Outdoor: 733,725; Non-Residential Indoor: 674,226; Non-Residential Outdoor: 224,742 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40

Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
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
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	313.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	313.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	508.00	152.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	102.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					22.4618	0.0000	22.4618	10.4060	0.0000	10.4060			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036		4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**22.4618**	**2.9387**	**25.4005**	**10.4060**	**2.7036**	**13.1096**		**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

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	lb/day										lb/day					
Hauling	0.2404	2.4832	3.1683	7.2900e-003	1.3633	0.0386	1.4019	0.1664	0.0355	0.2018		732.3098	732.3098	5.1100e-003		732.4172
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
Worker	0.0721	0.0649	0.8686	1.7500e-003	2.5202	1.0100e-003	2.5212	0.2740	9.2000e-004	0.2749		143.8975	143.8975	6.9500e-003		144.0434
Total	**0.3125**	**2.5481**	**4.0369**	**9.0400e-003**	**3.8835**	**0.0396**	**3.9231**	**0.4403**	**0.0364**	**0.4767**		**876.2073**	**876.2073**	**0.0121**		**876.4606**

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	lb/day										lb/day					
Fugitive Dust					5.6154	0.0000	5.6154	2.6015	0.0000	2.6015			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036	0.0000	4,065.0053	4,065.0053	1.2262		4,090.7544

Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**5.6154**	**2.9387**	**8.5541**	**2.6015**	**2.7036**	**5.3051**	**0.0000**	**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

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	lb/day										lb/day					
Hauling	0.2404	2.4832	3.1683	7.2900e-003	0.9024	0.0386	0.9410	0.1203	0.0355	0.1557		732.3098	732.3098	5.1100e-003		732.4172
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
Worker	0.0721	0.0649	0.8686	1.7500e-003	1.5957	1.0100e-003	1.5967	0.1815	9.2000e-004	0.1824		143.8975	143.8975	6.9500e-003		144.0434
Total	**0.3125**	**2.5481**	**4.0369**	**9.0400e-003**	**2.4981**	**0.0396**	**2.5377**	**0.3018**	**0.0364**	**0.3382**		**876.2073**	**876.2073**	**0.0121**		**876.4606**

3.3 Grading – 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	lb/day										lb/day					
Fugitive Dust					7.6638	0.0000	7.6638	3.4878	0.0000	3.4878			0.0000			0.0000
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975		6,414.9807	6,414.9807	1.9350		6,455.6154
Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**7.6638**	**3.5842**	**11.2480**	**3.4878**	**3.2975**	**6.7853**		**6,414.9807**	**6,414.9807**	**1.9350**		**6,455.6154**

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	lb/day										lb/day					
Hauling	0.0898	0.9275	1.1833	2.7200e-003	0.5092	0.0144	0.5236	0.0621	0.0132	0.0754		273.5133	273.5133	1.9100e-003		273.5534
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
Worker	0.0802	0.0721	0.9651	1.9500e-003	2.8002	1.1200e-003	2.8013	0.3044	1.0300e-003	0.3054		159.8861	159.8861	7.7200e-003		160.0483

Total	**0.1699**	**0.9996**	**2.1485**	**4.6700e-003**	**3.3094**	**0.0155**	**3.3249**	**0.3665**	**0.0143**	**0.3808**		**433.3994**	**433.3994**	**9.6300e-003**		**433.6017**

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	lb/day										lb/day					
Fugitive Dust					1.9160	0.0000	1.9160	0.8719	0.0000	0.8719			0.0000			0.0000
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975	0.0000	6,414.9807	6,414.9807	1.9350		6,455.6154
Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**1.9160**	**3.5842**	**5.5002**	**0.8719**	**3.2975**	**4.1694**	**0.0000**	**6,414.9807**	**6,414.9807**	**1.9350**		**6,455.6154**

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	lb/day										lb/day					
Hauling	0.0898	0.9275	1.1833	2.7200e-003	0.3370	0.0144	0.3515	0.0449	0.0132	0.0582		273.5133	273.5133	1.9100e-003		273.5534
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
Worker	0.0802	0.0721	0.9651	1.9500e-003	1.7730	1.1200e-003	1.7741	0.2017	1.0300e-003	0.2027		159.8861	159.8861	7.7200e-003		160.0483
Total	**0.1699**	**0.9996**	**2.1485**	**4.6700e-003**	**2.1101**	**0.0155**	**2.1256**	**0.2466**	**0.0143**	**0.2609**		**433.3994**	**433.3994**	**9.6300e-003**		**433.6017**

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	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

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	lb/day										lb/day					
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
Vendor	1.8365	12.2081	21.4198	0.0318	21.2415	0.2001	21.4416	2.2832	0.1838	2.4670		3,173.5075	3,173.5075	0.0250		3,174.0319
Worker	2.0359	1.8313	24.5146	0.0494	71.1243	0.0284	71.1527	7.7318	0.0261	7.7579		4,061.1058	4,061.1058	0.1962		4,065.2257
Total	**3.8724**	**14.0394**	**45.9344**	**0.0812**	**92.3658**	**0.2285**	**92.5943**	**10.0151**	**0.2098**	**10.2249**		**7,234.6133**	**7,234.6133**	**0.2212**		**7,239.2576**

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	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

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	lb/day										lb/day					
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
Vendor	1.8365	12.2081	21.4198	0.0318	13.3483	0.2001	13.5484	1.4939	0.1838	1.6777		3,173.5075	3,173.5075	0.0250		3,174.0319
Worker	2.0359	1.8313	24.5146	0.0494	45.0344	0.0284	45.0628	5.1229	0.0261	5.1489		4,061.1058	4,061.1058	0.1962		4,065.2257

Total	**3.8724**	**14.0394**	**45.9344**	**0.0812**	**58.3827**	**0.2285**	**58.6112**	**6.6168**	**0.2098**	**6.8266**		**7,234.6133**	**7,234.6133**	**0.2212**		**7,239.2576**

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	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

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	lb/day										lb/day					
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
Vendor	1.5836	10.8120	19.1813	0.0317	21.2417	0.1687	21.4103	2.2833	0.1549	2.4382		3,120.1018	3,120.1018	0.0233		3,120.5905
Worker	1.8152	1.6371	21.9461	0.0494	71.1243	0.0274	71.1517	7.7318	0.0253	7.7572		3,900.9275	3,900.9275	0.1790		3,904.6860
Total	**3.3988**	**12.4490**	**41.1274**	**0.0811**	**92.3660**	**0.1961**	**92.5621**	**10.0152**	**0.1802**	**10.1954**		**7,021.0292**	**7,021.0292**	**0.2023**		**7,025.2764**

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	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

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	lb/day										lb/day					
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
Vendor	1.5836	10.8120	19.1813	0.0317	13.3485	0.1687	13.5172	1.4940	0.1549	1.6489		3,120.1018	3,120.1018	0.0233		3,120.5905
Worker	1.8152	1.6371	21.9461	0.0494	45.0344	0.0274	45.0618	5.1229	0.0253	5.1482		3,900.9275	3,900.9275	0.1790		3,904.6860
Total	**3.3988**	**12.4490**	**41.1274**	**0.0811**	**58.3829**	**0.1961**	**58.5790**	**6.6169**	**0.1802**	**6.7971**		**7,021.0292**	**7,021.0292**	**0.2023**		**7,025.2764**

3.4 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	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**		**2,609.9390**	**2,609.9390**	**0.6387**		**2,623.3517**

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	lb/day										lb/day					
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
Vendor	1.3162	9.7459	16.7382	0.0316	21.2415	0.1550	21.3965	2.2833	0.1424	2.4257		3,062.5143	3,062.5143	0.0227		3,062.9907
Worker	1.6284	1.4749	19.7947	0.0494	71.1243	0.0269	71.1512	7.7318	0.0249	7.7567		3,753.7383	3,753.7383	0.1647		3,757.1968

Total	**2.9446**	**11.2208**	**36.5329**	**0.0810**	**92.3658**	**0.1819**	**92.5477**	**10.0151**	**0.1673**	**10.1824**		**6,816.2526**	**6,816.2526**	**0.1874**		**6,820.1875**

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	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048	0.0000	2,609.9389	2,609.9389	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**	**0.0000**	**2,609.9389**	**2,609.9389**	**0.6387**		**2,623.3517**

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	lb/day										lb/day					
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
Vendor	1.3162	9.7459	16.7382	0.0316	13.3483	0.1550	13.5033	1.4939	0.1424	1.6364		3,062.5143	3,062.5143	0.0227		3,062.9907
Worker	1.6284	1.4749	19.7947	0.0494	45.0344	0.0269	45.0613	5.1229	0.0249	5.1477		3,753.7383	3,753.7383	0.1647		3,757.1968
Total	**2.9446**	**11.2208**	**36.5329**	**0.0810**	**58.3827**	**0.1819**	**58.5646**	**6.6168**	**0.1673**	**6.7841**		**6,816.2526**	**6,816.2526**	**0.1874**		**6,820.1875**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3516	20.9650	17.1204	0.0268		1.2850	1.2850		1.2083	1.2083		2,580.7618	2,580.7618	0.6279		2,593.9479
Total	**2.3516**	**20.9650**	**17.1204**	**0.0268**		**1.2850**	**1.2850**		**1.2083**	**1.2083**		**2,580.7618**	**2,580.7618**	**0.6279**		**2,593.9479**

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	lb/day										lb/day					
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
Vendor	1.1949	8.8732	15.5901	0.0316	21.2417	0.1434	21.3851	2.2833	0.1318	2.4152		3,012.9083	3,012.9083	0.0221		3,013.3722
Worker	1.4973	1.3496	18.2908	0.0492	71.1243	0.0266	71.1509	7.7318	0.0246	7.7565		3,601.7189	3,601.7189	0.1532		3,604.9363
Total	**2.6922**	**10.2228**	**33.8809**	**0.0807**	**92.3660**	**0.1699**	**92.5360**	**10.0152**	**0.1564**	**10.1716**		**6,614.6272**	**6,614.6272**	**0.1753**		**6,618.3085**

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	lb/day										lb/day					
Off-Road	2.3516	20.9650	17.1204	0.0268		1.2850	1.2850		1.2083	1.2083	0.0000	2,580.7618	2,580.7618	0.6279		2,593.9479
Total	**2.3516**	**20.9650**	**17.1204**	**0.0268**		**1.2850**	**1.2850**		**1.2083**	**1.2083**	**0.0000**	**2,580.7618**	**2,580.7618**	**0.6279**		**2,593.9479**

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	lb/day										lb/day					
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
Vendor	1.1949	8.8732	15.5901	0.0316	13.3486	0.1434	13.4919	1.4940	0.1318	1.6258		3,012.9083	3,012.9083	0.0221		3,013.3722
Worker	1.4973	1.3496	18.2908	0.0492	45.0344	0.0266	45.0610	5.1229	0.0246	5.1475		3,601.7189	3,601.7189	0.1532		3,604.9363

Total	**2.6922**	**10.2228**	**33.8809**	**0.0807**	**58.3830**	**0.1699**	**58.5529**	**6.6169**	**0.1564**	**6.7733**		**6,614.6272**	**6,614.6272**	**0.1753**		**6,618.3085**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4259	14.9353	14.3652	0.0223		0.8094	0.8094		0.7447	0.7447		2,208.9731	2,208.9731	0.6989		2,223.6499
Paving	0.0280					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4539**	**14.9353**	**14.3652**	**0.0223**		**0.8094**	**0.8094**		**0.7447**	**0.7447**		**2,208.9731**	**2,208.9731**	**0.6989**		**2,223.6499**

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	lb/day										lb/day					
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
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
Worker	0.0442	0.0399	0.5401	1.4500e-003	0.1141	7.8000e-004	0.1149	0.0303	7.3000e-004	0.0310		106.3500	106.3500	4.5200e-003		106.4450
Total	**0.0442**	**0.0399**	**0.5401**	**1.4500e-003**	**0.1141**	**7.8000e-004**	**0.1149**	**0.0303**	**7.3000e-004**	**0.0310**		**106.3500**	**106.3500**	**4.5200e-003**		**106.4450**

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	lb/day										lb/day					
Off-Road	1.4259	14.9353	14.3652	0.0223		0.8094	0.8094		0.7447	0.7447	0.0000	2,208.9731	2,208.9731	0.6989		2,223.6499
Paving	0.0280					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Total	**1.4539**	**14.9353**	**14.3652**	**0.0223**		**0.8094**	**0.8094**		**0.7447**	**0.7447**	**0.0000**	**2,208.9731**	**2,208.9731**	**0.6989**		**2,223.6499**

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	lb/day										lb/day					
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
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
Worker	0.0442	0.0399	0.5401	1.4500e-003	0.1141	7.8000e-004	0.1149	0.0303	7.3000e-004	0.0310		106.3500	106.3500	4.5200e-003		106.4450
Total	**0.0442**	**0.0399**	**0.5401**	**1.4500e-003**	**0.1141**	**7.8000e-004**	**0.1149**	**0.0303**	**7.3000e-004**	**0.0310**		**106.3500**	**106.3500**	**4.5200e-003**		**106.4450**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	336.4972					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		281.9473
Total	**336.7637**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**281.9473**

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	lb/day										lb/day					
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
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
Worker	0.3006	0.2710	3.6726	9.8700e-003	0.7759	5.3300e-003	0.7813	0.2058	4.9400e-003	0.2108		723.1798	723.1798	0.0308		723.8258

Total	**0.3006**	**0.2710**	**3.6726**	**9.8700e-003**	**0.7759**	**5.3300e-003**	**0.7813**	**0.2058**	**4.9400e-003**	**0.2108**		**723.1798**	**723.1798**	**0.0308**		**723.8258**

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	lb/day										lb/day					
Archit. Coating	336.4972					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		281.9473
Total	**336.7637**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**281.9473**

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	lb/day										lb/day					
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
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
Worker	0.3006	0.2710	3.6726	9.8700e-003	0.7759	5.3300e-003	0.7813	0.2058	4.9400e-003	0.2108		723.1798	723.1798	0.0308		723.8258
Total	**0.3006**	**0.2710**	**3.6726**	**9.8700e-003**	**0.7759**	**5.3300e-003**	**0.7813**	**0.2058**	**4.9400e-003**	**0.2108**		**723.1798**	**723.1798**	**0.0308**		**723.8258**

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	lb/day										lb/day					
Mitigated	34.3299	53.8082	297.4092	0.7672	50.8910	0.8429	51.7339	13.5953	0.7777	14.3729		58,217.4520	58,217.4520	2.0910		58,261.3621

Unmitigated	34.3299	53.8082	297.4092	0.7672	50.8910	0.8429	51.7339	13.5953	0.7777	14.3729		58,217.4520	58,217.4520	2.0910		58,261.3621

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	1,291.64	1,403.36	1189.72	3,318,082	3,318,082
City Park	12.40	12.40	12.40	22,881	22,881
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	4,676.17	5,441.73	2748.64	6,302,085	6,302,085
Single Family Housing	4,737.15	4,989.60	4341.15	12,103,420	12,103,420
Total	10,717.36	11,847.10	8,291.91	21,746,467	21,746,467

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
City Park	10.00	5.00	6.50	33.00	48.00	19.00	66	28	6

Parking Lot	10.00	5.00	6.50	0.00	0.00	0.00	0	0	0
Regional Shopping Center	10.00	5.00	6.50	16.30	64.70	19.00	54	35	11
Single Family Housing	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.503605	0.067800	0.178973	0.146934	0.044621	0.006359	0.021238	0.016884	0.002315	0.002275	0.006260	0.000554	0.002182

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.4513	3.8643	1.6986	0.0246		0.3118	0.3118		0.3118	0.3118		4,923.1412	4,923.1412	0.0944	0.0903	4,953.1026
NaturalGas Unmitigated	0.4513	3.8643	1.6986	0.0246		0.3118	0.3118		0.3118	0.3118		4,923.1412	4,923.1412	0.0944	0.0903	4,953.1026

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	lb/day											lb/day				
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
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	1333.65	0.0144	0.1308	0.1098	7.8000e-004		9.9400e-003	9.9400e-003		9.9400e-003	9.9400e-003		156.9002	156.9002	3.0100e-003	2.8800e-003	157.8551
Single Family Housing	34714.1	0.3744	3.1991	1.3613	0.0204		0.2587	0.2587		0.2587	0.2587		4,084.0125	4,084.0125	0.0783	0.0749	4,108.8671
Apartments Low Rise	5798.94	0.0625	0.5344	0.2274	3.4100e-003		0.0432	0.0432		0.0432	0.0432		682.2285	682.2285	0.0131	0.0125	686.3804
Total		**0.4513**	**3.8643**	**1.6986**	**0.0246**		**0.3118**	**0.3118**		**0.3118**	**0.3118**		**4,923.1412**	**4,923.1412**	**0.0944**	**0.0903**	**4,953.1026**

