APPENDIX E

Air Quality and Greenhouse Gas Emissions Technical Report

Air Quality and Greenhouse Gas Emissions Technical Report for the Otay Ranch Village 4 Project City of Chula Vista, California

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SUMMARY

Otay Valley Quarry, LLC is proposing to develop an approximately 166.02-acre site, identified as Village Four in the Otay Ranch General Development Plan, with 73 single family residential dwelling units and 277 multifamily residential dwelling units on approximately 34.73 acres of the project site as well as approximately 12.48 acres for roadway and circulation right-of-way. 1.60 acres would be dedicated for community purpose facilities. The remainder of the project site, approximately 117.22 acres, would be open space (approximately 19.73 acres) and Multiples Species Conservation Plan (MSCP) Preserve (approximately 97.49 acres).

The air quality impact analysis evaluates the potential for significant adverse impacts to the ambient air quality due to construction and operational emissions resulting from the proposed project.

Construction of the proposed project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. The analysis concludes that the daily construction emissions would exceed the City of Chula Vista's (City) daily significance thresholds for oxides of nitrogen (NO_x) and carbon monoxide (CO). Daily construction emissions would not exceed the City's daily thresholds for volatile organic compounds (VOCs), sulfur oxides (SO_X), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$). Air quality impacts resulting from construction, therefore, would be potentially significant. Implementation of mitigation measures MM-AQ-1 through MM-AQ-3 would not reduce emissions to a level that is below the City of Chula Vista thresholds; therefore, impacts would be **significant and unavoidable** during construction. Additionally, the criteria air pollutant emissions associated with operation of the proposed project would not exceed the City of Chula Vista's thresholds. This impact is therefore considered **less than significant**.

The proposed project was found to result in a cumulatively considerable impact when considering the proposed project in combination with other existing and foreseeable future projects in the proposed project's vicinity. Because other cumulative projects would have the potential to be constructed in the project vicinity, cumulative construction emissions could further exacerbate emissions as shown in Table 10 and Table 14. Following implementation of MM-AQ-1 through MM-AQ- 3, cumulative construction emissions would remain **significant and unavoidable**. Operation of the proposed project would not result in a cumulatively considerable net increase of criteria pollutants. Therefore, cumulative operational emissions would be considered **less than significant**.

During construction, diesel equipment would be subject to the California Air Resources Board (CARB) air toxic control measures for in-use off-road diesel fleets, which would minimize diesel particulate matter (DPM) emissions. No residual toxic air contaminants (TAC) emissions and corresponding cancer risk are anticipated after construction, and no long-term sources of TAC emissions are anticipated during operation of the proposed project. However, construction of the proposed project would contribute to exceedances of the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) for NO_2 even after the implementation of MM-AQ-1 through MM-AQ-3. Therefore, health impacts in regards to NO_x emissions would be considered **significant and unavoidable**. Based on the traffic added to local and regional roadways the proposed project would not result in CO Hotspots and therefore impacts would be **less than significant**. Regarding odors, the proposed project involves residential uses and would not result in the creation of a land use that is commonly associated with odors. Therefore, project operations would result in an odor impact that is **less than significant**.

The proposed project's potential effect on global climate change was evaluated, and emissions of greenhouse gases (GHGs) were estimated based on the use of construction equipment and vehicle trips associated with construction activities as well as operational emissions once construction phases are complete. With implementation of mitigation measure MM-GHG-1, the proposed project would produce 3.4 MT CO_2E per service population (SP) per year. Mitigation measure MM-GHG-1 would help minimize GHG emissions associated with project operations specifically from energy and water consumption, and waste generation. However, the proposed project would exceed the City's efficiency metric of 1.3 MT CO_2E/SP, which is established for the purposes of assessing operational GHG emissions of projects in the City. The proposed project would also potentially obstruct applicable plans and policies adopted for the purpose of reducing GHG emissions including the City of Chula Vista's CO_2 Reduction Plan, SANDAG's *San Diego Forward: The Regional Plan*, California Air Resources Board's Scoping Plan, Senate Bill 32 and Executive Order S-3-05. The proposed project would therefore have a **significant and unavoidable** impact on global climate change.

Air Quality Technical Report for the Lake Pointe Project

1 INTRODUCTION

1.1 Purpose of the Report

The purpose of this report is to estimate and evaluate the potential air quality impacts and greenhouse gas (GHG) emissions impacts associated with construction and operation of the proposed project.

1.2 Project Description and Local Setting

The proposed project is located within Otay Ranch in the City of Chula Vista, California (Figures 1 and 2) and is situated directly west of State Route 125 (SR-125) and would be bounded by the future extension of Main Street to the north and future roadway Otay Valley Road to the east. The project site is currently undeveloped. Otay Valley Quarry, LLC is proposing to develop an approximately 166.02-acre site, identified as Village Four in the Otay Ranch General Development Plan (GDP), with 73 single family residential dwelling units and 277 multifamily residential dwelling units on approximately 34.49 acres of the project site, as well as approximately 12.06 acres for roadway and circulation right-of-way. 2.08 acres would be dedicated for community purpose facilities while the remainder of the project site, approximately 117.39 acres, would be open space (approximately 20.19 acres) and Multiples Species Conservation Plan (MSCP) Preserve (approximately 97.20 acres) (see Figure 3).

Construction of the proposed project is expected to commence in early 2018 and would last approximately 2 years. Grading, which includes blasting and rock crushing activities, would require approximately 7 months to complete and would generate approximately 260,534 cubic yards of export material in addition to 406,500 cubic yards of rock crushed. The development of site infrastructure would occur over approximately 1 month. For the purposes of modeling it was assumed the third phase of construction would consist of site paving, which would occur over a 3 month period following infrastructure development and would include the paving of roadways and other asphalt surfaces. The fourth phase of development would include single family and multifamily home construction which is assumed to occur following paving activities. Building construction would occur over a year beginning in late-2018. For the purposes of modeling, it was assumed architectural coatings would be applied starting 3 months before building construction would be completed, and would last a total of 4 months.

Air Quality Improvement Plan (AQIP)

The purpose of the Air Quality Improvement Plan (AQIP) is to respond to the Growth Management policies of the City of Chula Vista and those policies and regulations established at the broadest geographic level (State and Federal) to minimize air quality impacts during and after construction of projects. The City of Chula Vista requires that an AQIP be prepared for all major development projects with air quality impacts equivalent to that of a residential project of 50 or more dwelling units. The AQIP also demonstrates compliance with the air quality standards and policies of the San Diego County Air Pollution Control District (SDAPCD).

Water Conservation Plan (WCP)

The purpose of the Water Conservation Plan (WCP) is to respond to the Growth Management policies of the City of Chula Vista, which are intended to address the long-term need to conserve water in new developments, to address short-term emergency measures, and to establish standards for water conservation. The City of Chula Vista Municipal Code 19.09.080 requires a WCP to be submitted with all Sectional Planning Area (SPA) Plans. The WCP provides an analysis of water usage requirements of the project, an overview of mandated water conservation measures, a detailed plan of proposed measures for water conservation, potential use of recycled water, and other means of reducing water consumption.

Energy Conservation Plan

The Otay Ranch GDP requires all SPA Plans to prepare a Non-Renewable Energy Conservation Plan. An energy conservation plan was prepared as a part of the proposed project, which identifies feasible methods to reduce the consumption of non-renewable energy sources, including but not limited to transportation, building design, lighting, recycling, alternative energy sources, and land use. Features identified within this Plan including compliance with the Building and Energy Efficiency Standards in Title 24 Part 6 of the California Code of Building Regulations and water-related conservation features were accounted for within the proposed project's CalEEMod modeling.

Transit Planning Principles

Public transportation is an integral part of the Otay Ranch Community. The design of the Otay Ranch promotes access to public transit and locates land uses in proximity to proposed transit stations. Chula Vista Transit (CVT) provides bus service through the East Planning Area of the City that can be extended to serve the proposed project areas. Regional transit plans also provide for commuter lines to serve villages in Otay Ranch.

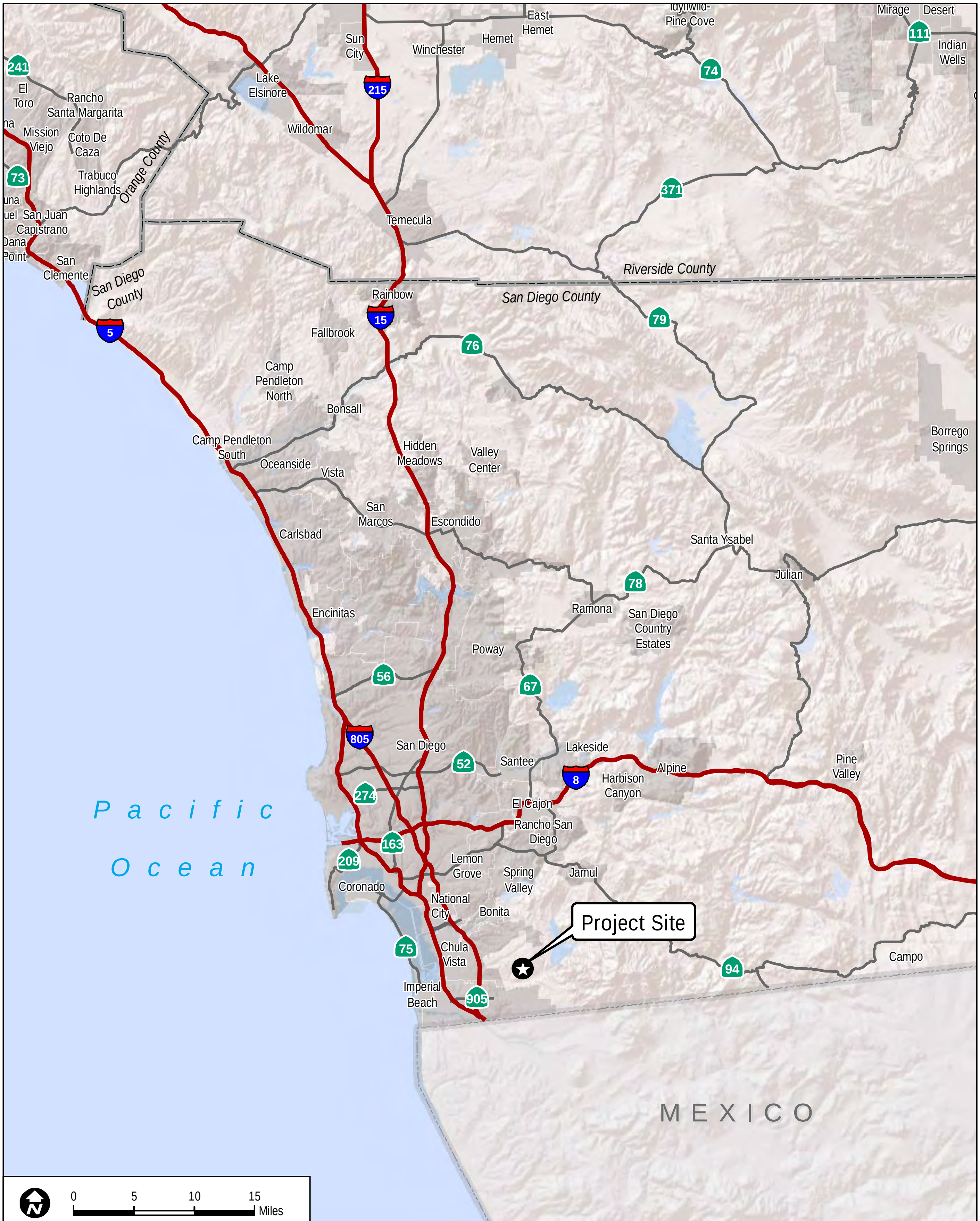

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FIGURE 1-1
Regional Map

Otay Ranch Village Four Air Quality and Greenhouse Gas Technical Report

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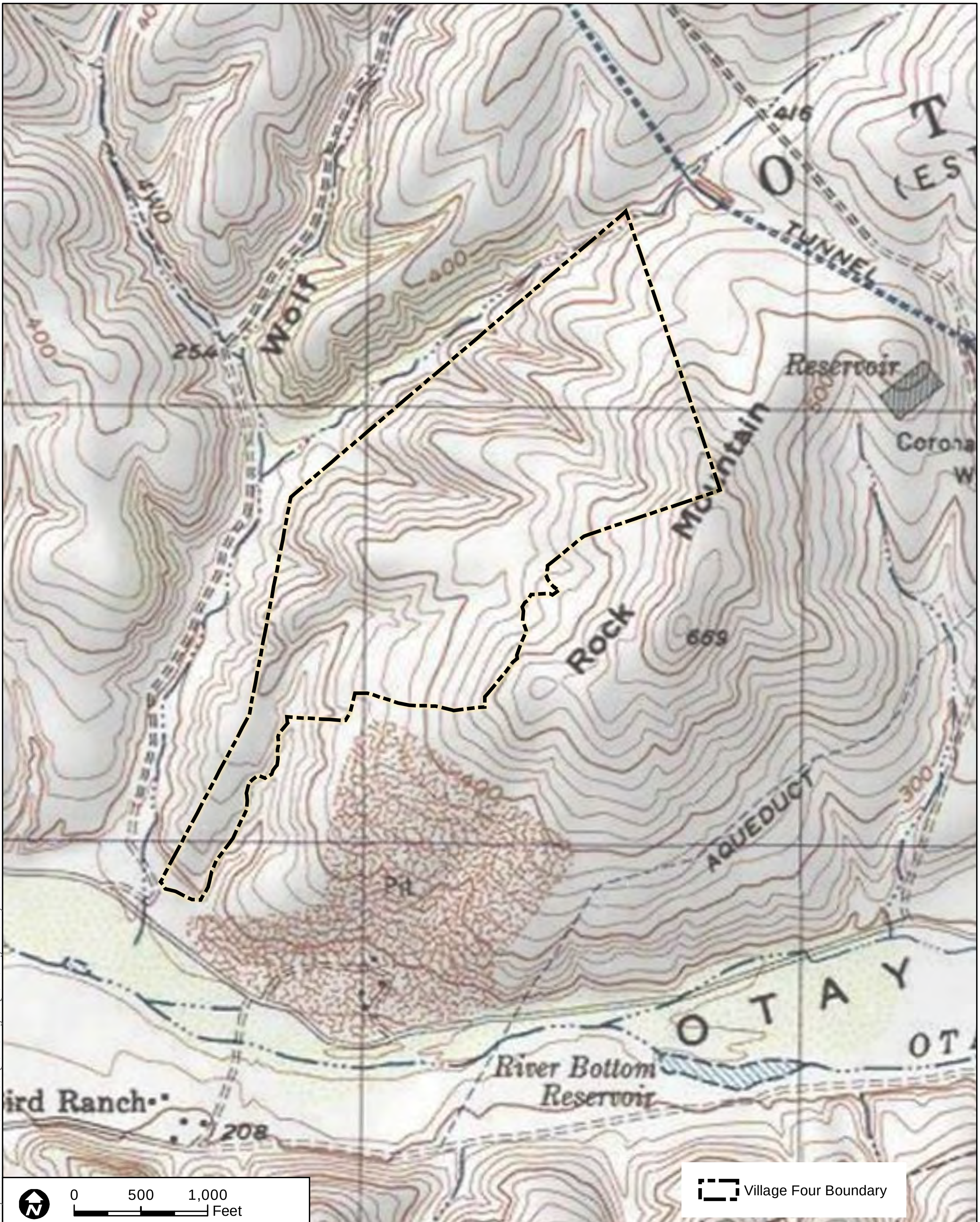