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	lb/day											lb/day				
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
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	1.33365	0.0144	0.1308	0.1098	7.8000e-004		9.9400e-003	9.9400e-003		9.9400e-003	9.9400e-003		156.9002	156.9002	3.0100e-003	2.8800e-003	157.8551
Single Family Housing	34.7141	0.3744	3.1991	1.3613	0.0204		0.2587	0.2587		0.2587	0.2587		4,084.0125	4,084.0125	0.0783	0.0749	4,108.8671
Apartments Low Rise	5.79894	0.0625	0.5344	0.2274	3.4100e-003		0.0432	0.0432		0.0432	0.0432		682.2285	682.2285	0.0131	0.0125	686.3804
Total		**0.4513**	**3.8643**	**1.6986**	**0.0246**		**0.3118**	**0.3118**		**0.3118**	**0.3118**		**4,923.1412**	**4,923.1412**	**0.0944**	**0.0903**	**4,953.1026**

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	lb/day										lb/day					

Mitigated	40.6278	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146	0.0000	102.6812	102.6812	0.1002	0.0000	104.7849
Unmitigated	40.6278	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146	0.0000	102.6812	102.6812	0.1002	0.0000	104.7849

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	lb/day										lb/day					
Architectural Coating	5.4393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	33.4454					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.7431	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146		102.6812	102.6812	0.1002		104.7849
Total	**40.6278**	**0.6617**	**57.2127**	**3.0100e-003**		**0.3146**	**0.3146**		**0.3146**	**0.3146**	**0.0000**	**102.6812**	**102.6812**	**0.1002**	**0.0000**	**104.7849**

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	lb/day										lb/day					
Architectural Coating	5.4393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	33.4454					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.7431	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146		102.6812	102.6812	0.1002		104.7849
Total	**40.6278**	**0.6617**	**57.2127**	**3.0100e-003**		**0.3146**	**0.3146**		**0.3146**	**0.3146**	**0.0000**	**102.6812**	**102.6812**	**0.1002**	**0.0000**	**104.7849**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Vegetation

Barrett Ranch East

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	27.20	1000sqft	0.62	27,200.00	0
City Park	7.80	Acre	7.80	339,768.00	0
Apartments Low Rise	196.00	Dwelling Unit	10.50	196,000.00	523
Single Family Housing	495.00	Dwelling Unit	95.50	891,000.00	1322
Regional Shopping Center	108.90	1000sqft	6.40	108,900.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2020

Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Land use, unit amount and ot acreage infomation was provided by the Applicant.

Construction Phase - Assumed construction schedule

On-road Fugitive Dust - Percent paved road are based on the assumption that 100% of travel will be on paved road

Grading - Assumed all material will be balanced on site, so no net import or export.

Vehicle Trips - Used daily trip rates provided by the Applicant with a 18% trip reduction.

Energy Use - Change default Ttle 24 Energy to incoprate 2013 Title 24 energy construction standards.

Construction Off-road Equipment Mitigation - Construction Off-road Equipment Mitigation - 75% reduction represents Enhanced Construction Emission Control to control fugitive dust.

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	55	75
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	55	75

tblConstructionPhase	NumDays	220.00	59.00
tblConstructionPhase	NumDays	3,100.00	815.00
tblConstructionPhase	NumDays	310.00	83.00
tblConstructionPhase	NumDays	220.00	58.00
tblConstructionPhase	NumDays	120.00	31.00
tblEnergyUse	T24E	348.18	261.14
tblEnergyUse	T24E	3.98	2.99
tblEnergyUse	T24E	729.62	547.22
tblEnergyUse	T24NG	11,068.06	8,301.05
tblEnergyUse	T24NG	4.72	3.54
tblEnergyUse	T24NG	26,218.01	19,663.51
tblGrading	AcresOfGrading	207.50	128.00
tblGrading	AcresOfGrading	0.00	128.00
tblLandUse	LotAcreage	12.25	10.50
tblLandUse	LotAcreage	160.71	95.50
tblLandUse	LotAcreage	2.50	6.40
tblProjectCharacteristics	OperationalYear	2014	2020
tblVehicleTrips	CC_TL	5.00	2.33

tblVehicleTrips	CNW_TL	6.50	3.02
tblVehicleTrips	CW_TL	10.00	4.65
tblVehicleTrips	HO_TL	6.50	3.02
tblVehicleTrips	HO_TL	6.50	3.02
tblVehicleTrips	HS_TL	5.00	2.33
tblVehicleTrips	HS_TL	5.00	2.33
tblVehicleTrips	HW_TL	10.00	4.65
tblVehicleTrips	HW_TL	10.00	4.65
tblVehicleTrips	ST_TR	7.16	5.49
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	ST_TR	49.97	27.03
tblVehicleTrips	ST_TR	10.08	7.50
tblVehicleTrips	SU_TR	6.07	5.49
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	SU_TR	25.24	27.03
tblVehicleTrips	SU_TR	8.77	7.50
tblVehicleTrips	WD_TR	6.59	5.49
tblVehicleTrips	WD_TR	1.59	0.00

tblVehicleTrips	WD_TR	42.94	54.06
tblVehicleTrips	WD_TR	9.57	7.50

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2016	7.2786	74.8858	64.4410	0.1080	22.5820	3.5854	25.5217	10.4398	3.2985	13.1443						
2017	6.5012	38.8547	59.2565	0.1079	4.7574	1.9773	6.7347	1.2793	1.8532	3.1325						
2018	5.6133	34.4817	54.0656	0.1078	4.7572	1.6761	6.4334	1.2793	1.5721	2.8514						
2019	337.0643	31.1878	51.0012	0.1075	4.7575	1.4550	6.2124	1.2793	1.3647	2.6441						
2020	337.0203	1.9350	5.2539	0.0128	0.7759	0.1163	0.8922	0.2058	0.1159	0.3217						
Total	**693.4777**	**181.3450**	**234.0183**	**0.4441**	**37.6300**	**8.8101**	**45.7944**	**14.4836**	**8.2044**	**22.0939**						

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	lb/day										lb/day					
2016	7.2786	74.8858	64.4410	0.1080	5.7482	3.5854	8.6879	2.6372	3.2985	5.3417						
2017	6.5012	38.8547	59.2565	0.1079	4.7574	1.9773	6.7347	1.2793	1.8532	3.1325						
2018	5.6133	34.4817	54.0656	0.1078	4.7572	1.6761	6.4334	1.2793	1.5721	2.8514						
2019	337.0643	31.1878	51.0012	0.1075	4.7575	1.4550	6.2124	1.2793	1.3647	2.6441						
2020	337.0203	1.9350	5.2539	0.0128	0.7759	0.1163	0.8922	0.2058	0.1159	0.3217						
Total	**693.4777**	**181.3450**	**234.0183**	**0.4441**	**20.7962**	**8.8101**	**28.9606**	**6.6809**	**8.2044**	**14.2913**						

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**44.74**	**0.00**	**36.76**	**53.87**	**0.00**	**35.32**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	40.6278	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146						
Energy	0.4513	3.8643	1.6986	0.0246		0.3118	0.3118		0.3118	0.3118						
Mobile	27.0562	27.8336	157.1488	0.3202	20.2396	0.3866	20.6262	5.4069	0.3568	5.7637						
Total	**68.1353**	**32.3596**	**216.0601**	**0.3479**	**20.2396**	**1.0130**	**21.2526**	**5.4069**	**0.9832**	**6.3901**						

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	lb/day										lb/day					
Area	40.6278	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146						
Energy	0.3819	3.2699	1.4371	0.0208		0.2638	0.2638		0.2638	0.2638						
Mobile	27.0562	27.8336	157.1488	0.3202	20.2396	0.3866	20.6262	5.4069	0.3568	5.7637						
Total	**68.0659**	**31.7652**	**215.7986**	**0.3441**	**20.2396**	**0.9650**	**21.2046**	**5.4069**	**0.9352**	**6.3421**						

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.10**	**1.84**	**0.12**	**1.09**	**0.00**	**4.73**	**0.23**	**0.00**	**4.88**	**0.75**	**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	1/1/2016	2/12/2016	5	31	
2	Grading	Grading	2/13/2016	6/8/2016	5	83	
3	Building Construction	Building Construction	6/9/2016	7/24/2019	5	815	
4	Paving	Paving	7/25/2019	10/14/2019	5	58	
5	Architectural Coating	Architectural Coating	10/15/2019	1/3/2020	5	59	

Acres of Grading (Site Preparation Phase): 128

Acres of Grading (Grading Phase): 128

Acres of Paving: 0

Residential Indoor: 2,201,175; Residential Outdoor: 733,725; Non-Residential Indoor: 674,226; Non-Residential Outdoor: 224,742 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

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
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	508.00	152.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	102.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					22.4451	0.0000	22.4451	10.4035	0.0000	10.4035						
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036						
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**22.4451**	**2.9387**	**25.3838**	**10.4035**	**2.7036**	**13.1071**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.0721	0.0649	0.8686	1.7500e-003	0.1369	1.0100e-003	0.1379	0.0363	9.2000e-004	0.0373						
Total	**0.0721**	**0.0649**	**0.8686**	**1.7500e-003**	**0.1369**	**1.0100e-003**	**0.1379**	**0.0363**	**9.2000e-004**	**0.0373**						

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	lb/day										lb/day					
Fugitive Dust					5.6113	0.0000	5.6113	2.6009	0.0000	2.6009						
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036						

Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**5.6113**	**2.9387**	**8.5500**	**2.6009**	**2.7036**	**5.3045**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.0721	0.0649	0.8686	1.7500e-003	0.1369	1.0100e-003	0.1379	0.0363	9.2000e-004	0.0373						
Total	**0.0721**	**0.0649**	**0.8686**	**1.7500e-003**	**0.1369**	**1.0100e-003**	**0.1379**	**0.0363**	**9.2000e-004**	**0.0373**						

3.3 Grading - 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	lb/day										lb/day					
Fugitive Dust					7.6576	0.0000	7.6576	3.4868	0.0000	3.4868						
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975						

Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**7.6576**	**3.5842**	**11.2418**	**3.4868**	**3.2975**	**6.7843**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.0802	0.0721	0.9651	1.9500e-003	0.1521	1.1200e-003	0.1533	0.0404	1.0300e-003	0.0414						
Total	**0.0802**	**0.0721**	**0.9651**	**1.9500e-003**	**0.1521**	**1.1200e-003**	**0.1533**	**0.0404**	**1.0300e-003**	**0.0414**						

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	lb/day										lb/day					
Fugitive Dust					1.9144	0.0000	1.9144	0.8717	0.0000	0.8717						
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975						

Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**1.9144**	**3.5842**	**5.4986**	**0.8717**	**3.2975**	**4.1692**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.0802	0.0721	0.9651	1.9500e-003	0.1521	1.1200e-003	0.1533	0.0404	1.0300e-003	0.0414						
Total	**0.0802**	**0.0721**	**0.9651**	**1.9500e-003**	**0.1521**	**1.1200e-003**	**0.1533**	**0.0404**	**1.0300e-003**	**0.0414**						

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	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485						
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**						

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	1.8365	12.2081	21.4198	0.0318	0.8928	0.2001	1.0929	0.2542	0.1838	0.4379						

Worker	2.0359	1.8313	24.5146	0.0494	3.8644	0.0284	3.8928	1.0251	0.0261	1.0511						
Total	**3.8724**	**14.0394**	**45.9344**	**0.0812**	**4.7572**	**0.2285**	**4.9857**	**1.2793**	**0.2098**	**1.4891**						

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	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485						
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**						

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	1.8365	12.2081	21.4198	0.0318	0.8928	0.2001	1.0929	0.2542	0.1838	0.4379						

Worker	2.0359	1.8313	24.5146	0.0494	3.8644	0.0284	3.8928	1.0251	0.0261	1.0511						
Total	**3.8724**	**14.0394**	**45.9344**	**0.0812**	**4.7572**	**0.2285**	**4.9857**	**1.2793**	**0.2098**	**1.4891**						

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	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730						
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**						

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	1.5836	10.8120	19.1813	0.0317	0.8931	0.1687	1.0617	0.2543	0.1549	0.4092						

Worker	1.8152	1.6371	21.9461	0.0494	3.8644	0.0274	3.8918	1.0251	0.0253	1.0504						
Total	**3.3988**	**12.4490**	**41.1274**	**0.0811**	**4.7574**	**0.1961**	**4.9535**	**1.2793**	**0.1802**	**1.4595**						

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	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730						
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**						

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	1.5836	10.8120	19.1813	0.0317	0.8931	0.1687	1.0617	0.2543	0.1549	0.4092						

Worker	1.8152	1.6371	21.9461	0.0494	3.8644	0.0274	3.8918	1.0251	0.0253	1.0504						
Total	**3.3988**	**12.4490**	**41.1274**	**0.0811**	**4.7574**	**0.1961**	**4.9535**	**1.2793**	**0.1802**	**1.4595**						

3.4 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	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048						
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**						

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	1.3162	9.7459	16.7382	0.0316	0.8929	0.1550	1.0478	0.2542	0.1424	0.3966						

Worker	1.6284	1.4749	19.7947	0.0494	3.8644	0.0269	3.8912	1.0251	0.0249	1.0499						
Total	**2.9446**	**11.2208**	**36.5329**	**0.0810**	**4.7572**	**0.1819**	**4.9391**	**1.2793**	**0.1673**	**1.4466**						

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	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048						
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**						

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	1.3162	9.7459	16.7382	0.0316	0.8929	0.1550	1.0478	0.2542	0.1424	0.3966						

Worker	1.6284	1.4749	19.7947	0.0494	3.8644	0.0269	3.8912	1.0251	0.0249	1.0499						
Total	**2.9446**	**11.2208**	**36.5329**	**0.0810**	**4.7572**	**0.1819**	**4.9391**	**1.2793**	**0.1673**	**1.4466**						

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3516	20.9650	17.1204	0.0268		1.2850	1.2850		1.2083	1.2083						
Total	**2.3516**	**20.9650**	**17.1204**	**0.0268**		**1.2850**	**1.2850**		**1.2083**	**1.2083**						

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	1.1949	8.8732	15.5901	0.0316	0.8931	0.1434	1.0365	0.2543	0.1318	0.3861						

Worker	1.4973	1.3496	18.2908	0.0492	3.8644	0.0266	3.8909	1.0251	0.0246	1.0497						
Total	**2.6922**	**10.2228**	**33.8809**	**0.0807**	**4.7574**	**0.1699**	**4.9274**	**1.2793**	**0.1564**	**1.4358**						

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	lb/day										lb/day					
Off-Road	2.3516	20.9650	17.1204	0.0268		1.2850	1.2850		1.2083	1.2083						
Total	**2.3516**	**20.9650**	**17.1204**	**0.0268**		**1.2850**	**1.2850**		**1.2083**	**1.2083**						

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	1.1949	8.8732	15.5901	0.0316	0.8931	0.1434	1.0365	0.2543	0.1318	0.3861						

Worker	1.4973	1.3496	18.2908	0.0492	3.8644	0.0266	3.8909	1.0251	0.0246	1.0497						
Total	**2.6922**	**10.2228**	**33.8809**	**0.0807**	**4.7574**	**0.1699**	**4.9274**	**1.2793**	**0.1564**	**1.4358**						

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4259	14.9353	14.3652	0.0223		0.8094	0.8094		0.7447	0.7447						
Paving	0.0280					0.0000	0.0000		0.0000	0.0000						

Total	**1.4539**	**14.9353**	**14.3652**	**0.0223**		**0.8094**	**0.8094**		**0.7447**	**0.7447**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.0442	0.0399	0.5401	1.4500e-003	0.1141	7.8000e-004	0.1149	0.0303	7.3000e-004	0.0310						
Total	**0.0442**	**0.0399**	**0.5401**	**1.4500e-003**	**0.1141**	**7.8000e-004**	**0.1149**	**0.0303**	**7.3000e-004**	**0.0310**						

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	lb/day										lb/day					
Off-Road	1.4259	14.9353	14.3652	0.0223		0.8094	0.8094		0.7447	0.7447						
Paving	0.0280					0.0000	0.0000		0.0000	0.0000						

Total	**1.4539**	**14.9353**	**14.3652**	**0.0223**		**0.8094**	**0.8094**		**0.7447**	**0.7447**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.0442	0.0399	0.5401	1.4500e-003	0.1141	7.8000e-004	0.1149	0.0303	7.3000e-004	0.0310						
Total	**0.0442**	**0.0399**	**0.5401**	**1.4500e-003**	**0.1141**	**7.8000e-004**	**0.1149**	**0.0303**	**7.3000e-004**	**0.0310**						