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AERIAL SOURCE: BING MAPPING SERVICE

FIGURE 2
Vicinity Map

Otay Ranch Village Four Air Quality and Greenhouse Gas Technical Report

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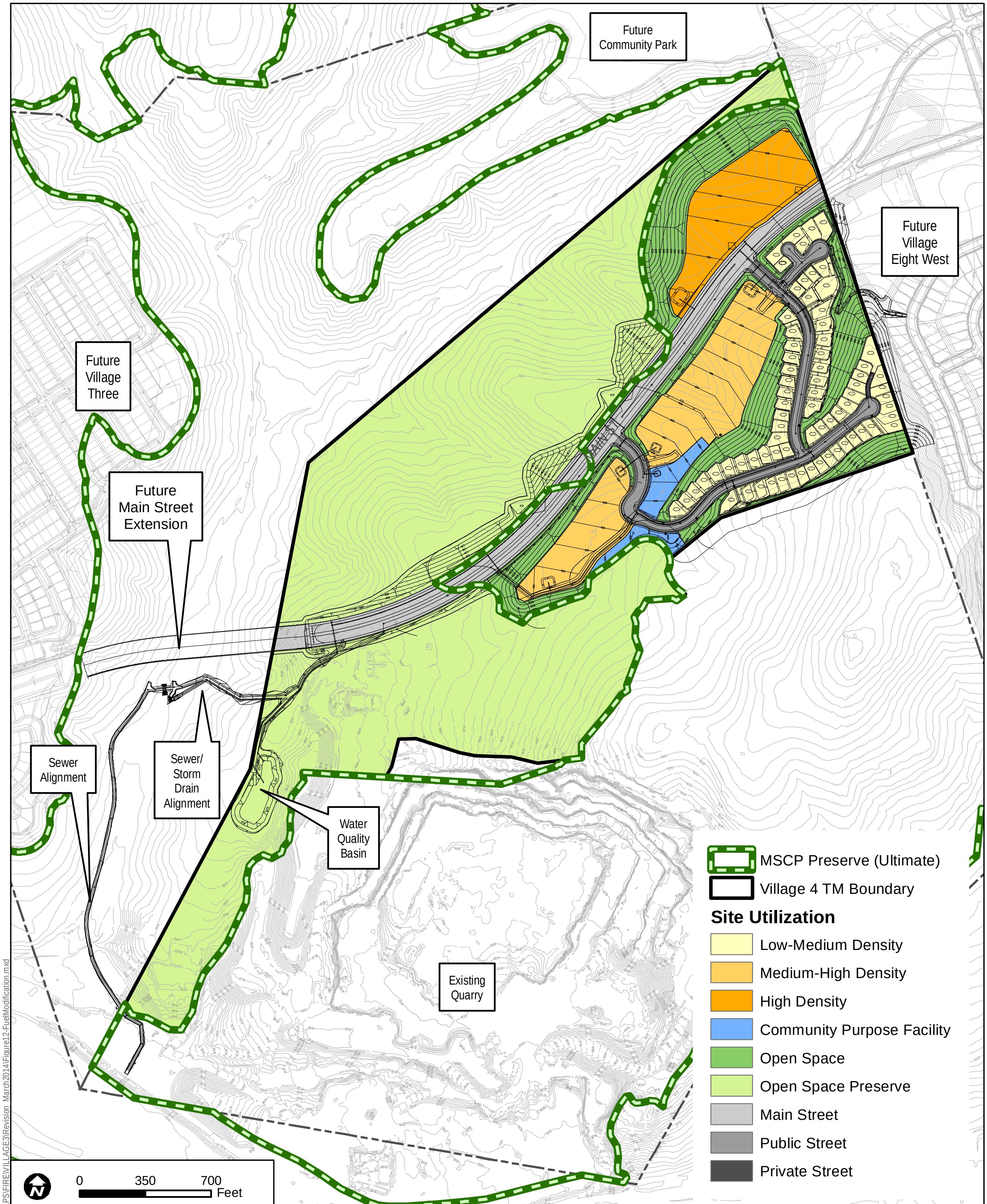

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SOURCE: HUNSAKER & ASSOCIATES 2017

FIGURE 3

Site Utilization Plan

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Transit stop locations and design are based on the following principles:

- Locate transit stops where there are a number of major pedestrian generators.
- Locate transit stops and pedestrian walkways to provide access while respecting the privacy of residential areas.
- At the intersection of two or more transit routes, locate bus stops to minimize walking distance between transfer stations.
- Locate bus turn-outs on the far side of the intersections to avoid conflicts between transit vehicles and automobile traffic, permitting right-turning vehicles to continue turning movements.
- Transit stops should be provided with adequate walkway lighting and well designated shelters.
- Walkway ramps should be provided at transit stops to ensure accessibility.

1.3 Construction Assumptions and Methodology

1.3.1 Construction Phasing, Equipment, and Vehicle Trips

Emissions from the construction phase of the project were estimated using the California Emissions Estimator Model (CalEEMod), Version 2016.3.1, available online (www.caleemod.com). For the purposes of modeling, it was assumed that grading of the project site would commence in January 2018. Construction of infrastructure would occur over 1 month and would begin August 2018 with building construction beginning in November 2018. The analysis contained herein is based on the following assumptions (duration of phases is approximate):

- Grading – 7 months (January 2018 – July 2018)
- Infrastructure – 1 month (August 2018)
- Paving – 3 months (October 2018 – December 2018)
- Building construction – 12 months (November 2018 – October 2019)
- Application of architectural coatings – 4 months (August 2019 – November 2019)

Grading of the project site would require the export of about 260,534 cubic yards of soil and is expected to occur over 7 months. Building construction would take approximately 12 months to complete. Paving would take approximately 3 months while architectural coatings would take approximately 4 months to complete. Construction of the proposed project is estimated to take approximately 22 months.

The construction equipment mix used for estimating the construction emissions of the project is based on information provided by the applicant and is shown in Table 1.

Table 1
Construction Scenario Assumptions

Construction Phase	Average Daily Worker One-Way Trips	Average Daily Vendor Truck One-Way Trips	Total Haul Truck One-Way Trips	Equipment	Quantity	Usage Hours
Grading	20	0	32,568	Excavators	2	8
				Graders	1	8
				Rubber Tired Dozers	1	8
				Scrapers	2	8
				Tractors/Loaders/Backhoes	2	8
Infrastructure	20	0	0	Excavators	2	8
				Graders	1	8
				Rubber Tired Dozers	1	8
				Scrapers	2	8
				Tractors/Loaders/Backhoes	2	8
Paving	16	0	0	Pavers	2	8
				Paving Equipment	2	8
				Rollers	2	8
Building Construction	484	138	0	Cranes	1	7
				Forklifts	3	8
				Generator Sets	1	8
				Tractors/Loaders/Backhoes	3	7
				Welders	1	8
Architectural Coating	98	0	0	Air Compressors	1	6

Notes: See Appendix A for details.
N/A = not applicable/not proposed

Construction phasing specifications were provided by the project applicant, while the default values generated by CalEEMod were used for the construction equipment mix. For the analysis, it was generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 5 days per week (22 days per month) during project construction. CalEEMod defaults were applied for the excess excavated soil, worker, and vendor trips.

A detailed depiction of the construction schedule—including information regarding subphases and equipment used during each subphase—is included in Appendix A of this report.

1.3.2 Blasting Emissions Methodology

The estimated emissions of NO_x, CO, and SO_X from explosives used for blasting were determined using emission factors in Section 13.3 (Explosives Detonation) of AP-42 (EPA 1980), and PM_{10} and $PM_{2.5}$ emissions were determined using Section 11.9 of AP-42 (EPA 1998). According to AP-42, "Unburned hydrocarbons also result from explosions, but in most instances, methane is the only species that has been reported" (EPA 1980); methane is not a VOC, and a methane emission factor has not been determined for ammonium nitrate/fuel oil (ANFO). The daily NO_x, CO, and SO_X emissions from blasting of explosive were calculated using the following equation:

Rock Blasted (cubic yard/day) × 1 pound explosive/cubic yard ÷ 2,000 pounds/ton × Emission Factor (pound/ton of explosive) = Pounds/day

The PM_{10} and $PM_{2.5}$ emissions were calculated using the following equation:

$$E = k \times 0.000014 \times A^{1.5}$$

Where:

E = pounds of PM_{10} or $PM_{2.5}$ per blast

k = particle size multiplier (= 0.52 for PM_{10} and 0.03 for $PM_{2.5}$)

A = horizontal area shifted by each blast in square feet

It should be noted that the AP-42 emission factors for explosives are based on studies conducted in the mid-1970s, over 35 years ago; however, no updated factors for blasting explosives were available. In addition, the PM_{10} and $PM_{2.5}$ emission factors from Section 11.9 of AP-42 were derived from methods for blasting operations at western surface coal mines, including those activities associated with removal of soil overburden. Thus, these factors may overestimate emissions for blasting of hard rock.

Table 2, Blasting Characteristics, shows the anticipated blasting quantities during each construction phase.

Table 2
Blasting Characteristics

Activity	Blasting Information
Blasting Days	60
Blasted Rock (cubic yards)	406,500
Blasted Rock (cubic yards/day)	6,775

Table 2
Blasting Characteristics

Activity	Blasting Information
Explosive Used (tons/day)	8.2
Area Blasted (square feet)	2,126,164
Area Blasted (square feet/day)	35,436

Source: Kruer 2015a.

1.3.3 Rock Crushing Emissions Methodology

Excavated rock would be crushed and screened to produce capping material ("6 inch minus") to be used in the construction of the proposed project. Much of this rock may be produced in the field using special attachments installed on off-road equipment used to excavate the rock. However, two to three rock crushing facilities may be installed to process the excavated rock. If so, this processing equipment will be the primary source of PM_{10} and $PM_{2.5}$ emissions. The processing equipment will consist of a crusher, screen, and conveyor, and the crushed rock would be stockpiled. While a single primary crusher and screen may be all that is required, use of a secondary crusher and additional screen would expedite this process. To generate a conservative emission estimate, it was assumed that a feed hopper, primary and secondary crushers, two screens, and several conveyors for transfers would be used. Particulate emissions from the crushers, screens, and conveyors will be controlled with water sprays.

The PM_{10} and $PM_{2.5}$ emissions from the processing equipment were calculated using factors provided in Section 11.9.2 of AP-42 (EPA 2004). Because the processing equipment will have water sprays installed to reduce the particulate emissions, emission factors for controlled sources were used for emission estimates.

For transfers to the feed hopper and stockpiles, the "drop" equation in Section 13.2.4 (Aggregate Handling and Storage Piles) of AP-42 (EPA 2006) was used to derive an emission factor. The drop equation is:

$$\textbf{Emission Factor} = k \times 0.0032 \times (U/5)^{1.3}/(M/2)^{1.4}$$

Where:

E = emission factor, pounds per ton
k = particle size multiplier (dimensionless)
U = mean wind speed, miles per hour
M = material moisture content (%)

The mean wind speed (2.3 miles per hour) from the Chula Vista meteorological dataset for 2013–2015 was used in this calculation. No additional emission controls were assumed.

The PM_{10} and $PM_{2.5}$ emissions were calculated using the following equation for each source (e.g., hopper loading, crusher, screen, conveyor, transfer to stockpile):

Emission Factor (pounds/ton) × Material Throughput (tons/day) = Pounds/day

Approximately 2,500 cubic yards of crushed rock would be processed per day (Rehm 2017). The rock crushing equipment would be powered by a diesel engine-generator. It is assumed that each engine-generator would be approximately 1,000 horsepower. Each engine-generator would operate up to 8 hours per day. The VOC, NO_x, CO, SO_X, PM_{10}, and $PM_{2.5}$ emissions from the diesel engine-generator were estimated using the off-road engine load factor and emission factors from the CalEEMod user's guide for a typical generator operating in 2018 (CAPCOA 2013). The daily emissions were calculated using the following equation:

Emission Factor (gram/BHP-hour) × Engine Rating (BHP) × Load Factor ÷ 453.6 gram/pound × hours/day = Pounds/day

As shown in Table 3, the annual number of days were estimated and is based on the total cubic yards of capping material required and the estimated processing rate of 2,500 cubic yards per day.

Table 3
Rock Crushing Characteristics

Activity	Crushing Information
Capping Material (cubic yards)	406,500
Processing Rate (cubic yards day)	2,500
Operating Days	163

Source: Kruer 2015a.

All overlapping construction activities and associated emissions, including those from general construction activities, blasting, and rock crushing were accounted for in the quantification of maximum daily emissions.

1.4 Operational Assumptions and Methodology

As shown in the Traffic Impact Analysis (TIA) completed for the proposed project (Fehr and Peers 2016), the project is calculated to generate 2,950 daily trips with 236 trips (53 inbound/183 outbound) in AM peak hours and 296 trips (207 inbound/89 outbound) during PM peak hours. CalEEMod was used to estimate daily emissions from proposed vehicular sources. Furthermore, the proposed project would result in an average trip length of 4.82 miles which would result in a daily vehicle miles traveled (VMT) of 14,219 miles[1]. The average trip length is based on the proposed project's TIA (Fehr and Peers 2016). As discussed within the TIA, the average trip length was derived by dividing the total VMT in traffic analysis zone 4405 (30,602 miles), where the proposed project is located, by the total daily trips (6,345 trips). Notably, the trip length calculation includes the completion of Main Street. CalEEMod default data, including temperature, trip characteristics, variable start information, and emissions factors were conservatively used for the model inputs. Project-related traffic was assumed to include a mixture of vehicles in accordance with the model outputs for traffic. Emission factors representing the vehicle mix and emissions for 2020 (the first full year of operation) were used to estimate emissions associated with full buildout of the proposed project.

In addition to estimating mobile source emissions, CalEEMod was used to estimate emissions from the project's energy use, which includes natural gas combustion. CalEEMod was also used to estimate emissions from the project's area sources, which include landscaping, consumer products, and architectural coatings for building maintenance.

1 Notably, there is a slight discrepancy between the trip generation in the TIA and what is included in the CalEEMod outputs. The traffic analysis was based on older project plans and assumed a total of 75 single-family dwelling units and 275 apartments with 2,950 daily trip generation, whereas the current project plans include a reduction of single-family dwelling units to 73 and an increase in apartments to 277 with a daily trip generation of 2,946. The criteria air pollutant and GHG emissions analysis uses the trip rates and trip lengths described in the TIA, but updated the land use assumptions to match the revised project description.