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	336.4972					0.0000	0.0000		0.0000	0.0000						
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288						

Total	**336.7637**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.3006	0.2710	3.6726	9.8700e-003	0.7759	5.3300e-003	0.7813	0.2058	4.9400e-003	0.2108						
Total	**0.3006**	**0.2710**	**3.6726**	**9.8700e-003**	**0.7759**	**5.3300e-003**	**0.7813**	**0.2058**	**4.9400e-003**	**0.2108**						

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	lb/day										lb/day					
Archit. Coating	336.4972					0.0000	0.0000		0.0000	0.0000						
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288						

Total	**336.7637**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.3006	0.2710	3.6726	9.8700e-003	0.7759	5.3300e-003	0.7813	0.2058	4.9400e-003	0.2108						
Total	**0.3006**	**0.2710**	**3.6726**	**9.8700e-003**	**0.7759**	**5.3300e-003**	**0.7813**	**0.2058**	**4.9400e-003**	**0.2108**						

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	336.4972					0.0000	0.0000		0.0000	0.0000						
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109						

Total	**336.7394**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.2809	0.2511	3.4225	9.8700e-003	0.7759	5.3400e-003	0.7813	0.2058	4.9500e-003	0.2108						
Total	**0.2809**	**0.2511**	**3.4225**	**9.8700e-003**	**0.7759**	**5.3400e-003**	**0.7813**	**0.2058**	**4.9500e-003**	**0.2108**						

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	lb/day										lb/day					
Archit. Coating	336.4972					0.0000	0.0000		0.0000	0.0000						
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109						

Total	**336.7394**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**						

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	lb/day										lb/day					
Hauling	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						

Worker	0.2809	0.2511	3.4225	9.8700e-003	0.7759	5.3400e-003	0.7813	0.2058	4.9500e-003	0.2108						
Total	**0.2809**	**0.2511**	**3.4225**	**9.8700e-003**	**0.7759**	**5.3400e-003**	**0.7813**	**0.2058**	**4.9500e-003**	**0.2108**						

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	lb/day										lb/day					
Mitigated	27.0562	27.8336	157.1488	0.3202	20.2396	0.3866	20.6262	5.4069	0.3568	5.7637						
Unmitigated	27.0562	27.8336	157.1488	0.3202	20.2396	0.3866	20.6262	5.4069	0.3568	5.7637						

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	1,076.04	1,076.04	1076.04	1,284,464	1,284,464
City Park	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	5,887.13	2,943.57	2943.57	3,292,688	3,292,688
Single Family Housing	3,712.50	3,712.50	3712.50	4,431,595	4,431,595
Total	10,675.67	7,732.11	7,732.11	9,008,747	9,008,747

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	4.65	2.33	3.02	46.50	12.50	41.00	86	11	3
City Park	10.00	5.00	6.50	33.00	48.00	19.00	66	28	6
Parking Lot	10.00	5.00	6.50	0.00	0.00	0.00	0	0	0
Regional Shopping Center	4.65	2.33	3.02	16.30	64.70	19.00	54	35	11
Single Family Housing	4.65	2.33	3.02	46.50	12.50	41.00	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.503605	0.067800	0.178973	0.146934	0.044621	0.006359	0.021238	0.016884	0.002315	0.002275	0.006260	0.000554	0.002182

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	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	lb/day										lb/day					
NaturalGas Mitigated	0.3819	3.2699	1.4371	0.0208		0.2638	0.2638		0.2638	0.2638						
NaturalGas Unmitigated	0.4513	3.8643	1.6986	0.0246		0.3118	0.3118		0.3118	0.3118						

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	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						
Regional Shopping	1333.65	0.0144	0.1308	0.1098	7.8000e-004		9.9400e-003	9.9400e-003		9.9400e-003	9.9400e-003						
Single Family Housing	34714.1	0.3744	3.1991	1.3613	0.0204		0.2587	0.2587		0.2587	0.2587						
Apartments Low Rise	5798.94	0.0625	0.5344	0.2274	3.4100e-003		0.0432	0.0432		0.0432	0.0432						
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						
Total		**0.4513**	**3.8643**	**1.6986**	**0.0246**		**0.3118**	**0.3118**		**0.3118**	**0.3118**						

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	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						
Regional Shopping	1.12242	0.0121	0.1100	0.0924	6.6000e-004		8.3600e-003	8.3600e-003		8.3600e-003	8.3600e-003						
Single Family Housing	29.3807	0.3169	2.7076	1.1522	0.0173		0.2189	0.2189		0.2189	0.2189						
Apartments Low Rise	4.90743	0.0529	0.4523	0.1925	2.8900e-003		0.0366	0.0366		0.0366	0.0366						
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						
Total		**0.3819**	**3.2699**	**1.4371**	**0.0208**		**0.2639**	**0.2639**		**0.2639**	**0.2639**						

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	lb/day										lb/day					
Mitigated	40.6278	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146						
Unmitigated	40.6278	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146						

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	lb/day										lb/day					
Architectural Coating	5.4393					0.0000	0.0000		0.0000	0.0000						
Consumer Products	33.4454					0.0000	0.0000		0.0000	0.0000						
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						
Landscaping	1.7431	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146						

Total	**40.6278**	**0.6617**	**57.2127**	**3.0100e-003**		**0.3146**	**0.3146**		**0.3146**	**0.3146**						

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	lb/day										lb/day					
Architectural Coating	5.4393					0.0000	0.0000		0.0000	0.0000						
Consumer Products	33.4454					0.0000	0.0000		0.0000	0.0000						
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						
Landscaping	1.7431	0.6617	57.2127	3.0100e-003		0.3146	0.3146		0.3146	0.3146						
Total	**40.6278**	**0.6617**	**57.2127**	**3.0100e-003**		**0.3146**	**0.3146**		**0.3146**	**0.3146**						

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Vegetation

PM10 Modeling Results

PM10 Emission Estimates for PM10 Modeling

Total Construction PM10 Emissions (ppd)		Total PM10 Emissions with 45% Reduction in Exhaust (ppd)		Total Onsite (g/s)		
Fugitive	Exhaust	Fugitive	Exhaust	Fugitive	Exhaust	Total
5.7	3.6	5.7	2.0	0.09	0.031	0.121

Cconstruction PM10 emission estimates (ppd or pounds per day) are worst-case daily and were obtained from CalEEMod emissions for 2016, the first year of construction. During 2016, site preparation would occur first from January through February, while grading is assumed to occur from February through June. Fugitive emissions assume a 75% reduction from uncontrolled levels and were estimated using CalEEMod. This 75% reduction represents SMAQMD's enhanced mitigation for fugitive dust. CalEEMod does not account for the 45% reduction in exhaust emissions required by Mitigation Air-1. Consequently, the table above shows total exhaust emissions with the 45% reduction estimated separately to represent SMAQMD's enhanced mitigation.

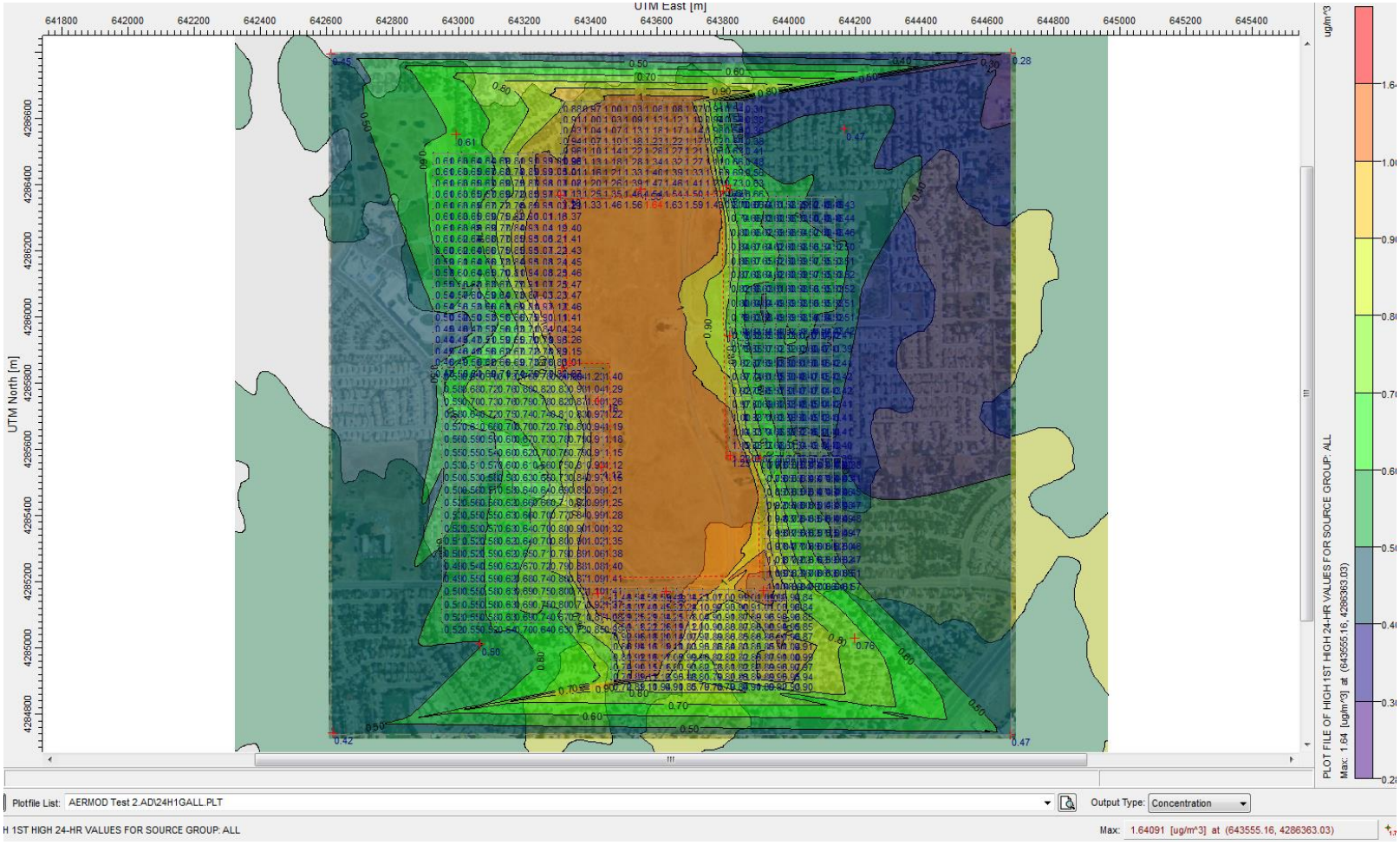
Emissions were then converted to grams per second emissions to be used as inputs to AERMOD. To convert grams per second emission rates, pounds per day emissions were multiplied by a grams per pound (453.6) conversion factor and divided by the number of seconds (28,800) in an eight hour work day.

SMAQMD's modeling guidance was used to setup and run AERMOD, including pollutant type (PM10), averaging time (24 hours), dispersion coefficient (urban), source pathway (volume sources, with fugitive and exhaust sources overlain), 25% of the total area (75 acres) modeled, a receptor grid spacing of 10 meters, receptor flagpole heights of 1.8 meters, and five years of meteorological data (2007 through 2011) for Sacramento International Airport.. The modeling analysis also included local terrain data.

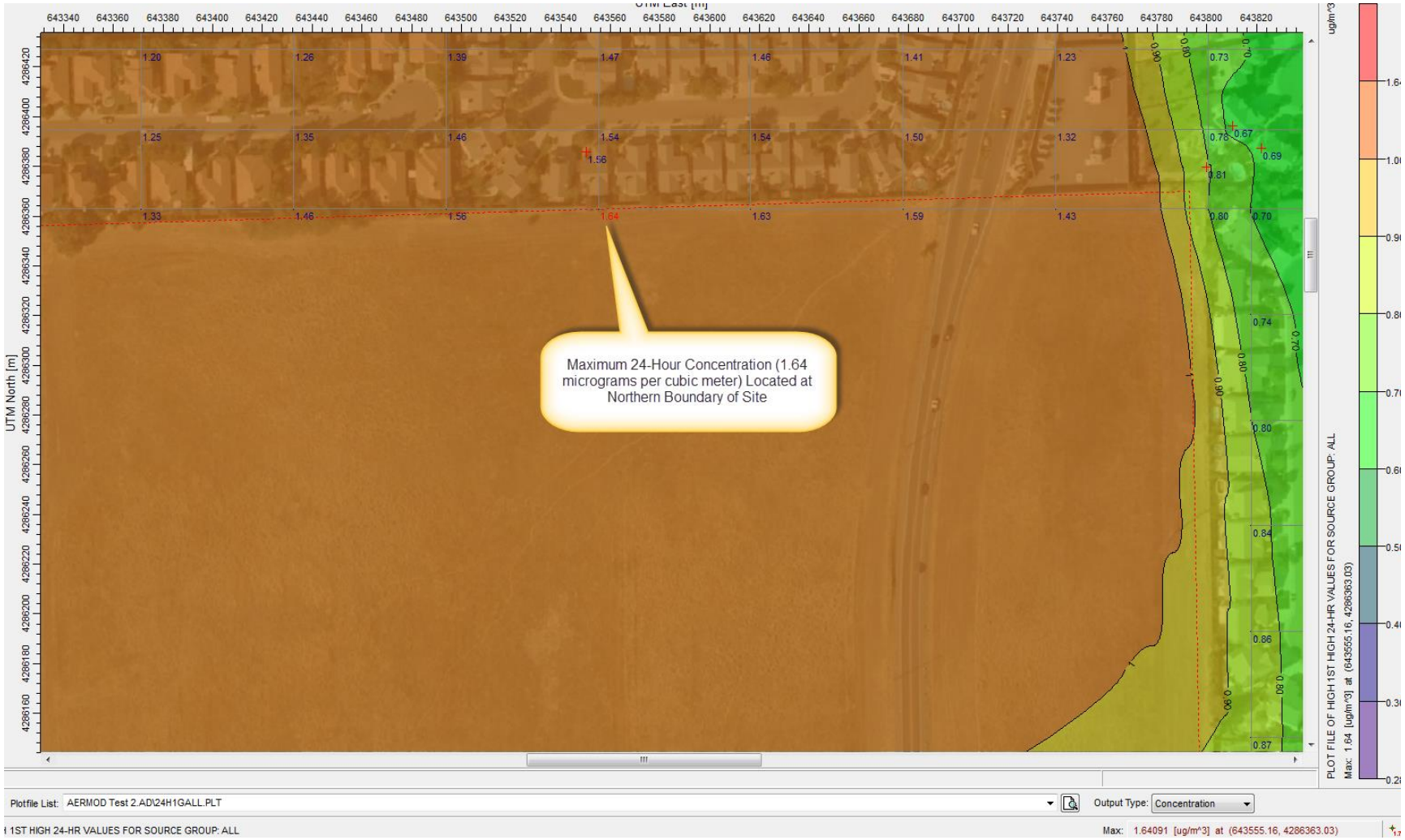
The AERMOD results are shown in the following output.

AERMOD Graphical Results

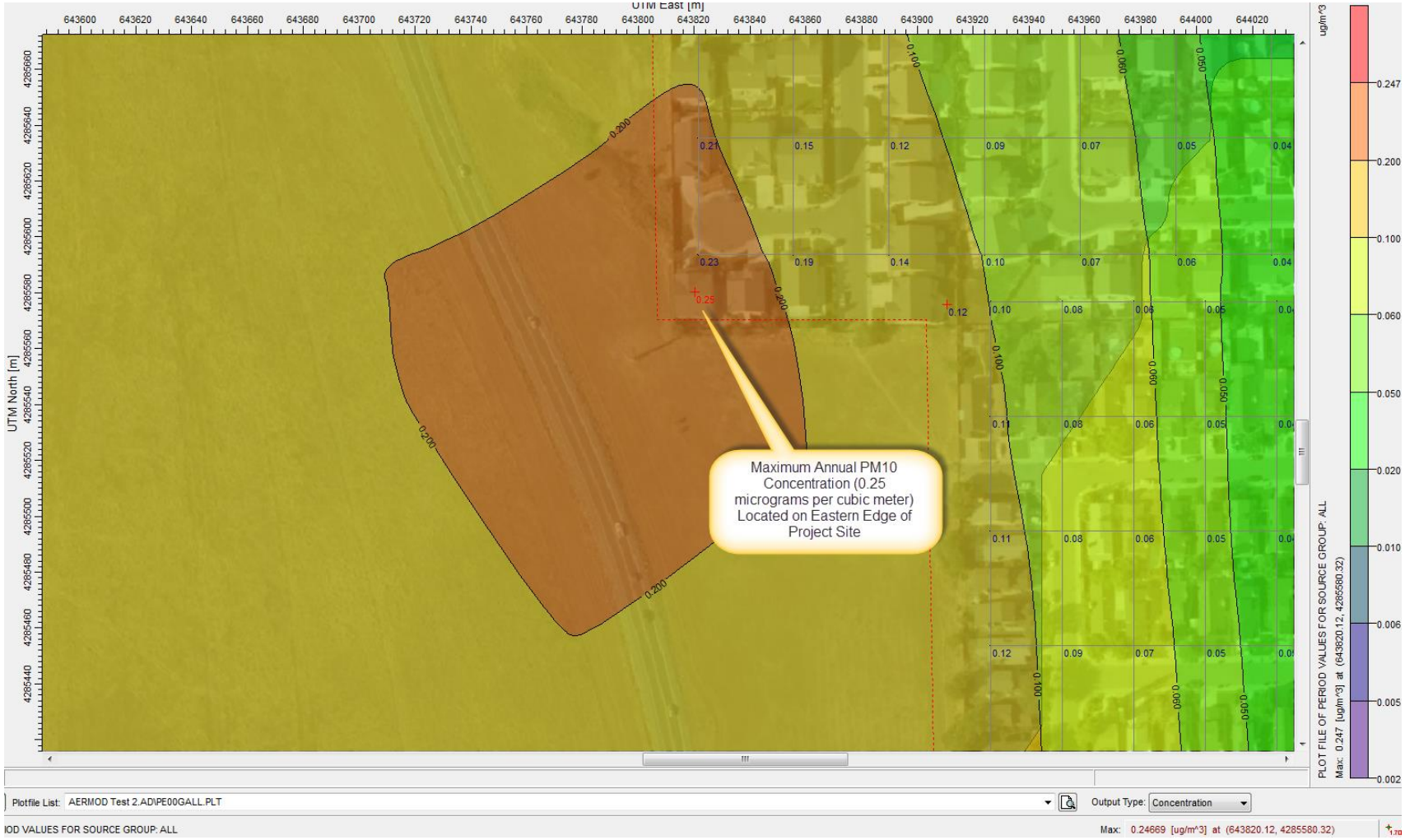
Overview (red dotted outline area represents area sources included in the modeling {128 acres})



Maximum 24-Hour Concentration (located at northern boundary)



Maximum Annual PM10 Concentration



AERMOD Summary Output File

```
*** AERMOD - VERSION  12060 ***   *** C:\Users\sda\Desktop\AERMOD Test 2\AERMOD Test 2.isc                ***        11/12/14
                                   ***                                                                    ***        10:54:11
                                                                                                                     PAGE   1
 **MODELOPTs:  NonDFAULT CONC                                      FLAT and  ELEV


                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Allows User-Specified Options:
         1. Stack-tip Downwash.
         2. Allow FLAT/ELEV Terrain Option by Source,
            with      0 FLAT and      1 ELEV Source(s).
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Model Assumes No FLAGPOLE Receptor Heights.

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates PERIOD Averages

 **This Run Includes:      1 Source(s);       1 Source Group(s); and     982 Receptor(s)

 **The Model Assumes A Pollutant Type of:  PM_10

 **Model Set To Continue RUNning After the Setup Testing.

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and Missing Hours
```

```
**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    10.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      3.6 MB of RAM.

**Detailed Error/Message File:   AERMOD Test 2.err
**File for Summary of Results:   AERMOD Test 2.sum
```

```
                                                *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                                 (1=YES; 0=NO)

          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1

                     METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 2007   1  1  1
                                                        AND END DATE: 2009  12 31 24

              NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.


                                       *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                                  (METERS/SEC)

                                                  1.54,   3.09,   5.14,   8.23,  10.80,
```

**MODELOPTs: NonDFAULT CONC FLAT and ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: Int07-11N1MD.SFC Met Version: 11059
Profile file: Int07-11N1MD.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 93225 Upper air station no.: 23230
Name: UNKNOWN Name: OAKLAND/WSO_AP
Year: 2007 Year: 2007

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
07	01	01	1	01	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.06	0.69	1.00	0.00	0.	10.0	275.9	2.0
07	01	01	1	02	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.06	0.69	1.00	0.00	0.	10.0	275.4	2.0
07	01	01	1	03	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.06	0.69	1.00	0.00	0.	10.0	276.4	2.0
07	01	01	1	04	-5.4	0.073	-9.000	-9.000	-999.	45.	6.5	0.08	0.69	1.00	1.76	293.	10.0	274.2	2.0
07	01	01	1	05	-30.3	0.259	-9.000	-9.000	-999.	303.	52.3	0.07	0.69	1.00	3.86	323.	10.0	275.4	2.0
07	01	01	1	06	-25.3	0.216	-9.000	-9.000	-999.	231.	36.3	0.08	0.69	1.00	3.36	292.	10.0	275.4	2.0
07	01	01	1	07	-50.3	0.431	-9.000	-9.000	-999.	651.	145.6	0.06	0.69	1.00	5.96	335.	10.0	276.4	2.0
07	01	01	1	08	-9.0	0.093	-9.000	-9.000	-999.	275.	8.2	0.06	0.69	1.00	2.36	999.	10.0	275.9	2.0
07	01	01	1	09	11.9	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.06	0.69	0.41	0.00	0.	10.0	277.0	2.0
07	01	01	1	10	32.8	0.167	0.478	0.012	122.	157.	-13.0	0.06	0.69	0.28	1.76	351.	10.0	279.2	2.0
07	01	01	1	11	62.9	0.552	0.800	0.006	297.	942.	-243.3	0.06	0.69	0.24	6.96	334.	10.0	285.9	2.0
07	01	01	1	12	79.2	0.573	0.948	0.005	392.	998.	-216.9	0.07	0.69	0.22	6.96	326.	10.0	287.0	2.0
07	01	01	1	13	82.1	0.629	0.989	0.005	430.	1146.	-276.0	0.06	0.69	0.22	7.96	333.	10.0	289.2	2.0
07	01	01	1	14	70.5	0.734	0.963	0.005	462.	1445.	-511.1	0.07	0.69	0.23	9.06	319.	10.0	289.2	2.0
07	01	01	1	15	45.9	0.744	0.848	0.005	483.	1476.	-817.0	0.06	0.69	0.26	9.56	332.	10.0	289.9	2.0
07	01	01	1	16	10.2	0.655	0.515	0.005	487.	1229.	-2509.3	0.06	0.69	0.35	8.46	334.	10.0	289.2	2.0
07	01	01	1	17	-54.1	0.535	-9.000	-9.000	-999.	915.	258.3	0.07	0.69	0.61	6.96	321.	10.0	287.0	2.0
07	01	01	1	18	-60.0	0.533	-9.000	-9.000	-999.	895.	229.6	0.07	0.69	1.00	6.96	307.	10.0	285.4	2.0
07	01	01	1	19	-10.4	0.097	-9.000	-9.000	-999.	447.	8.0	0.03	0.69	1.00	2.86	34.	10.0	283.8	2.0
07	01	01	1	20	-9.4	0.096	-9.000	-9.000	-999.	149.	8.7	0.07	0.69	1.00	2.36	167.	10.0	282.0	2.0
07	01	01	1	21	-16.7	0.146	-9.000	-9.000	-999.	128.	16.9	0.07	0.69	1.00	2.86	170.	10.0	280.9	2.0
07	01	01	1	22	-24.7	0.215	-9.000	-9.000	-999.	229.	36.6	0.07	0.69	1.00	3.36	162.	10.0	280.4	2.0
07	01	01	1	23	-8.0	0.087	-9.000	-9.000	-999.	70.	7.4	0.04	0.69	1.00	2.36	130.	10.0	279.2	2.0
07	01	01	1	24	-27.0	0.234	-9.000	-9.000	-999.	260.	43.1	0.04	0.69	1.00	3.86	120.	10.0	278.8	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
07	01	01	01	10.0	1	-999.	-99.00	276.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: NonDFAULT CONC FLAT and ELEV

*** THE SUMMARY OF MAXIMUM PERIOD (26304 HRS) RESULTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.24669 AT (643820.12, 4285580.32, 45.99, 45.99, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.23323 AT (643821.38, 4285593.78, 45.80, 45.80, 0.00)	GC	UCART1
	3RD HIGHEST VALUE IS	0.21009 AT (643821.38, 4285635.29, 45.70, 45.70, 0.00)	GC	UCART1
	4TH HIGHEST VALUE IS	0.19363 AT (643821.38, 4285676.80, 46.60, 46.60, 0.00)	GC	UCART1
	5TH HIGHEST VALUE IS	0.19112 AT (643616.53, 4286363.03, 44.60, 44.60, 0.00)	GC	UCART3
	6TH HIGHEST VALUE IS	0.18918 AT (643677.90, 4286363.03, 44.20, 44.20, 0.00)	GC	UCART3
	7TH HIGHEST VALUE IS	0.18916 AT (643555.16, 4286363.03, 44.80, 44.80, 0.00)	GC	UCART3
	8TH HIGHEST VALUE IS	0.18502 AT (643855.61, 4285593.78, 46.60, 46.60, 0.00)	GC	UCART1
	9TH HIGHEST VALUE IS	0.18056 AT (643821.38, 4285718.31, 46.80, 46.80, 0.00)	GC	UCART1
	10TH HIGHEST VALUE IS	0.17990 AT (643493.79, 4286363.03, 45.70, 45.70, 0.00)	GC	UCART3

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: NonDFAULT CONC FLAT and ELEV

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	1.64091c	ON 07011824:	AT (643555.16, 4286363.03, 44.80, 44.80, 0.00)	GC	UCART3

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: NonDFAULT CONC   FLAT and ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   7 Warning Message(s)
A Total of   5371 Informational Message(s)

A Total of   26304 Hours Were Processed

A Total of   4122 Calm Hours Identified

A Total of   1249 Missing Hours Identified (4.75 Percent)

   ******** FATAL ERROR MESSAGES ********
              *** NONE ***

   ********   WARNING MESSAGES   ********
RE W213   54 RECART:ELEV Input Inconsistent With Option: Input Ignored   UCART1
RE W213   97 RECART:ELEV Input Inconsistent With Option: Input Ignored   UCART2
RE W213   140 RECART:ELEV Input Inconsistent With Option: Input Ignored   UCART3
RE W213   223 RECART:ELEV Input Inconsistent With Option: Input Ignored   UCART4
RE W213   310 RECART:ELEV Input Inconsistent With Option: Input Ignored   UCART5
RE W213   373 RECART:ELEV Input Inconsistent With Option: Input Ignored   UCART6
RE W213   416 RECART:ELEV Input Inconsistent With Option: Input Ignored   UCART7

Appendix B – Greenhouse Gas Emissions

Table of Contents

Greenhouse Gas Emission Estimates

EMFAC2011 Emissions

itle : Sacramento County Subarea Summer 45 CYrs 1990 to 2035 Default Title

Version : Emfac2011-LDV V2.50.58.094 Sp: Trip Assign Santa Clara County

Run Date : 2014/10/23 14:43:37

Scen Year: 1990 -- All model years in the range 1965 to 1990 selected

Season : Annual

Area : Sacramento

****

Year: 1990 -- Model Years 1965 to 1990 Inclusive -- Annual

Emfac2011-LDV Emission Factors: V2.50.58.094 Sp: Trip Assign Santa Clara County

County Average Sacramento County Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Carbon Dioxide Temperature: 70F Relative Humidity: 0%

Speed

MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	1068.033	1292.658	1827.577	2513.997	2886.175	193.385	1212.716
10	807.947	977.315	1335.637	1675.394	2652.348	165.448	911.682
15	634.448	766.955	1024.584	1179.395	2514.265	143.751	713.107
20	517.125	624.707	823.133	877.083	2430.188	126.844	579.987
25	437.464	528.122	690.973	689.737	2377.936	113.668	490.211

30	384.054	463.365	604.735	572.878	2345.383	103.447	430.322
35	349.863	421.909	550.724	502.443	2325.795	95.611	392.132
40	330.688	398.661	521.080	465.260	2315.484	89.744	370.789
45	324.285	390.897	511.750	454.847	2312.637	85.549	363.721
50	329.923	397.733	521.519	469.472	2316.770	82.819	370.103
55	348.245	419.948	551.725	511.658	2328.588	81.425	390.694
60	381.391	460.135	606.582	588.908	2350.190	81.301	427.992
65	433.419	523.218	694.228	715.973	2385.707	82.441	486.751
70	433.419	523.218	748.647	919.625	2442.630	84.899	493.978
75	433.419	523.218	836.448	1248.137	2534.469	88.791	505.637

VMT Estimates and Metric Tons CO2e per capita for Transportation

Bin Name	VMT Speed Bins Actual	2035 cumulative (A)		2035 cumulative with project (B)		2035 Project Only (B - A)		Weight (grams/mile)	Metric Ton Per year CO2
		VMT	%	VMT	%	VMT	%		
5	0.0 - 4.99	23,298	0.03%	23,313	0.03%	14	0.00%	1,213	6
10	5.0 - 9.99	91,242	0.11%	99,412	0.12%	8,170	0.01%	912	2,719
15	10.0 - 14.99	609,688	0.74%	575,727	0.70%	-33,961	-0.04%	713	-8,839
20	15.0 - 19.99	2,585,454	3.16%	2,621,885	3.20%	36,431	0.04%	580	7,712
25	20.0 - 24.99	4,823,715	5.89%	4,840,220	5.91%	16,506	0.02%	490	2,953
30	25.0 - 29.99	6,908,027	8.44%	6,978,382	8.52%	70,355	0.08%	430	11,050
35	30.0 - 34.99	11,564,159	14.13%	11,459,246	14.00%	-104,912	-0.13%	392	-15,016
40	35.0 - 39.99	10,450,848	12.77%	10,516,587	12.84%	65,739	0.08%	371	8,897
45	40.0 - 44.99	10,124,199	12.37%	10,129,844	12.37%	5,644	0.00%	364	749
50	45.0 - 49.99	13,990,963	17.09%	14,095,351	17.22%	104,388	0.12%	370	14,102
55	50.0 - 54.99	12,439,628	15.20%	12,349,907	15.08%	-89,721	-0.11%	391	-12,794
60	55.0 - 59.99	5,173,870	6.32%	5,131,788	6.27%	-42,082	-0.05%	428	-6,574
65	60.0 - 64.99	1,307,633	1.60%	1,294,796	1.58%	-12,837	-0.02%	487	-2,281
70	65.0 - 69.99	1,756,482	2.15%	1,757,231	2.15%	749	0.00%	494	135
75	>= 70.0	0	0.00%	0	0.00%	0	0.00%	506	0

Total MT CO2 per Year	MT CO2e per Year	Population	MT per Capita	Threshold
2,820	2,961	1,845	1.60	2.64

Notes: The EMFAC2011 run was made for Sacramento County for 2020 with emission rates generated by speed. A CO2 emission rate was estimated for each speed bin based on the percentage of vehicle miles traveled (weighted by vehicle class and fuel type) within that bin. VMT estimates for 2035 cumulative and 2035 with project were used for the GHG estimates (2020 VMT was unavailable). The Barrett Rach East project VMT per day is the difference between 2035 cumulative and 2035 cumulative with project. VMT per day for each speed bin was multiplied by weighted grams/mile for that speed bin and converted to metric tons per day, which then multiplied by 365 to obtain metric tons per year. EMFAC2011 does not include emission rates for CH4 or N20. CH4 and N20 were included in the MT of CO2e per year by multiplying the MT of CO2 per year by 1.05[1]

[1] U.S. Environmental Protection Agency (EPA). *Greenhouse Gas Emissions from a Typical Passenger Vehicle (EPA-420-F-14-040).* May 2014

Barrett Ranch East

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	27.20	1000sqft	0.62	27,200.00	0
City Park	7.80	Acre	7.80	339,768.00	0
Apartments Low Rise	196.00	Dwelling Unit	10.50	196,000.00	523
Single Family Housing	495.00	Dwelling Unit	95.50	891,000.00	1322
Regional Shopping Center	108.90	1000sqft	6.40	108,900.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2020

Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Land use, unit amount and ot acreage infomation was provided by the Applicant.

Construction Phase - Assumed construction schedule

On-road Fugitive Dust - Percent paved road are based on the assumption that 100% of travel will be on paved road

Grading - Assumed all material will be balanced on site, so no net import or export.

Vehicle Trips - Used daily trip rates provided by the Applicant with a 18% trip reduction.

Energy Use - Change default Ttle 24 Energy to incoprate 2013 Title 24 energy construction standards.

Construction Off-road Equipment Mitigation - Construction Off-road Equipment Mitigation - 75% reduction represents Enhanced Construction Emission Control to control fugitive dust.