2 AIR QUALITY

2.1 Existing Conditions

2.1.1 Climate and Topography

The project site is located within the San Diego Air Basin (SDAB), which is one of 15 air basins that geographically divide California. The SDAB lies in the southwestern corner of California and comprises the entire San Diego region, covering 4,260 square miles.

The SDAB experiences warm summers, mild winters, infrequent rainfalls, light winds, and moderate humidity. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The weather of the San Diego region, as in most of Southern California, is influenced by the Pacific Ocean and its semipermanent high-pressure systems that result in dry, warm summers and mild, occasionally wet winters. The average temperature ranges (in degrees Fahrenheit (°F)) from the mid-40s to the high 90s. Most of the region's precipitation falls from November to April, with infrequent (approximately 10%) precipitation during the summer. The average seasonal precipitation in Chula Vista is approximately 9 inches; the amount increases with elevation as moist air is lifted over the mountains to the east (WRCC 2016).

The interaction of ocean, land, and the Pacific High Pressure Zone maintains clear skies for much of the year and influences the direction of prevailing winds (westerly to northwesterly). Local terrain is often the dominant factor inland, and winds in inland mountainous areas tend to blow through the valleys during the day and down the hills and valleys at night. The topography in the San Diego region varies greatly, from beaches on the west to mountains and desert on the east. Along with local meteorology, the topography influences the dispersal and movement of pollutants in the SDAB. The mountains to the east prohibit dispersal of pollutants in that direction and help trap them in inversion layers. The SDAB experiences frequent temperature inversions. Subsidence inversions occur during the warmer months as descending air associated with the Pacific High Pressure Zone meets cool marine air. The boundary between the two layers of air creates a temperature inversion that traps pollutants. Another type of inversion, a radiation inversion, develops on winter nights when air near the ground cools by heat radiation and air aloft remains warm. The shallow inversion layer formed between these two air masses also can trap pollutants. As the pollutants become more concentrated in the atmosphere, photochemical reactions occur that produce ozone (O_3), commonly known as smog.

Light daytime winds, predominately from the west, further aggravate the condition by driving air pollutants inland, toward the mountains. Under certain conditions, atmospheric oscillation results in the offshore transport of air from the Los Angeles region to the County of San Diego (County). This often produces high O_3 concentrations, as measured at air pollutant monitoring stations within the County. The transport of air pollutants from Los Angeles to San Diego has also occurred within the stable layer of the elevated subsidence inversion, where high levels of O_3 are transported (County of San Diego 2011).

2.1.2 Sensitive Receptors

Reduced visibility, eye irritation, and adverse health impacts upon those persons termed sensitive receptors are the most serious hazards of existing air quality conditions in the area. Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. People most likely to be affected by air pollution, as identified by the California Air Resources Board (CARB), include children, the elderly, and people with cardiovascular and chronic respiratory diseases. Sensitive receptors include residences, schools, playgrounds, child care centers, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes (CARB 2005). The SDAPCD identifies sensitive receptors as schools (preschool–12th grade), hospitals, resident care facilities, and day-care centers (County of San Diego 2007).

The project site is currently undeveloped. The nearest existing sensitive receptors are located north and east of the project site. The closest existing single-family residences are located 0.6 miles north of the site. Olympian High School and Wolf Canyon Elementary School are located approximately 0.5 miles northeast of the project site. Additionally, future residential receptors would be located to the east, adjacent to the site as part of the Village 8 West development.

2.2 Pollutants and Effects

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include O_3, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter equal to or less than 2.5 microns ($PM_{2.5}$), and lead. These pollutants, as well as toxic air contaminants (TACs), are discussed in the following text.[2] In

2 The descriptions of each of the criteria air pollutants and associated health effects are based on the EPA's Criteria Air Pollutants (2016a) and the CARB Glossary of Air Pollutant Terms (2016a).

California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants.

Ozone. O_3 is a strong-smelling, pale blue, reactive, toxic chemical gas consisting of three oxygen atoms. It is a secondary pollutant formed in the atmosphere by a photochemical process involving the sun's energy and O_3 precursors, such as hydrocarbons and NO_x. These precursors are mainly NO_x and volatile organic compounds (VOCs). The maximum effects of precursor emissions on O_3 concentrations usually occur several hours after they are emitted and many miles from the source. Meteorology and terrain play major roles in O_3 formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. O_3 exists in the upper atmosphere ozone layer as well as at the Earth's surface in the troposphere. The O_3 that the Environmental Protection Agency (EPA) and CARB regulate as a criteria air pollutant is produced close to the ground level, where people live, exercise, and breathe. Ground-level ozone is a harmful air pollutant that causes numerous adverse health effect and is thus, considered "bad" ozone. Stratospheric ozone, or "good" ozone, occurs naturally in the upper atmosphere, where it reduces the amount of ultraviolet light (i.e., solar radiation) entering the earth's atmosphere. Without the protection of the beneficial stratospheric ozone layer, plant and animal life would be seriously harmed.

O_3 in the troposphere causes numerous adverse health effects; short-term exposures (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. These health problems are particularly acute in sensitive receptors such as the sick, the elderly, and young children.

Nitrogen Dioxide. NO_2 is a brownish, highly reactive gas that is present in all urban atmospheres. The major mechanism for the formation of NO_2 in the atmosphere is the oxidation of the primary air pollutant nitric oxide, which is a colorless, odorless gas. NO_x plays a major role, together with VOCs, in the atmospheric reactions that produce O_3. NO_x is formed from fuel combustion under high temperature or pressure. In addition, NO_x is an important precursor to acid rain and may affect both terrestrial and aquatic ecosystems. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.

NO_2 can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections.

Carbon Monoxide. CO is a colorless, odorless gas formed by the incomplete combustion of hydrocarbon, or fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the project location, automobile exhaust accounts for the majority of CO emissions. CO is a nonreactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions—primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, which is a typical situation at dusk in urban areas from November to February. The highest levels of CO typically occur during the colder months of the year, when inversion conditions are more frequent.

In terms of adverse health effects, CO competes with oxygen, often replacing it in the blood, reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can include dizziness, fatigue, and impairment of central nervous system functions.

Sulfur Dioxide. SO_2 is a colorless, pungent gas formed primarily from incomplete combustion of sulfur-containing fossil fuels. The main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels.

SO_2 is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. When combined with particulate matter, SO_2 can injure lung tissue and reduce visibility and the level of sunlight. SO_2 can also yellow plant leaves and erode iron and steel.

Particulate Matter. Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Coarse particulate matter (PM_{10}) is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. Fine particulate matter ($PM_{2.5}$) is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., from motor vehicles and power generation and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SO_x), NO_x, and VOCs.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the blood stream, causing damage elsewhere in the body. Additionally, these substances can transport adsorbed gases such as chlorides or ammonium into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissue. Suspended particulates also damage and discolor surfaces on which they settle and produce haze and reduce regional visibility.

People with influenza, people with chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death as a result of breathing particulate matter. People with bronchitis can expect aggravated symptoms from breathing in particulate matter. Children may experience a decline in lung function due to breathing in PM_{10} and $PM_{2.5}$. Other groups considered sensitive are smokers, people who cannot breathe well through their noses, and exercising athletes (because many breathe through their mouths).

Lead. Lead in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline; the manufacturing of batteries, paints, ink, ceramics, and ammunition; and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phaseout of leaded gasoline reduced the overall inventory of airborne lead by nearly 95%. With the phaseout of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emissions sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient performance, psychomotor performance, reaction time, and growth. Children are highly susceptible to the effects of lead.