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	55	75
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	55	75

tblConstructionhase	NumDays	220.00	59.00
tblConstructionPhase	NumDays	3,100.00	815.00
tblConstructionPhase	NumDays	310.00	83.00
tblConstructionPhase	NumDays	220.00	58.00
tblConstructionPhase	NumDays	120.00	31.00
tblEnergyUse	T24E	348.18	261.14
tblEnergyUse	T24E	3.98	2.99
tblEnergyUse	T24E	729.62	547.22
tblEnergyUse	T24NG	11,068.06	8,301.05
tblEnergyUse	T24NG	4.72	3.54
tblEnergyUse	T24NG	26,218.01	19,663.51
tblGrading	AcresOfGrading	207.50	128.00
tblGrading	AcresOfGrading	0.00	128.00
tblLandUse	LotAcreage	12.25	10.50
tblLandUse	LotAcreage	160.71	95.50
tblLandUse	LotAcreage	2.50	6.40
tblProjectCharacteristics	OperationalYear	2014	2020
tblVehicleTrips	CC_TL	5.00	2.33

tblVehicleTrips	CNW_TL	6.50	3.02
tblVehicleTrips	CW_TL	10.00	4.65
tblVehicleTrips	HO_TL	6.50	3.02
tblVehicleTrips	HO_TL	6.50	3.02
tblVehicleTrips	HS_TL	5.00	2.33
tblVehicleTrips	HS_TL	5.00	2.33
tblVehicleTrips	HW_TL	10.00	4.65
tblVehicleTrips	HW_TL	10.00	4.65
tblVehicleTrips	ST_TR	7.16	5.49
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	ST_TR	49.97	27.03
tblVehicleTrips	ST_TR	10.08	7.50
tblVehicleTrips	SU_TR	6.07	5.49
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	SU_TR	25.24	27.03
tblVehicleTrips	SU_TR	8.77	7.50
tblVehicleTrips	WD_TR	6.59	5.49
tblVehicleTrips	WD_TR	1.59	0.00

tblVehicleTrips	WD_TR	42.94	54.06
tblVehicleTrips	WD_TR	9.57	7.50

2.0 Emissions Summary

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

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area											0.0000	11.6439	11.6439	0.0114	0.0000	11.8824
Energy											0.0000	2,326.7393	2,326.7393	0.0899	0.0303	2,338.0223
Mobile											0.0000	3,506.6398	3,506.6398	0.1500	0.0000	3,509.7896
Waste											138.2571	0.0000	138.2571	8.1708	0.0000	309.8432

Water											18.7826	110.7692	129.5518	0.0701	0.0420	144.0349
Total											**157.0397**	**5,955.7921**	**6,112.8319**	**8.4921**	**0.0723**	**6,313.5724**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area											0.0000	11.6439	11.6439	0.0114	0.0000	11.8824
Energy											0.0000	2,122.9515	2,122.9515	0.0836	0.0272	2,133.1436
Mobile											0.0000	3,506.6398	3,506.6398	0.1500	0.0000	3,509.7896
Waste											138.2571	0.0000	138.2571	8.1708	0.0000	309.8432
Water											18.7826	110.7692	129.5518	0.0703	0.0420	144.0559
Total											**157.0397**	**5,752.0043**	**5,909.0441**	**8.4861**	**0.0692**	**6,108.7146**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.42**	**3.33**	**0.07**	**4.22**	**3.24**

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	1/1/2016	2/12/2016	5	31	
2	Grading	Grading	2/13/2016	6/8/2016	5	83	
3	Building Construction	Building Construction	6/9/2016	7/24/2019	5	815	
4	Paving	Paving	7/25/2019	10/14/2019	5	58	
5	Architectural Coating	Architectural Coating	10/15/2019	1/3/2020	5	59	

Acres of Grading (Site Preparation Phase): 128

Acres of Grading (Grading Phase): 128

Acres of Paving: 0

Residential Indoor: 2,201,175; Residential Outdoor: 733,725; Non-Residential Indoor: 674,226; Non-Residential Outdoor: 224,742 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

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
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	508.00	152.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	102.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 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					
Fugitive Dust											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road											0.0000	57.1595	57.1595	0.0172	0.0000	57.5216
Total											**0.0000**	**57.1595**	**57.1595**	**0.0172**	**0.0000**	**57.5216**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker											0.0000	1.8287	1.8287	1.0000e-004	0.0000	1.8308
Total											**0.0000**	**1.8287**	**1.8287**	**1.0000e-004**	**0.0000**	**1.8308**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road											0.0000	57.1595	57.1595	0.0172	0.0000	57.5215

Total											**0.0000**	**57.1595**	**57.1595**	**0.0172**	**0.0000**	**57.5215**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker											0.0000	1.8287	1.8287	1.0000e-004	0.0000	1.8308
Total											**0.0000**	**1.8287**	**1.8287**	**1.0000e-004**	**0.0000**	**1.8308**

3.3 Grading - 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					
Fugitive Dust											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road											0.0000	241.5123	241.5123	0.0729	0.0000	243.0421

Total											**0.0000**	**241.5123**	**241.5123**	**0.0729**	**0.0000**	**243.0421**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker											0.0000	5.4403	5.4403	2.9000e-004	0.0000	5.4464
Total											**0.0000**	**5.4403**	**5.4403**	**2.9000e-004**	**0.0000**	**5.4464**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road											0.0000	241.5120	241.5120	0.0729	0.0000	243.0418

Total											**0.0000**	**241.5120**	**241.5120**	**0.0729**	**0.0000**	**243.0418**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker											0.0000	5.4403	5.4403	2.9000e-004	0.0000	5.4464
Total											**0.0000**	**5.4403**	**5.4403**	**2.9000e-004**	**0.0000**	**5.4464**

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											0.0000	177.9829	177.9829	0.0441	0.0000	178.9099
Total											**0.0000**	**177.9829**	**177.9829**	**0.0441**	**0.0000**	**178.9099**

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
Vendor											0.0000	210.8291	210.8291	1.6900e-003	0.0000	210.8645

Worker												0.0000	244.7340	244.7340	0.0131	0.0000	245.0087
Total												**0.0000**	**455.5631**	**455.5631**	**0.0148**	**0.0000**	**455.8732**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road											0.0000	177.9827	177.9827	0.0441	0.0000	178.9097
Total											**0.0000**	**177.9827**	**177.9827**	**0.0441**	**0.0000**	**178.9097**

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
Vendor											0.0000	210.8291	210.8291	1.6900e-003	0.0000	210.8645

Worker												0.0000	244.7340	244.7340	0.0131	0.0000	245.0087
Total												**0.0000**	**455.5631**	**455.5631**	**0.0148**	**0.0000**	**455.8732**

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											0.0000	311.3228	311.3228	0.0766	0.0000	312.9319
Total											**0.0000**	**311.3228**	**311.3228**	**0.0766**	**0.0000**	**312.9319**

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
Vendor											0.0000	366.6143	366.6143	2.7800e-003	0.0000	366.6727

Worker												0.0000	415.7387	415.7387	0.0211	0.0000	416.1820
Total												**0.0000**	**782.3530**	**782.3530**	**0.0239**	**0.0000**	**782.8547**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road											0.0000	311.3225	311.3225	0.0766	0.0000	312.9315
Total											**0.0000**	**311.3225**	**311.3225**	**0.0766**	**0.0000**	**312.9315**

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
Vendor											0.0000	366.6143	366.6143	2.7800e-003	0.0000	366.6727

Worker												0.0000	415.7387	415.7387	0.0211	0.0000	416.1820
Total												**0.0000**	**782.3530**	**782.3530**	**0.0239**	**0.0000**	**782.8547**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road											0.0000	308.9844	308.9844	0.0756	0.0000	310.5723
Total											**0.0000**	**308.9844**	**308.9844**	**0.0756**	**0.0000**	**310.5723**

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
Vendor											0.0000	361.2264	361.2264	2.7200e-003	0.0000	361.2836

Worker												0.0000	401.5615	401.5615	0.0195	0.0000	401.9710
Total												**0.0000**	**762.7879**	**762.7879**	**0.0222**	**0.0000**	**763.2546**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road											0.0000	308.9841	308.9841	0.0756	0.0000	310.5720
Total											**0.0000**	**308.9841**	**308.9841**	**0.0756**	**0.0000**	**310.5720**

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
Vendor											0.0000	361.2264	361.2264	2.7200e-003	0.0000	361.2836

Worker												0.0000	401.5615	401.5615	0.0195	0.0000	401.9710
Total												**0.0000**	**762.7879**	**762.7879**	**0.0222**	**0.0000**	**763.2546**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road											0.0000	172.0802	172.0802	0.0419	0.0000	172.9595
Total											**0.0000**	**172.0802**	**172.0802**	**0.0419**	**0.0000**	**172.9595**

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
Vendor											0.0000	200.1529	200.1529	1.4900e-003	0.0000	200.1842

Worker												0.0000	217.0061	217.0061	0.0102	0.0000	217.2206
Total												**0.0000**	**417.1590**	**417.1590**	**0.0117**	**0.0000**	**417.4049**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road											0.0000	172.0800	172.0800	0.0419	0.0000	172.9593
Total											**0.0000**	**172.0800**	**172.0800**	**0.0419**	**0.0000**	**172.9593**

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
Vendor											0.0000	200.1529	200.1529	1.4900e-003	0.0000	200.1842

Worker												0.0000	217.0061	217.0061	0.0102	0.0000	217.2206
Total												**0.0000**	**417.1590**	**417.1590**	**0.0117**	**0.0000**	**417.4049**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road											0.0000	58.1145	58.1145	0.0184	0.0000	58.5006
Paving											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total											**0.0000**	**58.1145**	**58.1145**	**0.0184**	**0.0000**	**58.5006**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker											0.0000	2.5282	2.5282	1.2000e-004	0.0000	2.5307
Total											**0.0000**	**2.5282**	**2.5282**	**1.2000e-004**	**0.0000**	**2.5307**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road											0.0000	58.1144	58.1144	0.0184	0.0000	58.5005
Paving											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total											**0.0000**	**58.1144**	**58.1144**	**0.0184**	**0.0000**	**58.5005**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker											0.0000	2.5282	2.5282	1.2000e-004	0.0000	2.5307
Total											**0.0000**	**2.5282**	**2.5282**	**1.2000e-004**	**0.0000**	**2.5307**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road											0.0000	7.1491	7.1491	6.0000e-004	0.0000	7.1618

Total											**0.0000**	**7.1491**	**7.1491**	**6.0000e-004**	**0.0000**	**7.1618**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker												0.0000	16.5989	16.5989	7.8000e-004	0.0000	16.6153
Total												**0.0000**	**16.5989**	**16.5989**	**7.8000e-004**	**0.0000**	**16.6153**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road											0.0000	7.1491	7.1491	6.0000e-004	0.0000	7.1618

Total											**0.0000**	**7.1491**	**7.1491**	**6.0000e-004**	**0.0000**	**7.1618**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker												0.0000	16.5989	16.5989	7.8000e-004	0.0000	16.6153
Total												**0.0000**	**16.5989**	**16.5989**	**7.8000e-004**	**0.0000**	**16.6153**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road											0.0000	0.3830	0.3830	3.0000e-005	0.0000	0.3836

Total											**0.0000**	**0.3830**	**0.3830**	**3.0000e-005**	**0.0000**	**0.3836**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker											0.0000	0.8540	0.8540	4.0000e-005	0.0000	0.8549
Total											**0.0000**	**0.8540**	**0.8540**	**4.0000e-005**	**0.0000**	**0.8549**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road											0.0000	0.3830	0.3830	3.0000e-005	0.0000	0.3836

Total											**0.0000**	**0.3830**	**0.3830**	**3.0000e-005**	**0.0000**	**0.3836**

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
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker												0.0000	0.8540	0.8540	4.0000e-005	0.0000	0.8549
Total												**0.0000**	**0.8540**	**0.8540**	**4.0000e-005**	**0.0000**	**0.8549**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated											0.0000	3,506.6398	3,506.6398	0.1500	0.0000	3,509.7896
Unmitigated											0.0000	3,506.6398	3,506.6398	0.1500	0.0000	3,509.7896

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	1,076.04	1,076.04	1076.04	1,284,464	1,284,464
City Park	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	5,887.13	2,943.57	2943.57	3,292,688	3,292,688
Single Family Housing	3,712.50	3,712.50	3712.50	4,431,595	4,431,595
Total	10,675.67	7,732.11	7,732.11	9,008,747	9,008,747

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	4.65	2.33	3.02	46.50	12.50	41.00	86	11	3
City Park	10.00	5.00	6.50	33.00	48.00	19.00	66	28	6
Parking Lot	10.00	5.00	6.50	0.00	0.00	0.00	0	0	0
Regional Shopping Center	4.65	2.33	3.02	16.30	64.70	19.00	54	35	11
Single Family Housing	4.65	2.33	3.02	46.50	12.50	41.00	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.503605	0.067800	0.178973	0.146934	0.044621	0.006359	0.021238	0.016884	0.002315	0.002275	0.006260	0.000554	0.002182

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	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	1,433.2320	1,433.2320	0.0704	0.0146	1,439.2265
Electricity Unmitigated											0.0000	1,511.6581	1,511.6581	0.0743	0.0154	1,517.9807
NaturalGas Mitigated											0.0000	689.7195	689.7195	0.0132	0.0126	693.9170
NaturalGas Unmitigated											0.0000	815.0812	815.0812	0.0156	0.0149	820.0417

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					
City Park	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping	486783											0.0000	25.9766	25.9766	5.0000e-004	4.8000e-004	26.1347
Single Family Housing	1.26706e+007											0.0000	676.1541	676.1541	0.0130	0.0124	680.2690
Apartments Low Rise	2.11661e+006											0.0000	112.9506	112.9506	2.1600e-003	2.0700e-003	113.6380
Total												**0.0000**	**815.0812**	**815.0812**	**0.0156**	**0.0150**	**820.0417**

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					
Parking Lot	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping	409682											0.0000	21.8622	21.8622	4.2000e-004	4.0000e-004	21.9952
Single Family Housing	1.0724e+007											0.0000	572.2714	572.2714	0.0110	0.0105	575.7542
Apartments Low Rise	1.79121e+006											0.0000	95.5859	95.5859	1.8300e-003	1.7500e-003	96.1677
City Park	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total												**0.0000**	**689.7195**	**689.7195**	**0.0132**	**0.0126**	**693.9170**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use		Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	tons/yr	MT/yr			
Apartments Low Rise	725835		194.3497	9.5500e-003	1.9800e-003	195.1626
City Park	0		0.0000	0.0000	0.0000	0.0000
Parking Lot	23936		6.4091	3.1000e-004	7.0000e-005	6.4359
Regional Shopping	1.30462e+006		349.3257	0.0172	3.5500e-003	350.7868
Single Family	3.59118e+006		961.5736	0.0472	9.7700e-003	965.5954
Total			**1,511.6581**	**0.0743**	**0.0154**	**1,517.9806**

Mitigated

	Electricity Use		Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	tons/yr	MT/yr			
Apartments Low Rise	699715		187.3559	9.2000e-003	1.9000e-003	188.1395
City Park	0		0.0000	0.0000	0.0000	0.0000
Parking Lot	21542.4		5.7682	2.8000e-004	6.0000e-005	5.7923
Regional Shopping	1.17405e+006		314.3640	0.0154	3.2000e-003	315.6788
Single Family	3.45736e+006		925.7439	0.0455	9.4100e-003	929.6159
Total			**1,433.2320**	**0.0704**	**0.0146**	**1,439.2265**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated											0.0000	11.6439	11.6439	0.0114	0.0000	11.8824
Unmitigated											0.0000	11.6439	11.6439	0.0114	0.0000	11.8824

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	11.6439	11.6439	0.0114	0.0000	11.8824

Total											**0.0000**	**11.6439**	**11.6439**	**0.0114**	**0.0000**	**11.8824**

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	11.6439	11.6439	0.0114	0.0000	11.8824
Total											**0.0000**	**11.6439**	**11.6439**	**0.0114**	**0.0000**	**11.8824**

7.0 Water Detail

7.1 Mitigation Measures Water

		Total CO2	CH4	N2O	CO2e
Category	tons/yr	MT/yr			
Mitigated		129.5518	0.0703	0.0420	144.0559
Unmitigated		129.5518	0.0701	0.0420	144.0349

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use		Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr	MT/yr			
Apartments Low Rise	12.7702 / 8.05077		29.1002	0.0168	0.0101	32.5755
City Park	0 / 9.29355		8.7096	4.3000e-004	9.0000e-005	8.7460
Parking Lot	0 / 0		0.0000	0.0000	0.0000	0.0000
Regional Shopping	8.0665 / 4.94398		18.2491	0.0106	6.3600e-003	20.4438

Single Family	32.2512 / 20.3323		73.4929	0.0423	0.0255	82.2697
Total			**129.5518**	**0.0701**	**0.0420**	**144.0349**

Mitigated

	Indoor/Outdoor Use		Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr	MT/yr			
Apartments Low Rise	12.7702 / 8.05077		29.1002	0.0168	0.0101	32.5805
City Park	0 / 9.29355		8.7096	4.3000e-004	9.0000e-005	8.7460
Parking Lot	0 / 0		0.0000	0.0000	0.0000	0.0000
Regional Shopping	8.0665 / 4.94398		18.2491	0.0106	6.3700e-003	20.4469
Single Family	32.2512 / 20.3323		73.4929	0.0425	0.0255	82.2825
Total			**129.5518**	**0.0703**	**0.0420**	**144.0559**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

		Total CO2	CH4	N2O	CO2e
	tons/yr	MT/yr			
Mitigated		138.2571	8.1708	0.0000	309.8432
Unmitigated		138.2571	8.1708	0.0000	309.8432

8.2 Waste by Land Use

Unmitigated

	Waste Disposed		Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr	MT/yr			
Apartments Low Rise	90.16		18.3017	1.0816	0.0000	41.0152
City Park	0.67		0.1360	8.0400e-003	0.0000	0.3048
Parking Lot	0		0.0000	0.0000	0.0000	0.0000
Regional Shopping	114.35		23.2120	1.3718	0.0000	52.0196
Single Family Housing	475.92		96.6075	5.7093	0.0000	216.5035
Total			**138.2572**	**8.1708**	**0.0000**	**309.8432**

Mitigated

	Waste Disposed		Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr	MT/yr			
Apartments Low Rise	90.16		18.3017	1.0816	0.0000	41.0152
City Park	0.67		0.1360	8.0400e-003	0.0000	0.3048
Parking Lot	0		0.0000	0.0000	0.0000	0.0000
Regional Shopping	114.35		23.2120	1.3718	0.0000	52.0196
Single Family Housing	475.92		96.6075	5.7093	0.0000	216.5035
Total			**138.2572**	**8.1708**	**0.0000**	**309.8432**

9.0 Operational Offroad

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

10.0 Vegetation

Metric Tons GHG per Capita Energy Estimates

MT CO2e per Year (Electricity)	MT CO2e per Year (Natural Gas)	Population	MT per Capita	Threshold
1,439	694	1,845	1.15	1.33

Appendix C – Operational Air Quality Mitigation Plan

Table of Contents

Introduction

SMAQMD guidance recommends that projects that exceed its operational significance thresholds should prepare and implement an Air Quality Mitigation Plan (AQMP). The AQMP must be incorporated into the project's environmental document and be enforced by the local jurisdiction. The objective of the AQMP is to reduce ozone precursor emissions by 15 percent for projects considered to be in the State Implementation Plan and 35 percent for projects not considered to be in the State Implementation Plan[1,2]. The Barrett Ranch Project is considered to be within the SIP[3].

AQMPs can include two types of measures, those included within CalEEMod (known as on-model measures) and those located solely within this guidance (called off-model measures). This AQMP relies on a combination of on- and off-model measures.

On a ton for ton basis, NOx reductions provide greater ozone benefits than ROG reductions. Thus, SMAQMD recommends normalizing ozone precursors based on their ozone creation potential in units of Equivalent Oxides of Nitrogen (NOxe). To estimate NOxe, ROG is divided by 3 and then added to total NOx. To estimate the effectiveness of a mitigation plan, the following equation is used:

AQMP Effectiveness = ((Unmitigated Project NOxe – Mitigated NOxe)/(Unmitigated NOxe)) x 100.

This analysis uses SMAQMD's recommended approach to estimate AQMP effectiveness.

Result Summary

For the Barrett Ranch East Project, the AQMP analysis examines whether mitigation measures can be used to reduce unmitigated emissions by 15%. This requires two steps. The first step involves using CalEEMod to estimate unmitigated emissions.

Unmitigated Emission Estimate

The Project's unmitigated ROG and NOx operational emissions were estimated using the CalEEMod model (2013.2.2 version). The unmitigated CalEEMod results are shown in Appendix A and summarized in Table C-1 below. The average daily trip rates used to generate the results shown in Table C-1, are based on the CalEEMod default trip rates and trip lengths for each land use type.[4] Table C-1 shows that unmitigated ROG emissions exceed the SMAQMD ROG significance threshold, hence the need for this AQMP.

---

[1] Sacramento Metropolitan Air Quality Management District. *Operational Emissions Mitigation.* http://www.airquality.org/ceqa/mitigation.shtml. Accessed November 4, 2014.

[2] SMAQMD Recommended Guidance for Land Use Emission Reductions, Version 3.1. June 2014.

[3] Dubose, Rachel, SMAQMD. November 6, 2014 e-mail to Tim Rimpo, ESA regarding: "RE: Air Quality SIP Question."

[4] Philley, Paul, SMAQMD. November 5, 2015 phone conversation with Tim Rimpo, ESA regarding calculation of the unmitigated baseline.

Table C-1. Barrett Ranch East Maximum Unmitigated Daily Ozone Precursor Emissions

Parameter	ROG (ppd)	NOx (ppd)	NOxe (ppd)
Area Sources	40.6	0.7	
Energy Sources	0.5	3.9	
Mobile Sources	34.3	53.8	
Total Emissions	75.4	58.3	**83.4**
Significance Threshold	65	65	N/A
Exceed Operational Threshold?	Yes	No	N/A

Mitigated Emission Estimate

The mitigated emission estimates rely on one off-model and one on-model mitigation measure.

Off Model Measure

TS: Traffic Study (meta-measure). This measure from the SMAQMD's AQMP guidance recognizes that site-specific information is better than information generated from a statewide model. Consequently, it recommends that for projects that have a traffic study, that study should be used in lieu of the CalEEMod model defaults.[6] As discussed in SMAQMD's guidance, traffic studies typically include calculations of internal trip capture, mix of uses, distance to job centers, and sometimes walking and cycling information. In lieu of using CalEEMod to estimate the impact of these features on a project, the project should use the results of the traffic study. The first step in this approach is to run CalEEMod using the proposed land uses in default mode to establish the unmitigated baseline. This analysis was conducted and the baseline emission results are shown above in Table C-1.

The next step is to conduct a mitigated emission run using CalEEMod, altering the defaults and adding any mitigation not included in the traffic study. Consequently, mitigated off-model measures were estimated by modifying the CalEEMod defaults as follows:

The trip generation rates were modified to be consistent with the trip generation rates in the project traffic study. As part of this modification, the trip rates were also adjusted to account for internal trip reduction, estimated at 18% for total daily trips.[7]

The CalEEMod default estimate of total vehicle miles traveled (VMT) was revised to be consistent with the project specific VMT estimates.[8] VMT is the product of trip generation rates

[6] Sacramento Metropolitan Air Quality Management District. *Operational Emissions Mitigation.* http://www.airquality.org/ceqa/mitigation.shtml. Accessed November 4, 2014.
[7] Kimley-Horn and Associates, Inc. 2014 Traffic Impact Analysis, Barrett Ranch East, Sacramento County, California. Draft. October 14, 2014.
[8] Weir, M., Kimley-Horn. September, 25, 2014 email to Tim Rimpo, ESA RE: Barrett Ranch East | VMT.

times trip lengths. CalEEMod's default trip lengths were adjusted so that its VMT matched the project specific estimates.

The trip generation rates, trip lengths, and VMT estimates for the Barrett Ranch East project were modeled using the Sacramento Area Council of Government's (SACOG) SACSIM travel demand model. SACSIM accounts for several factors, including job accessibility (within a 30 minute drive or transit travel time), proximity to transit (distance to nearest light rail or bus station, in miles), job and housing density (dwelling units and jobs per acre), jobs and housing mix, and street pattern and urban design (intersection density for 1, 3, and 4 legged intersections).[9],[10] SACSIM does not account for measures such as TMA membership, transit subsidies, ride-sharing, low-income housing, or similar programs.

On Model Measure

One on-model measure was also identified for this project: exceedance of the Title 24 Energy Standards by 20 percent was specified. This measure was specified because CalEEMod generates estimates using the 2008 Title 24 standards. By specifying a 20% reduction from Title 24 standards, this will bring the project into line with the 2013 standards.

Results

As shown in Table C-2, the Operational AQMP would reduce NO_{xe} emissions by 34.4 percent. This reduction would easily exceed SMAQMD's minimum emission reduction requirements of 15 percent for projects located within a SIP area. The detailed CalEEMod mitigated results can be found in Appendix A.

Table C-2. Barrett Ranch East Maximum Mitigated Daily Ozone Precursor Emission

Parameter	ROG (ppd)	NOx (ppd)	NOxe (ppd)
Area Sources	40.6	0.7	
Energy Sources	0.4	3.3	
Mobile Sources	27.1	27.8	
Total Emissions	68.1	31.8	**54.5 (34.4 % reduction from unmitigated**
Significance Threshold	65	65	N/A
Exceed Operational Threshold?	Yes	No	N/A

[9] Wong, D., Kimley-Horn. November 13, 2014 e-mail to Tim Rimpo, ESA, regarding SACSIM.
[10] Long, J., DKS Associates. November 6, 2014 phone conversation with Tim Rimpo, ESA, regarding SACSIM.

ESA

2600 Capitol Avenue
Suite 200
Sacramento, CA 95816
916.564.4500 phone
916.564.4501 fax

www.esassoc.com

memorandum

date July 13, 2016

to Michael Winn - Barrett Winn, LLC & Antelope RBVP, LP

from Tim Rimpo

subject Supplemental Air Quality Analysis (Commercial Land Use Alternative)
Barrett Ranch East – Sacramento County, California

In 2014, ESA prepared an Air Quality Technical Report (AQTR) for the Barrett Ranch East Project (Project).[1,2] The proposed Commercial Land Use Alternative (Alternative) represents a different land use plan for the same site. The Alternative includes 496 single-family residential units, 26 apartments, and a commercial center that includes a 45,000 square-foot health club and a 33,000 square-foot shopping center.[3,4]

This memo evaluates the air emissions from the Alternative, which were not evaluated in the 2014 AQTR. Construction emissions associated with the Alternative would be similar to those for the Project and therefore are not analyzed in this memo. Consequently, this memo focuses on the Alternative's operational air emissions. The criteria pollutant analysis estimates emissions of ozone precursors – reactive organic gases (ROG) and nitrogen oxides (NOx) – and particulate matter (PM10 and PM2.5). The operational analysis also qualitatively evaluates the Alternative's toxic air contaminant (TAC) and odor impacts. The greenhouse gas (GHG) analysis estimates the Alternative's emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and carbon dioxide equivalence (CO_2e).[5]

[1] Environmental Science Associates, Inc. 2014. Barrett Ranch East Project, Air Quality Technical Report. November.
[2] The Project, to be located in northeastern Sacramento County, includes 495 single-family houses, 196 apartments, and a 108,900 square feet shopping center.
[3] Weir, M., P.E., T.E., PTOE, Kimley-Horn, 2015. Supplemental Traffic Impact Analysis (Land Use Alternate) Barrett Ranch East – Sacramento County, California. December 29th.
[4] The Alternative would result in 3,281 fewer daily trips compared to the Project (30.7 percent fewer daily trips).
[5] CO_2e consists of total GHG emissions adjusted by the global warming potential of each pollutant. For this analysis, a global warming potential of one was used for carbon dioxide, 21 for methane, and 310 for nitrous oxide.

Criteria Pollutant Emissions

The CalEEMod model was used to estimate criteria pollutant and GHG emissions. CalEEMod groups criteria pollutant emissions into three categories: transportation, energy, and area sources. Of these, transportation emissions represent the largest emission source.

The CalEEMod model estimates transportation emissions using default daily trip rates for each land use. Those default trip rates are based on equations included in the Institute of Transportation Engineers' (ITE) Trip Generation Manual. [6] CalEEMod allows the trip rates to be overridden when project-specific trip rates are available. For this analysis, CalEEMod' default trip rates were replaced with values included in the Alternative traffic study.[7] Those rates were developed using the Sacramento Council of Governments' SACSIM travel demand model. Consequently, for this analysis, the CalEEMod default trip rates were replaced with the SACSIM-generated "mitigated" trip generation rates.[8]

Table 1 shows that the Alternative would result in emissions of ROG, NOx, PM10, and PM2.5 that are below the significance thresholds established by the SMAQMD.[9] **This impact is less than significant.**

Table 1. Operational Criteria Pollutant Emissions (mitigated, pounds per day)

Commercial Land Use Alternative	ROG	NOx	PM10	PM2.5
Operational Emissions	57.1	36.4	32.0	9.2
Operational Thresholds	65	65	80	82
Exceed Threshold?	No	No	No	No

Notes – All emissions estimated using CalEEMod and the trip generation rates used in the Kimley Horn Supplemental Traffic Impact Analysis (Land Use Alternate), December 29, 2015. The Alternatives' annual emissions would equal 5.6 tons per year of PM10, which is below the SMAQMD threshold of 14.6 tons per year. The Alternative's annual emissions of PM2.5 would equal 1.6 tons per year, which is less than the SMAQMD threshold of 15.0 tons per year.

Toxic Air Contaminant Emissions

The Alternative would not include any new stationary sources of TACs. In addition, there are not nearby sources of TACs that represent a health concern to future residents. The Alternative would not locate new residences within 500 feet of any high volume roads (defined as a freeway or urban roadway with more than 100,000 vehicles per day). Consequently, the Alternative would not result in significant health risk impacts from exposure to TACs. **This impact is less than significant.**

[6] Institute of Transportation Engineers, 2012. Trip Generation Manual, 9th Edition.
[7] Weir, M., P.E., T.E., PTOE, Kimley-Horn, 2015. Supplemental Traffic Impact Analysis (Land Use Alternate) Barrett Ranch East – Sacramento County, California. December 29th.
[8] The "mitigated" daily trips estimated using SACSIM are 23 percent lower than the trips estimated using the ITE rates.
[9] SMAQMD, 2015. SMAQMD Thresholds of Significance Table, CEQA Guide December 2009, Revised November 2014, May 2015.

Odors

The Alternative is not considered a source of objectionable odors. Diesel emissions during construction would be short-term, located at a distance from sensitive receptors, and would not be detectable. During operation, the Alternative would not generate objectionable odors. In addition, the Alternative would not expose residents to objectionable odors from nearby land uses. Land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. No odor-generating sources are located near the Alternative. Thus, the Alternative's residents would not be exposed to objectionable odors. **Odor impacts would be less than significant.**

Greenhouse Gas Emissions

The GHG analysis uses CalEEMod to estimate emissions for all categories except mobile sources. Sacramento County requires that the mobile emission estimates be made using vehicle miles traveled (VMT) by speed category. VMT by speed category was available for the Project, but not the Alternative. Consequently, mobile source emissions for the Alternative were based on the mobile emissions estimated for the Project, but reduced by 30.7 percent to account for the Alternative's lower number of daily trips as compared to the Project.[10]

The current version of CalEEMod (version 2013.2.2) bases building energy use on the California Energy Commission's 2008 California Title 24 building energy standards. The Title 24 standards were tightened in 2013 resulting in a 25 percent reduction in energy use compared to the 2008 Title 24 standards.[11] The 2016 Title 24 standards, scheduled to take effect on January 1, 2017, will reduce emissions by 28 percent compared to the 2013 standards.[12] The combined energy efficiency reductions associated with the 2013 and 2016 Title 24 standards would reduce building and lighting energy use and associated emissions by 46 percent compared to the CalEEMod default values. The energy emissions shown in Table 2 account for the 46 percent reduction in building energy use.

[10] The Supplemental Traffic Impact Analysis (Land Use Alternate) Barrett Ranch East – Sacramento County, prepared by Kimley-Horn did not include VMT estimates by speed bin. Consequently, emissions were scaled from the Project's speed-bin based emission estimates.

[11] California Energy Commission, 2013. 2013 Building Energy Efficiency Standards, Frequently Asked Questions. Available: http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2013_Building_Energy_Efficiency_Standards_FAQ.pdf

[12] California Energy Commission, 2016. 2016 Building Energy Efficiency Standards, Frequently Asked Questions. Available: http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2016_Building_Energy_Efficiency_Standards_FAQ.pdf

Table 2. Operational Greenhouse Gas Emissions (mitigated, metric tons per year)

Category	CO_2	CH_4	N_2O	CO_2e
Area	9	0.01	0.0	9
Energy	1,756	0.07	0.023	1,765
Mobile	1,954	-	-	2,052
Waste	158	9.4	0.0	355
Water	89	0.05	0.031	100
Total	3,938	9.6	0.054	4,251

Notes: CO_2e is based on a global warming potential of 21 for CH_4 and 310 for N_2O. CO_2e for mobile sources is assumed to equal 105% of mobile source CO_2 emissions.