Volatile Organic Compounds. Hydrocarbons are organic gases that are formed from hydrogen and carbon and sometimes other elements. Hydrocarbons that contribute to formation of O_3 are referred to and regulated as VOCs (also referred to as reactive organic gases). Combustion engine exhaust, oil refineries, and fossil-fueled power plants are the sources of hydrocarbons.

Other sources of hydrocarbons include evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint.

The primary health effects of VOCs result from the formation of O_3 and its related health effects. High levels of VOCs in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons, such as benzene, are considered TACs. There are no separate health standards for VOCs as a group.

Non-Criteria Air Pollutants

Toxic Air Contaminants. A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic noncancer health effects. A toxic substance released into the air is considered a TAC. TACs are identified by federal and state agencies based on a review of available scientific evidence. In the state of California, TACs are identified through a two-step process that was established in 1983 under the Toxic Air Contaminant Identification and Control Act. This two-step process of risk identification and risk management and reduction was designed to protect residents from the health effects of toxic substances in the air. In addition, the California Air Toxics "Hot Spots" Information and Assessment Act, Assembly Bill (AB) 2588, was enacted by the legislature in 1987 to address public concern over the release of TACs into the atmosphere. The law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years.

Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources, such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources, such as automobiles; and area sources, such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and noncarcinogenic effects. Noncarcinogenic effects typically affect one or more target organ systems and may be experienced on either short-term (acute) or long-term (chronic) exposure to a given TAC.

Diesel Particulate Matter. Diesel particulate matter (DPM) is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is composed of two phases, gas and particle, both of which contribute to health risks. The California Air Resources Board (CARB) classified "particulate emissions from diesel-fueled engines" (i.e., DPM; 17 CCR 93000) as a TAC in August 1998. DPM is emitted from a broad range of diesel engines: on-road diesel engines of trucks, buses, and cars and off-road diesel engines including locomotives, marine vessels, and heavy-duty construction equipment, among others. Approximately 70% of all airborne cancer risk in California is associated with DPM (CARB 2000). To reduce the cancer risk associated with DPM, CARB adopted a diesel risk reduction plan in 2000 (CARB 2000).

Odorous Compounds. Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor and recognition may only occur with an alteration in the intensity. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

2.3 Regulatory Setting

2.3.1 Federal

Criteria Air Pollutants

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The EPA is responsible for implementing most aspects of the Clean Air Act, including the setting of National Ambient Air Quality Standards (NAAQS) for major air pollutants, hazardous air pollutant (HAP) standards, approval of state attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric O_3 protection, and enforcement provisions. NAAQS are established for "criteria pollutants" under the Clean Air Act, which are O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The NAAQS (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a State Implementation Plan that demonstrates how those areas will attain the standards within mandated time frames.

Hazardous Air Pollutants

The 1977 federal Clean Air Act amendments required the EPA to identify National Emission Standards for Hazardous Air Pollutants to protect public health and welfare. HAPs include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 federal Clean Air Act Amendments, which expanded the control program for HAPs, 189 substances and chemical families were identified as HAPs.

2.3.2 State

Criteria Air Pollutants

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts (AQMDs) and air pollution control districts (APCDs) at the regional and county levels. CARB, which became part of the California Environmental Protection Agency (CalEPA) in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Table 4.

Table 4
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary*[c,d]	*Secondary*[c,e]
O_3	1 hour	0.09 ppm (180 μg/m^3)	—	Same as Primary Standard[f]
	8 hours	0.070 ppm (137 μg/m^3)	0.070 ppm (137 μg/m^3)[f]	
NO_2[g]	1 hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3)	Same as Primary

Table 4
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary[c,d]*	*Secondary[c,e]*
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)	Standard
CO	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
SO_2[h]	1 hour	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3)	—
	3 hours	—	—	0.5 ppm (1,300 μg/m^3)
	24 hours	0.04 ppm (105 μg/m^3)	0.14 ppm (for certain areas)[g]	—
	Annual	—	0.030 ppm (for certain areas)[g]	—
PM_{10}[i]	24 hours	50 μg/m^3	150 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 μg/m^3	—	
$PM_{2.5}$[i]	24 hours	—	35 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3
Lead[j,k]	30-day Average	1.5 μg/m^3	—	—
	Calendar Quarter	—	1.5 μg/m^3 (for certain areas)[k]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 μg/m^3	
Hydrogen sulfide	1 hour	0.03 ppm (42 μg/m^3)	—	—
Vinyl chloride[j]	24 hours	0.01 ppm (26 μg/m^3)	—	—
Sulfates	24- hours	25 μg/m^3	—	—
Visibility reducing particles	8 hour (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%	—	—

Source: CARB 2016b.

Notes: ppm = parts per million by volume; μg/m^3 = micrograms per cubic meter; mg/m^3= milligrams per cubic meter.

[a] California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter—PM_{10}, $PM_{2.5}$, and visibility-reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 micrograms per cubic meter (μg/m^3) is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25° Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] On October 1, 2015, the primary and secondary NAAQS for O_3 were lowered from 0.075 ppm to 0.070 ppm

[g] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[h] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[i] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM_{10} standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[j] CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[k] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

Toxic Air Contaminants

The state Air Toxics Program was established in 1983 under AB 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and noncarcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the (federal) HAPs. The Air Toxics “Hot Spots” Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. TAC emissions from individual facilities are quantified and prioritized. “High-priority” facilities are required to perform a health risk assessment, and if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. The regulation is anticipated to result in an 80% decrease in statewide diesel health risk in 2020 compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel powered equipment. Several Airborne Toxic Control Measures that reduce diesel emissions including In-Use Off-Road Diesel-Fueled Fleets (13 CCR 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025).

2.3.3 Local

San Diego Air Pollution Control District

While CARB is responsible for the regulation of mobile emission sources within the state, local AQMDs and APCDs are responsible for enforcing standards and regulating stationary sources. The project is located within the SDAB and is subject to SDAPCD guidelines and regulations. In San Diego County, O_3 and particulate matter are the pollutants of main concern, since exceedances of the CAAQS for those pollutants are experienced in the County in most years. For this reason, the SDAB has been designated as a nonattainment area for the state PM_{10}, $PM_{2.5}$, and O_3 (1-hour and 8-hour) CAAQS (CARB 2016c) and as a federal O_3 marginal nonattainment area for the 2008 8-hour NAAQS (EPA 2016b), as discussed in Section 2.4.

The SDAPCD and the San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The *Regional Air Quality Strategy* (RAQS) for the San Diego Air Basin was initially adopted in 1991, and is updated on a triennial basis, most recently in 2016 (SDAPCD 2016a). The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for O_3. The RAQS relies on information from CARB and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in San Diego County and the cities in the county, to project future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population, vehicle trends, and land use plans developed by San Diego County and the cities in the county as part of the development of their general plans (SANDAG 2017a, 2017b).

In December 2016, the SDAPCD revised the RAQS for San Diego County. Since 2007, the San Diego region reduced daily VOC emissions and NO_x emissions by 3.9% and 7.0% respectively; the SDAPCD expects to continue reductions through 2035 (SDAPCD 2016a). These reductions were achieved through implementation of six VOC control measures and three NO_x control measures adopted in the SDAPCD's 2009 RAQS; in addition, the SDAPCD is considering additional measures, including three VOC measures and four control measures to reduce 0.3 daily tons of VOC and 1.2 daily tons of NO_x, provided they are found to be feasible region-wide. In addition, SDAPCD has implemented nine incentive-based programs, has worked with SANDAG to implement regional transportation control measures, and has reaffirmed the state emission offset repeal.