Table 3 shows that the Alternative's energy-related CO_2e emissions per capita would not exceed Sacramento County's CO_2e per capita energy threshold. In addition, Table 3 shows that the Alternative's mobile source CO_2e emissions per capita would be below Sacramento County's mobile source CO_2e threshold. **Consequently, the Alternative's GHG emissions would be less than significant.**

Table 3. Comparison of Operational Energy and Mobile Source GHG Emissions

Category	CO_2e	CO_2e/Capita	Sacramento Threshold	Exceed Threshold?
Energy	1,765	1.27	1.33	No
Mobile	2,052	1.47	2.64	No

Notes: Alternative population estimated at 1,393 based on CalEEMod results.

Barrett Ranch East - Commercial Alternative

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	435.60	1000sqft	10.00	435,600.00	0
Health Club	45.00	1000sqft	6.50	45,000.00	0
Apartments Low Rise	26.00	Dwelling Unit	2.10	26,000.00	69
Single Family Housing	496.00	Dwelling Unit	93.10	892,800.00	1324
Regional Shopping Center	33.00	1000sqft	8.30	33,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2020
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Land use, unit amount and ot acreage infomation was provided by the Applicant.

Construction Phase - Assumed construction schedule

On-road Fugitive Dust - Percent paved road are based on the assumption that 100% of travel will be on paved road

Grading - Assumed all material will be balanced on site, so no net import or export.

Vehicle Trips - Used daily trip rates provided by the Applicant with a 18% trip reduction.

Energy Use - Change default Ttle 24 Energy to incoprate 2013 Title 24 energy construction standards.

Construction Off-road Equipment Mitigation - Construction Off-road Equipment Mitigation - 75% reduction represents Enhanced Construction Emission Control to control fugitive dust.

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	45,534.00	39,408.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	136,602.00	118,224.00
tblAreaCoating	Area_Nonresidential_Interior	136602	118224
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	55	75
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	55	75
tblConstructionPhase	NumDays	220.00	586.00
tblConstructionPhase	NumDays	3,100.00	684.00
tblConstructionPhase	NumDays	310.00	28.00
tblConstructionPhase	NumDays	220.00	25.00
tblConstructionPhase	NumDays	120.00	22.00
tblConstructionPhase	PhaseEndDate	2/25/2022	12/27/2019
tblConstructionPhase	PhaseStartDate	11/29/2019	9/29/2017
tblGrading	AcresOfGrading	70.00	775.00
tblLandUse	LotAcreage	1.03	6.50

tblLandUse	LotAcreage	1.63	2.10
tblLandUse	LotAcreage	161.04	93.10
tblLandUse	LotAcreage	0.76	8.30
tblProjectCharacteristics	OperationalYear	2014	2020
tblTripsAndVMT	VendorTripNumber	140.00	73.00
tblTripsAndVMT	WorkerTripNumber	410.00	238.00
tblTripsAndVMT	WorkerTripNumber	82.00	48.00
tblVehicleTrips	ST_TR	7.16	8.35
tblVehicleTrips	ST_TR	20.87	25.37
tblVehicleTrips	ST_TR	49.97	77.10
tblVehicleTrips	ST_TR	10.08	7.05
tblVehicleTrips	SU_TR	6.07	8.35
tblVehicleTrips	SU_TR	26.73	25.37
tblVehicleTrips	SU_TR	25.24	77.10
tblVehicleTrips	SU_TR	8.77	7.05
tblVehicleTrips	WD_TR	6.59	8.35
tblVehicleTrips	WD_TR	32.93	25.37
tblVehicleTrips	WD_TR	42.94	77.10
tblVehicleTrips	WD_TR	9.57	7.05

2.0 Emissions Summary

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	lb/day										lb/day					
Area	35.4362	0.5002	43.2616	2.2800e-003		0.2378	0.2378		0.2378	0.2378	0.0000	77.6567	77.6567	0.0759	0.0000	79.2509
Energy	0.5363	4.6132	2.1693	0.0293		0.3706	0.3706		0.3706	0.3706		5,851.0219	5,851.0219	0.1121	0.1073	5,886.6303
Mobile	21.3312	33.0147	182.5741	0.4685	31.0496	0.5157	31.5653	8.2947	0.4758	8.7706		35,552.7745	35,552.7745	1.2797		35,579.6484
Total	**57.3037**	**38.1281**	**228.0050**	**0.5001**	**31.0496**	**1.1241**	**32.1737**	**8.2947**	**1.0842**	**9.3789**	**0.0000**	**41,481.4531**	**41,481.4531**	**1.4678**	**0.1073**	**41,545.5296**

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	lb/day										lb/day					
Area	35.4362	0.5002	43.2616	2.2800e-003		0.2378	0.2378		0.2378	0.2378	0.0000	77.6567	77.6567	0.0759	0.0000	79.2509
Energy	0.3385	2.9133	1.3813	0.0185		0.2339	0.2339		0.2339	0.2339		3,692.9714	3,692.9714	0.0708	0.0677	3,715.4462
Mobile	21.3312	33.0147	182.5741	0.4685	31.0496	0.5157	31.5653	8.2947	0.4758	8.7706		35,552.7745	35,552.7745	1.2797		35,579.6484
Total	**57.1059**	**36.4282**	**227.2170**	**0.4893**	**31.0496**	**0.9874**	**32.0370**	**8.2947**	**0.9475**	**9.2422**	**0.0000**	**39,323.4026**	**39,323.4026**	**1.4264**	**0.0677**	**39,374.3455**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.35**	**4.46**	**0.35**	**2.16**	**0.00**	**12.16**	**0.42**	**0.00**	**12.61**	**1.46**	**0.00**	**5.20**	**5.20**	**2.82**	**36.89**	**5.23**

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	lb/day										lb/day					
Mitigated	21.3312	33.0147	182.5741	0.4685	31.0496	0.5157	31.5653	8.2947	0.4758	8.7706		35,552.7745	35,552.7745	1.2797		35,579.6484
Unmitigated	21.3312	33.0147	182.5741	0.4685	31.0496	0.5157	31.5653	8.2947	0.4758	8.7706		35,552.7745	35,552.7745	1.2797		35,579.6484

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	217.10	217.10	217.10	557,102	557,102
Health Club	1,141.65	1,141.65	1141.65	1,576,751	1,576,751
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	2,544.30	2,544.30	2544.30	3,555,163	3,555,163

Single Family Housing	3,496.80	3,496.80	3496.80	8,973,170	8,973,170
Total	7,399.85	7,399.85	7,399.85	14,662,187	14,662,187

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
Health Club	10.00	5.00	6.50	16.90	64.10	19.00	52	39	9
Parking Lot	10.00	5.00	6.50	0.00	0.00	0.00	0	0	0
Regional Shopping Center	10.00	5.00	6.50	16.30	64.70	19.00	54	35	11
Single Family Housing	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.503605	0.067800	0.178973	0.146934	0.044621	0.006359	0.021238	0.016884	0.002315	0.002275	0.006260	0.000554	0.002182

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	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	lb/day										lb/day					
NaturalGas Mitigated	0.3385	2.9133	1.3813	0.0185		0.2339	0.2339		0.2339	0.2339		3,692.9714	3,692.9714	0.0708	0.0677	3,715.4462
NaturalGas Unmitigated	0.5363	4.6132	2.1693	0.0293		0.3706	0.3706		0.3706	0.3706		5,851.0219	5,851.0219	0.1121	0.1073	5,886.6303

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	lb/day										lb/day					
Apartments Low Rise	966.349	0.0104	0.0891	0.0379	5.7000e-004		7.2000e-003	7.2000e-003		7.2000e-003	7.2000e-003		113.6882	113.6882	2.1800e-003	2.0800e-003	114.3801
Health Club	4565.34	0.0492	0.4476	0.3760	2.6900e-003		0.0340	0.0340		0.0340	0.0340		537.0991	537.0991	0.0103	9.8500e-003	540.3678
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	510.822	5.5100e-003	0.0501	0.0421	3.0000e-004		3.8100e-003	3.8100e-003		3.8100e-003	3.8100e-003		60.0967	60.0967	1.1500e-003	1.1000e-003	60.4624
Single Family Housing	43691.2	0.4712	4.0264	1.7134	0.0257		0.3255	0.3255		0.3255	0.3255		5,140.1379	5,140.1379	0.0985	0.0942	5,171.4200
Total		**0.5363**	**4.6132**	**2.1693**	**0.0293**		**0.3706**	**0.3706**		**0.3706**	**0.3706**		**5,851.0219**	**5,851.0219**	**0.1121**	**0.1073**	**5,886.6303**

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	lb/day										lb/day					
Health Club	3.16965	0.0342	0.3108	0.2610	1.8600e-003		0.0236	0.0236		0.0236	0.0236		372.9002	372.9002	7.1500e-003	6.8400e-003	375.1697
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	0.314522	3.3900e-003	0.0308	0.0259	1.9000e-004		2.3400e-003	2.3400e-003		2.3400e-003	2.3400e-003		37.0026	37.0026	7.1000e-004	6.8000e-004	37.2277
Single Family Housing	27.3024	0.2944	2.5161	1.0707	0.0161		0.2034	0.2034		0.2034	0.2034		3,212.0473	3,212.0473	0.0616	0.0589	3,231.5953
Apartments Low Rise	0.603681	6.5100e-003	0.0556	0.0237	3.6000e-004		4.5000e-003	4.5000e-003		4.5000e-003	4.5000e-003		71.0213	71.0213	1.3600e-003	1.3000e-003	71.4535
Total		**0.3385**	**2.9133**	**1.3813**	**0.0185**		**0.2339**	**0.2339**		**0.2339**	**0.2339**		**3,692.9714**	**3,692.9714**	**0.0708**	**0.0677**	**3,715.4462**

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	lb/day										lb/day					
Mitigated	35.4362	0.5002	43.2616	2.2800e-003		0.2378	0.2378		0.2378	0.2378	0.0000	77.6567	77.6567	0.0759	0.0000	79.2509

Unmitigated	35.4362	0.5002	43.2616	2.2800e-003		0.2378	0.2378		0.2378	0.2378	0.0000	77.6567	77.6567	0.0759	0.0000	79.2509

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	lb/day										lb/day					
Architectural Coating	3.4622					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	30.6534					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.3207	0.5002	43.2616	2.2800e-003		0.2378	0.2378		0.2378	0.2378		77.6567	77.6567	0.0759		79.2509
Total	**35.4362**	**0.5002**	**43.2616**	**2.2800e-003**		**0.2378**	**0.2378**		**0.2378**	**0.2378**	**0.0000**	**77.6567**	**77.6567**	**0.0759**	**0.0000**	**79.2509**

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	lb/day										lb/day					
Architectural Coating	3.4622					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	30.6534					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.3207	0.5002	43.2616	2.2800e-003		0.2378	0.2378		0.2378	0.2378		77.6567	77.6567	0.0759		79.2509
Total	**35.4362**	**0.5002**	**43.2616**	**2.2800e-003**		**0.2378**	**0.2378**		**0.2378**	**0.2378**	**0.0000**	**77.6567**	**77.6567**	**0.0759**	**0.0000**	**79.2509**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Vegetation

CalEEMod – Annual Results

Barrett Ranch East - Commercial Alternative

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	435.60	1000sqft	10.00	435,600.00	0
Health Club	45.00	1000sqft	6.50	45,000.00	0
Apartments Low Rise	26.00	Dwelling Unit	2.10	26,000.00	69
Single Family Housing	496.00	Dwelling Unit	93.10	892,800.00	1324
Regional Shopping Center	33.00	1000sqft	8.30	33,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2020
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Land use, unit amount and ot acreage infomation was provided by the Applicant.

Construction Phase - Assumed construction schedule

On-road Fugitive Dust - Percent paved road are based on the assumption that 100% of travel will be on paved road

Grading - Assumed all material will be balanced on site, so no net import or export.

Vehicle Trips - Used daily trip rates provided by the Applicant with a 18% trip reduction.

Energy Use - Change default Ttle 24 Energy to incoprate 2013 Title 24 energy construction standards.

Construction Off-road Equipment Mitigation - Construction Off-road Equipment Mitigation - 75% reduction represents Enhanced Construction Emission Control to control fugitive dust.

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	45,534.00	39,408.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	136,602.00	118,224.00
tblAreaCoating	Area_Nonresidential_Interior	136602	118224
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	55	75
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	55	75
tblConstructionPhase	NumDays	220.00	586.00
tblConstructionPhase	NumDays	3,100.00	684.00
tblConstructionPhase	NumDays	310.00	28.00
tblConstructionPhase	NumDays	220.00	25.00
tblConstructionPhase	NumDays	120.00	22.00
tblConstructionPhase	PhaseEndDate	2/25/2022	12/27/2019
tblConstructionPhase	PhaseStartDate	11/29/2019	9/29/2017
tblGrading	AcresOfGrading	70.00	775.00
tblLandUse	LotAcreage	1.03	6.50
tblLandUse	LotAcreage	1.63	2.10
tblLandUse	LotAcreage	161.04	93.10
tblLandUse	LotAcreage	0.76	8.30
tblProjectCharacteristics	OperationalYear	2014	2020
tblTripsAndVMT	VendorTripNumber	140.00	73.00

tblTripsAndVMT	WorkerTripNumber	410.00	238.00
tblTripsAndVMT	WorkerTripNumber	82.00	48.00
tblVehicleTrips	ST_TR	7.16	8.35
tblVehicleTrips	ST_TR	20.87	25.37
tblVehicleTrips	ST_TR	49.97	77.10
tblVehicleTrips	ST_TR	10.08	7.05
tblVehicleTrips	SU_TR	6.07	8.35
tblVehicleTrips	SU_TR	26.73	25.37
tblVehicleTrips	SU_TR	25.24	77.10
tblVehicleTrips	SU_TR	8.77	7.05
tblVehicleTrips	WD_TR	6.59	8.35
tblVehicleTrips	WD_TR	32.93	25.37
tblVehicleTrips	WD_TR	42.94	77.10
tblVehicleTrips	WD_TR	9.57	7.05

2.0 Emissions Summary

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	6.3912	0.0625	5.4077	2.8000e-004		0.0297	0.0297		0.0297	0.0297	0.0000	8.8061	8.8061	8.6100e-003	0.0000	8.9869

Energy	0.0979	0.8419	0.3959	5.3400e-003		0.0676	0.0676		0.0676	0.0676	0.0000	2,399.6086	2,399.6086	0.0889	0.0323	2,411.4888
Mobile	3.3952	6.4597	32.2611	0.0786	5.4585	0.0940	5.5525	1.4624	0.0868	1.5491	0.0000	5,437.0984	5,437.0984	0.2111	0.0000	5,441.5324
Waste						0.0000	0.0000		0.0000	0.0000	158.2822	0.0000	158.2822	9.3542	0.0000	354.7206
Water						0.0000	0.0000		0.0000	0.0000	13.8394	75.2133	89.0527	0.0513	0.0309	99.6974
Total	**9.8843**	**7.3641**	**38.0647**	**0.0842**	**5.4585**	**0.1914**	**5.6499**	**1.4624**	**0.1841**	**1.6465**	**172.1216**	**7,920.7264**	**8,092.8480**	**9.7142**	**0.0632**	**8,316.4261**

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	6.3912	0.0625	5.4077	2.8000e-004		0.0297	0.0297		0.0297	0.0297	0.0000	8.8061	8.8061	8.6100e-003	0.0000	8.9869
Energy	0.0618	0.5317	0.2521	3.3700e-003		0.0427	0.0427		0.0427	0.0427	0.0000	1,756.0487	1,756.0487	0.0680	0.0228	1,764.5572
Mobile	3.3952	6.4597	32.2611	0.0786	5.4585	0.0940	5.5525	1.4624	0.0868	1.5491	0.0000	5,437.0984	5,437.0984	0.2111	0.0000	5,441.5324
Waste						0.0000	0.0000		0.0000	0.0000	158.2822	0.0000	158.2822	9.3542	0.0000	354.7206
Water						0.0000	0.0000		0.0000	0.0000	13.8394	75.2133	89.0527	0.0515	0.0309	99.7128
Total	**9.8482**	**7.0539**	**37.9209**	**0.0823**	**5.4585**	**0.1664**	**5.6249**	**1.4624**	**0.1592**	**1.6215**	**172.1216**	**7,277.1665**	**7,449.2881**	**9.6934**	**0.0537**	**7,669.5099**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.37**	**4.21**	**0.38**	**2.34**	**0.00**	**13.04**	**0.44**	**0.00**	**13.55**	**1.52**	**0.00**	**8.13**	**7.95**	**0.21**	**14.91**	**7.78**