In December 2016, the SDAPCD also adopted an update to the *Eight-Hour Ozone Attainment Plan for San Diego County* (2008 O_3 NAAQS). The 2016 *Eight-Hour Ozone Attainment Plan for San Diego County* identifies control measures and associated emission reductions which would allow the region to reach attainment of the federal 8-hour O_3 standard (2008 O_3 NAAQS) by July 20, 2018 (SDAPCD 2016b). Currently, the County is in moderate nonattainment for the 2008 O_3 NAAQS. As documented in the 2016 *Eight-Hour Ozone Attainment Plan for San Diego County*, the County has a likely chance of obtaining attainment due to the transition to low emission cars, stricter new source review rules, and continuing the requirement of general conformity for military growth and the San Diego International Airport. The County will also continue emission control measures including ongoing implementation of existing regulations in ozone precursor reduction to stationary and area-wide sources, subsequent inspections of facilities and sources, and the adoption of laws requiring Best Available Retrofit Control Technology for control of emissions (SDAPCD 2016a).

In this plan, SDAPCD relies on the RAQS to demonstrate how the region will comply with the federal O_3 standard. The RAQS details how the region will manage and reduce O_3 precursors (NO_x and VOCs) by identifying measures and regulations intended to reduce these pollutants. The control measures identified in the RAQS generally focus on stationary sources; however, the emissions inventories and projections in the RAQS address all potential sources, including those under the authority of CARB and the EPA. Incentive programs for reduction of emissions from heavy-duty diesel vehicles, passenger vehicles, off-road equipment, and school buses are also established in the RAQS. According to the Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County, the SDAB did not reach attainment of the federal 1997 standard until 2011 (SDAPCD 2012). This plan, however, demonstrates the region's attainment of the 1997 O_3 NAAQS and outlines the plan for maintaining attainment status.

In regards to particulate matter emissions reduction efforts, in December 2005, the SDAPCD prepared a report titled "Measures to Reduce Particulate Matter in San Diego County" to address implementation of Senate Bill (SB) 656 in San Diego County (SB 656 required additional controls to reduce ambient concentrations of PM_{10} and $PM_{2.5}$) (SDAPCD 2005). In the report, SDAPCD evaluated the implementation of source-control measures that would reduce particulate matter emissions associated with residential wood combustion; various construction activities including earthmoving, demolition, and grading; bulk material storage and handling; carryout and trackout removal and cleanup methods; inactive disturbed land; disturbed open areas; unpaved parking lots/staging areas; unpaved roads; and windblown dust (SDAPCD 2005).

As stated above, the SDAPCD is responsible for planning, implementing, and enforcing federal and state ambient standards in the SDAB. The following rules and regulations would apply to the project:

- **SDAPCD Regulation IV: Prohibitions; Rule 51: Nuisance.** Prohibits the discharge, from any source, of such quantities of air contaminants or other materials that cause or have a tendency to cause injury, detriment, nuisance, annoyance to people and/or the public, or damage to any business or property (SDAPCD 1969).
- **SDAPCD Regulation IV: Prohibitions; Rule 55: Fugitive Dust.** Regulates fugitive dust emissions from any commercial construction or demolition activity capable of generating fugitive dust emissions, including active operations, open storage piles, and inactive disturbed areas, as well as track-out and carry-out onto paved roads beyond a project site (SDAPCD 2009).
- **SDAPCD Regulation IV: Prohibitions; Rule 67.0.1: Architectural Coatings.** Requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories (SDAPCD 2015).

City of Chula Vista

The City of Chula Vista General Plan (City of Chula Vista 2005) includes various policies related to improving air quality (both directly and indirectly). Applicable policies include the following:

Land Use and Transportation Element

- **Policy LUT-23.1:** Encourage the use of bicycles and walking as alternatives to driving.
- **Policy LUT-23.2:** Foster the development of a system of inter-connecting bicycle routes throughout the City and region.
- **Policy LUT-23.5:** Provide linkages between bicycle facilities that utilize circulation element alignments and open space corridors.
- **Policy LUT-23.8:** Provide and maintain a safe and efficient system of sidewalks, trails, and pedestrian crossings.
- **Policy LUT-23.14:** Require new development projects to provide internal bikeway systems with connections to the citywide bicycle networks.

Environmental Element

- **Policy E-6.1:** Encourage compact development featuring a mix of uses that locate residential areas within reasonable walking distance to jobs, services, and transit.
- **Policy E-6.5:** Ensure that plans development to meet the City's energy demand use the least polluting strategies, wherever practical. Conservation, clean renewables, and clean distributed generation should be considered as part of the City's energy plan, along with larger natural gas-fired plants.
- **Policy E-6.6:** Explore incentives to promote voluntary air pollutant reductions, including incentives for developers who go above and beyond applicable requirements and for facilities and operations that are not otherwise regulated.
- **Policy E-6.7:** Encourage innovative energy conservation practices and air quality improvements in new development and redevelopment projects consistent with the City's Air Quality Improvement Plan Guidelines or its equivalent, pursuant to the City's Growth Management Program.
- **Policy E-6.8:** Support the use of alternative fuel transit, City fleet and private vehicles in Chula Vista.
- **Policy E-6.9:** Discourage the use of landscaping equipment powered by two-stroke gasoline engines within the City and promote less-polluting alternatives to their use.
- **Policy E-6.11:** Develop strategies to minimize CO hot spots that address all modes of transportation.
- **Policy E-6.12:** Promote clean fuel sources that help reduce the exposure of sensitive uses to pollutants.
- **Policy E-6.A.1:** Continue to limit exposure to secondhand smoke by encouraging the creation of smoke free spaces and facilities at all workplaces and multi-unit housing.

Otay Ranch General Development Plan

The Otay Ranch General Development Plan adopted by the City of Chula Vista establishes goals to minimize the adverse impacts of development on air quality, including creating a safe and efficient multi-modal transportation network that serves to minimize the number and length of single-passenger vehicle trips. The following objectives and policies may be applicable to the proposed project.

- **Objective:** Minimize the number and length of single passenger vehicle trips to and from employment and commercial centers to achieve an average of 1.5 persons per passenger vehicle during weekday commute hours.
- **Policies:**
  - Establish or participate in employer based commute programs, which minimize the number and length of single passenger vehicle trips
  - Encourage the development of a Transportation Management Association (TMA) for the Otay Mesa Area
  - Encourage, as appropriate, alternative transportation incentives offered to employees, alternative work hour programs, alternative transportation promotional materials, information on car pool and van pool matching services, transit pass information, space for car-pool and van-pool-riders-wanted advertisements, information about transit and rail service, as well as information about bicycle facilities, routes, storage, and location of nearby shower and locker facilities.
  - Promote telecommuting and teleconferencing programs and policies in employment centers.
  - Establish or participate in education-based commute programs, which minimize the number and length of single passenger vehicle trips.
  - Provide on-site amenities in commercial and employment centers to include childcare facilities, post offices, banking services, cafeterias/delis/restaurants, etc.
  - Should Otay Ranch include a college or university, the facility should comply with RAQS transportation demand management strategies relating to such uses
- **Objective:** Expand the capacity of both the highway and transit components of the regional transportation system to minimize congestion and facilitate the movement of people and goods.
- **Policies:**
  - Facilitate the implementation of the Regional Transportation Plan and Congestion Management Capital Improvement Plan.
  - Expand the capacity of non-vehicular modes of transportation, such as high-occupancy vehicle (HOV) lanes, carts and bicycle networks.
  - Identify, and designate corridors for light rail and public transit facilities, including feeder transit systems connected to “line-haul” networks.