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	3.3952	6.4597	32.2611	0.0786	5.4585	0.0940	5.5525	1.4624	0.0868	1.5491	0.0000	5,437.0984	5,437.0984	0.2111	0.0000	5,441.5324
Unmitigated	3.3952	6.4597	32.2611	0.0786	5.4585	0.0940	5.5525	1.4624	0.0868	1.5491	0.0000	5,437.0984	5,437.0984	0.2111	0.0000	5,441.5324

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	217.10	217.10	217.10	557,102	557,102
Health Club	1,141.65	1,141.65	1141.65	1,576,751	1,576,751
Parking Lot	0.00	0.00	0.00		

Regional Shopping Center	2,544.30	2,544.30	2544.30	3,555,163	3,555,163
Single Family Housing	3,496.80	3,496.80	3496.80	8,973,170	8,973,170
Total	7,399.85	7,399.85	7,399.85	14,662,187	14,662,187

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
Health Club	10.00	5.00	6.50	16.90	64.10	19.00	52	39	9
Parking Lot	10.00	5.00	6.50	0.00	0.00	0.00	0	0	0
Regional Shopping Center	10.00	5.00	6.50	16.30	64.70	19.00	54	35	11
Single Family Housing	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.503605	0.067800	0.178973	0.146934	0.044621	0.006359	0.021238	0.016884	0.002315	0.002275	0.006260	0.000554	0.002182

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	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	1,144.6359	1,144.6359	0.0562	0.0116	1,149.4234
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,430.9063	1,430.9063	0.0703	0.0145	1,436.8912
NaturalGas Mitigated	0.0618	0.5317	0.2521	3.3700e-003		0.0427	0.0427		0.0427	0.0427	0.0000	611.4128	611.4128	0.0117	0.0112	615.1338
NaturalGas Unmitigated	0.0979	0.8419	0.3959	5.3400e-003		0.0676	0.0676		0.0676	0.0676	0.0000	968.7023	968.7023	0.0186	0.0178	974.5977

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 Low Rise	352718	1.9000e-003	0.0163	6.9200e-003	1.0000e-004		1.3100e-003	1.3100e-003		1.3100e-003	1.3100e-003	0.0000	18.8224	18.8224	3.6000e-004	3.5000e-004	18.9369
Health Club	1.66635e+006	8.9900e-003	0.0817	0.0686	4.9000e-004		6.2100e-003	6.2100e-003		6.2100e-003	6.2100e-003	0.0000	88.9228	88.9228	1.7000e-003	1.6300e-003	89.4640
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	186450	1.0100e-003	9.1400e-003	7.6800e-003	5.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	9.9497	9.9497	1.9000e-004	1.8000e-004	10.0102
Single Family Housing	1.59473e+007	0.0860	0.7348	0.3127	4.6900e-003		0.0594	0.0594		0.0594	0.0594	0.0000	851.0075	851.0075	0.0163	0.0156	856.1866
Total		**0.0979**	**0.8419**	**0.3959**	**5.3300e-003**		**0.0676**	**0.0676**		**0.0676**	**0.0676**	**0.0000**	**968.7023**	**968.7023**	**0.0186**	**0.0178**	**974.5977**

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					
Health Club	1.15692e+006	6.2400e-003	0.0567	0.0476	3.4000e-004		4.3100e-003	4.3100e-003		4.3100e-003	4.3100e-003	0.0000	61.7378	61.7378	1.1800e-003	1.1300e-003	62.1135
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	114800	6.2000e-004	5.6300e-003	4.7300e-003	3.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	6.1262	6.1262	1.2000e-004	1.1000e-004	6.1635
Single Family Housing	9.96538e+006	0.0537	0.4592	0.1954	2.9300e-003		0.0371	0.0371		0.0371	0.0371	0.0000	531.7905	531.7905	0.0102	9.7500e-003	535.0268
Apartments Low Rise	220344	1.1900e-003	0.0102	4.3200e-003	6.0000e-005		8.2000e-004	8.2000e-004		8.2000e-004	8.2000e-004	0.0000	11.7584	11.7584	2.3000e-004	2.2000e-004	11.8299
Total		**0.0618**	**0.5317**	**0.2521**	**3.3600e-003**		**0.0427**	**0.0427**		**0.0427**	**0.0427**	**0.0000**	**611.4128**	**611.4128**	**0.0117**	**0.0112**	**615.1338**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use		Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	tons/yr	MT/yr			
Apartments Low Rise	98547.3		26.3870	1.3000e-003	2.7000e-004	26.4974
Health Club	745200		199.5348	9.8000e-003	2.0300e-003	200.3694
Parking Lot	383328		102.6400	5.0400e-003	1.0400e-003	103.0692
Regional Shopping Center	428010		114.6040	5.6300e-003	1.1600e-003	115.0833
Single Family Housing	3.6889e+006		987.7405	0.0485	0.0100	991.8718
Total			**1,430.9063**	**0.0703**	**0.0145**	**1,436.8911**

Mitigated

	Electricity Use		Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	tons/yr	MT/yr			
Apartments Low Rise	84691.1		22.6769	1.1100e-003	2.3000e-004	22.7718
Health Club	551448		147.6558	7.2500e-003	1.5000e-003	148.2734
Parking Lot	206997		55.4256	2.7200e-003	5.6000e-004	55.6574
Regional Shopping Center	276362		73.9987	3.6400e-003	7.5000e-004	74.3082
Single Family Housing	3.15536e+006		844.8790	0.0415	8.5900e-003	848.4127
Total			**1,144.6359**	**0.0562**	**0.0116**	**1,149.4234**

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	6.3912	0.0625	5.4077	2.8000e-004		0.0297	0.0297		0.0297	0.0297	0.0000	8.8061	8.8061	8.6100e-003	0.0000	8.9869

Unmitigated	6.3912	0.0625	5.4077	2.8000e-004		0.0297	0.0297		0.0297	0.0297	0.0000	8.8061	8.8061	8.6100e-003	0.0000	8.9869

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	0.6318					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.5942					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.1651	0.0625	5.4077	2.8000e-004		0.0297	0.0297		0.0297	0.0297	0.0000	8.8061	8.8061	8.6100e-003	0.0000	8.9869
Total	**6.3912**	**0.0625**	**5.4077**	**2.8000e-004**		**0.0297**	**0.0297**		**0.0297**	**0.0297**	**0.0000**	**8.8061**	**8.8061**	**8.6100e-003**	**0.0000**	**8.9869**

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	0.6318					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.5942					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.1651	0.0625	5.4077	2.8000e-004		0.0297	0.0297		0.0297	0.0297	0.0000	8.8061	8.8061	8.6100e-003	0.0000	8.9869
Total	**6.3912**	**0.0625**	**5.4077**	**2.8000e-004**		**0.0297**	**0.0297**		**0.0297**	**0.0297**	**0.0000**	**8.8061**	**8.8061**	**8.6100e-003**	**0.0000**	**8.9869**

7.0 Water Detail

7.1 Mitigation Measures Water

		Total CO2	CH4	N2O	CO2e
Category	tons/yr	MT/yr			
Mitigated		89.0527	0.0515	0.0309	99.7128
Unmitigated		89.0527	0.0513	0.0309	99.6974

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use		Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr	MT/yr			
Apartments Low Rise	1.694 / 1.06796		3.8602	2.2200e-003	1.3400e-003	4.3212
Health Club	2.66144 / 1.63121		6.0211	3.4900e-003	2.1000e-003	6.7452
Parking Lot	0 / 0		0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	2.44439 / 1.49818		5.5300	3.2100e-003	1.9300e-003	6.1951
Single Family Housing	32.3164 / 20.3734		73.6414	0.0424	0.0255	82.4359
Total			**89.0527**	**0.0513**	**0.0309**	**99.6974**

Mitigated

	Indoor/Outdoor Use		Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr	MT/yr			
Apartments Low Rise	1.694 / 1.06796		3.8602	2.2300e-003	1.3400e-003	4.3219
Health Club	2.66144 / 1.63121		6.0211	3.5000e-003	2.1000e-003	6.7462
Parking Lot	0 / 0		0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	2.44439 / 1.49818		5.5300	3.2200e-003	1.9300e-003	6.1960
Single Family Housing	32.3164 / 20.3734		73.6414	0.0426	0.0255	82.4487
Total			**89.0527**	**0.0515**	**0.0309**	**99.7128**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

		Total CO2	CH4	N2O	CO2e
	tons/yr	MT/yr			

Mitigated		158.2822	9.3542	0.0000	354.7206
Unmitigated		158.2822	9.3542	0.0000	354.7206

8.2 Waste by Land Use

Unmitigated

	Waste Disposed		Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr	MT/yr			
Apartments Low Rise	11.96		2.4278	0.1435	0.0000	5.4408
Health Club	256.5		52.0672	3.0771	0.0000	116.6859
Parking Lot	0		0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	34.65		7.0336	0.4157	0.0000	15.7628
Single Family Housing	476.64		96.7536	5.7180	0.0000	216.8311
Total			**158.2822**	**9.3542**	**0.0000**	**354.7206**

Mitigated

	Waste Disposed		Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr	MT/yr			
Apartments Low Rise	11.96		2.4278	0.1435	0.0000	5.4408
Health Club	256.5		52.0672	3.0771	0.0000	116.6859
Parking Lot	0		0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	34.65		7.0336	0.4157	0.0000	15.7628
Single Family Housing	476.64		96.7536	5.7180	0.0000	216.8311
Total			**158.2822**	**9.3542**	**0.0000**	**354.7206**

9.0 Operational Offroad

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

10.0 Vegetation

Appendix C – Operational Air Quality Mitigation Plan

Table of Contents

Introduction

SMAQMD guidance recommends that projects that exceed its operational significance thresholds should prepare and implement an Air Quality Mitigation Plan (AQMP). The AQMP must be incorporated into the project's environmental document and be enforced by the local jurisdiction. The objective of the AQMP is to reduce ozone precursor emissions by 15 percent for projects considered to be in the State Implementation Plan and 35 percent for projects not considered to be in the State Implementation Plan[1,2]. The Barrett Ranch Project is considered to be within the SIP[3].

AQMPs can include two types of measures, those included within CalEEMod (known as on-model measures) and those located solely within this guidance (called off-model measures). This AQMP relies on a combination of on- and off-model measures.

On a ton for ton basis, NOx reductions provide greater ozone benefits than ROG reductions. Thus, SMAQMD recommends normalizing ozone precursors based on their ozone creation potential in units of Equivalent Oxides of Nitrogen (NOxe). To estimate NOxe, ROG is divided by 3 and then added to total NOx. To estimate the effectiveness of a mitigation plan, the following equation is used:

AQMP Effectiveness = ((Unmitigated Project NOxe – Mitigated NOxe)/(Unmitigated NOxe)) x 100.

This analysis uses SMAQMD's recommended approach to estimate AQMP effectiveness.

Result Summary

For the Barrett Ranch East Project, the AQMP analysis examines whether mitigation measures can be used to reduce unmitigated emissions by 15%. This requires two steps. The first step involves using CalEEMod to estimate unmitigated emissions.

Unmitigated Emission Estimate

The Project's unmitigated ROG and NOx operational emissions were estimated using the CalEEMod model (2013.2.2 version). The unmitigated CalEEMod results are shown in Appendix A and summarized in Table C-1 below. The average daily trip rates used to generate the results shown in Table C-1, are based on the CalEEMod default trip rates and trip lengths for each land use type.[4] Table C-1 shows that unmitigated ROG emissions exceed the SMAQMD ROG significance threshold, hence the need for this AQMP.

[1] Sacramento Metropolitan Air Quality Management District. *Operational Emissions Mitigation.* http://www.airquality.org/ceqa/mitigation.shtml. Accessed November 4, 2014.
[2] SMAQMD Recommended Guidance for Land Use Emission Reductions, Version 3.1. June 2014.
[3] Dubose, Rachel, SMAQMD. November 6, 2014 e-mail to Tim Rimpo, ESA regarding: "RE: Air Quality SIP Question."
[4] Philley, Paul, SMAQMD. November 5, 2015 phone conversation with Tim Rimpo, ESA regarding calculation of the unmitigated baseline.

Table C-1. Barrett Ranch East Maximum Unmitigated Daily Ozone Precursor Emissions

Parameter	ROG (ppd)	NOx (ppd)	NOxe (ppd)
Area Sources	40.6	0.7	
Energy Sources	0.5	3.9	
Mobile Sources	34.3	53.8	
Total Emissions	75.4	58.3	**83.4**
Significance Threshold	65	65	N/A
Exceed Operational Threshold?	Yes	No	N/A

Mitigated Emission Estimate

The mitigated emission estimates rely on one off-model and one on-model mitigation measure.

Off Model Measure

TS: Traffic Study (meta-measure). This measure from the SMAQMD's AQMP guidance recognizes that site-specific information is better than information generated from a statewide model. Consequently, it recommends that for projects that have a traffic study, that study should be used in lieu of the CalEEMod model defaults.[6] As discussed in SMAQMD's guidance, traffic studies typically include calculations of internal trip capture, mix of uses, distance to job centers, and sometimes walking and cycling information. In lieu of using CalEEMod to estimate the impact of these features on a project, the project should use the results of the traffic study. The first step in this approach is to run CalEEMod using the proposed land uses in default mode to establish the unmitigated baseline. This analysis was conducted and the baseline emission results are shown above in Table C-1.

The next step is to conduct a mitigated emission run using CalEEMod, altering the defaults and adding any mitigation not included in the traffic study. Consequently, mitigated off-model measures were estimated by modifying the CalEEMod defaults as follows:

The trip generation rates were modified to be consistent with the trip generation rates in the project traffic study. As part of this modification, the trip rates were also adjusted to account for internal trip reduction, estimated at 18% for total daily trips.[7]

The CalEEMod default estimate of total vehicle miles traveled (VMT) was revised to be consistent with the project specific VMT estimates.[8] VMT is the product of trip generation rates

[6] Sacramento Metropolitan Air Quality Management District. *Operational Emissions Mitigation.* http://www.airquality.org/ceqa/mitigation.shtml. Accessed November 4, 2014.
[7] Kimley-Horn and Associates, Inc. 2014 Traffic Impact Analysis, Barrett Ranch East, Sacramento County, California. Draft. October 14, 2014.
[8] Weir, M., Kimley-Horn. September, 25, 2014 email to Tim Rimpo, ESA RE: Barrett Ranch East | VMT.

times trip lengths. CalEEMod's default trip lengths were adjusted so that its VMT matched the project specific estimates.

The trip generation rates, trip lengths, and VMT estimates for the Barrett Ranch East project were modeled using the Sacramento Area Council of Government's (SACOG) SACSIM travel demand model. SACSIM accounts for several factors, including job accessibility (within a 30 minute drive or transit travel time), proximity to transit (distance to nearest light rail or bus station, in miles), job and housing density (dwelling units and jobs per acre), jobs and housing mix, and street pattern and urban design (intersection density for 1, 3, and 4 legged intersections).[9],[10] SACSIM does not account for measures such as TMA membership, transit subsidies, ride-sharing, low-income housing, or similar programs.

On Model Measure

One on-model measure was also identified for this project: exceedance of the Title 24 Energy Standards by 20 percent was specified. This measure was specified because CalEEMod generates estimates using the 2008 Title 24 standards. By specifying a 20% reduction from Title 24 standards, this will bring the project into line with the 2013 standards.

Results

As shown in Table C-2, the Operational AQMP would reduce NO_{xe} emissions by 34.4 percent. This reduction would easily exceed SMAQMD's minimum emission reduction requirements of 15 percent for projects located within a SIP area. The detailed CalEEMod mitigated results can be found in Appendix A.

Table C-2. Barrett Ranch East Maximum Mitigated Daily Ozone Precursor Emission

Parameter	ROG (ppd)	NOx (ppd)	NOxe (ppd)
Area Sources	40.6	0.7	
Energy Sources	0.4	3.3	
Mobile Sources	27.1	27.8	
Total Emissions	68.1	31.8	**54.5 (34.4 % reduction from unmitigated**
Significance Threshold	65	65	N/A
Exceed Operational Threshold?	Yes	No	N/A

[9] Wong, D., Kimley-Horn. November 13, 2014 e-mail to Tim Rimpo, ESA, regarding SACSIM.
[10] Long, J., DKS Associates. November 6, 2014 phone conversation with Tim Rimpo, ESA, regarding SACSIM.