- Include alternative forms of transportation as a priority part of the circulation system, such as bicycle paths, riding and hiking trails, and pedestrian walkways.
- Provide park-and-ride facilities, which do not undermine feeder lines. Park and ride facilities may be located near multiple-trip generating activities; intercept trips close to their origin; and target longer trips along corridors with HOV lanes. Park-and-ride facilities should be equipped with secure bicycle storage facilities and should have adequate spaces to serve demand.

- **Objective:** HOV lanes shall be encouraged.
- **Policies:**
  - HOV lanes should include frequent transit stops for transfer of passengers from public transit systems.
  - HOV bypass lanes should be provided at all metered SR-125 entrance ramps, where consistent with public safety standards.
- **Objective:** Provide a safe, thorough and comprehensive bicycle network which includes bicycle paths between major destinations within, and adjacent to, Otay Ranch.
- **Policies:**
  - Bicycle facilities should be designated for bicycle use, and pedestrian facilities for pedestrian use to the extent necessary to provide safe, accessible facilities.
  - Bicycling shall be promoted through bicycle lane maps and bicycle destination signage.
  - Provide secure bicycle storage facilities at transit stops, and employment and retail centers.
  - Convenient bicycle access shall be provided to transit nodes.
- **Objective:** Design arterial and major roads and their traffic signals to minimize travel time, stops and delays.
- **Policies:**
  - Optimize traffic signals control systems at all activity centers to minimize travel time, stops and delays. Consider providing priority signal treatment for tenant systems.
  - Minimize the number of ingress and egress to major arterial roads.
  - Traffic signals at the street end of freeway on and off ramps shall be coordinated and integrated with the surrounding street systems.

- o Promote street design to give first priority to transit vehicles.

2.4 Local Air Quality

2.4.1 San Diego Air Basin Attainment Designation

An area is designated in attainment when it is in compliance with the NAAQS and/or CAAQS. These standards are set by the EPA or CARB for the maximum level of a given air pollutant that can exist in the outdoor air without unacceptable effects on human health or the public welfare.

Pursuant to the 1990 federal Clean Air Act Amendments, the EPA classifies air basins (or portions thereof) as “attainment” or “nonattainment” for each criteria air pollutant, based on whether the NAAQS have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as “attainment” for that pollutant. If an area exceeds the standard, the area is classified as “nonattainment” for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as “unclassified” or “unclassifiable.” The designation of “unclassifiable/attainment” means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are redesignated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the standards. The California Clean Air Act, like its federal counterpart, called for the designation of areas as “attainment” or “nonattainment,” but based on CAAQS rather than the NAAQS. Table 5 depicts the current attainment status of the SDAB with respect to the NAAQS and CAAQS.

Table 5
San Diego Air Basin Attainment Classification

Pollutant	Federal Designation	State Designation
O_3 (1 hour)	Attainment (Maintenance)[1]	Nonattainment
O_3 (8 hour – 1997) (8 hour – 2008)	Attainment (Maintenance) Nonattainment (Marginal)	Nonattainment
NO_2	Unclassifiable/Attainment	Attainment
CO	Attainment (Maintenance)[2]	Attainment
SO_2	Attainment	Attainment
PM_{10}	Unclassifiable[3]	Nonattainment
$PM_{2.5}$	Attainment	Nonattainment
Lead	Attainment	Attainment
Sulfates	(no federal standard)	Attainment
Hydrogen Sulfide	(no federal standard)	Unclassified
Visibility-Reducing Particles	(no federal standard)	Unclassified

Source: EPA 2016b; CARB 2016c.

1 The federal 1-hour standard of 0.12 ppm was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in state implementation plans.
2 The western and central portions of the basin are designated attainment (maintenance), while the eastern portion is designated unclassifiable/attainment.
3 At the time of designation, if the available data does not support a designation of attainment or nonattainment, the area is designated as unclassifiable.

2.4.2 Air Quality Monitoring Data

CARB, air districts, and other agencies monitor ambient air quality at approximately 250 air quality monitoring stations across the state. The project site's local ambient air quality is monitored by the SDAPCD. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The most recent background ambient air quality data from 2013 to 2015 are presented in Table 6. The Chula Vista monitoring station, located at 80 East J Street, is the nearest air quality monitoring station to the project site, located approximately 5 miles northwest from the project site. The data collected at this station are considered representative of the air quality experienced in the project vicinity. Air quality data for O_3, NO_2, PM_{10}, and $PM_{2.5}$ from the Chula Vista monitoring station are provided in Table 6. Because CO and SO_2 are not monitored at the Chula Vista monitoring station, CO measurements were taken from the San Diego - Beardsley monitoring station and SO_2 measurements were taken from the El Cajon monitoring station. The number of days exceeding the ambient air quality standards is also shown in Table 6.

Table 6
Local Ambient Air Quality Data

Concentration or Exceedances	Ambient Air Quality Standard	2013	2014	2015
Ozone (O_3) (Chula Vista Monitoring Station)				
Maximum 1-hour concentration (ppm)	0.09 ppm (state)	0.073	0.093	0.088
Number of days exceeding state standard (days)		*0*	*0*	*0*
Maximum 8-hour concentration (ppm)	0.070 ppm (state)	0.063	0.072	0.067
	0.070 ppm (federal)	0.062	0.072	0.066
Number of days exceeding state standard (days)		*0*	*1*	*0*
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Nitrogen Dioxide (NO_2) (Chula Vista Monitoring Station)				
Maximum 1-hour concentration (ppm)	0.18 ppm (state)	0.057	0.055	0.049
	0.100 ppm (federal)	0.057	0.055	0.049
Number of days exceeding state standard (days)		*0*	*0*	*0*
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Annual concentration (ppm)	0.030 ppm (state)	0.011	0.011	0.010
	0.053 ppm (federal)	—	—	—

Table 6
Local Ambient Air Quality Data

Concentration or Exceedances	Ambient Air Quality Standard	2013	2014	2015
Carbon Monoxide (CO) (San Diego – Beardsley Monitoring Station)				
Maximum 1-hour concentration (ppm)	20 ppm (state)	—	—	—
	35 ppm (federal)	3.0	2.7	2.6
Number of days exceeding state standard (days)		—	—	—
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Maximum 8-hour concentration (ppm)	9.0 ppm (state)	—	—	—
	9 ppm (federal)	2.1	3.0	1.9
Number of days exceeding state standard (days)		—	—	—
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Sulfur Dioxide (SO_2) (El Cajon Monitoring Station)				
Maximum 1-hour concentration (ppm)	0.075 ppm (federal)	0.065	0.010	0.012
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Maximum 24-hour concentration (ppm)	0.14 ppm (federal)	0.006	0.003	0.004
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Annual concentration (ppm)	0.030 ppm (federal)	0.001	0.001	0.001
Coarse Particulate Matter (PM_{10}) (Chula Vista Monitoring Station)				
Maximum 24-hour concentration ($\mu g/m^3$)	50 $\mu g/m^3$ (state)	40.0	39.0	45.0
	150 $\mu g/m^3$ (federal)	38.0	38.0	46.0
Number of days exceeding state standard (days)[a]		*0.0 (0)*	*0.0 (0)*	*0.0 (0)*
Number of days exceeding federal standard (days) [a]		*0.0 (0)*	*0.0 (0)*	*0.0 (0)*
Annual concentration (state method) ($\mu g/m^3$)	20 $\mu g/m^3$ (state)	23.7	23.4	19.8
Fine Particulate Matter ($PM_{2.5}$) (Chula Vista Monitoring Station)				
Maximum 24-hour concentration ($\mu g/m^3$)	35 $\mu g/m^3$ (federal)	21.9	26.5	33.5
Number of days exceeding federal standard (days) [a]		*0.0 (0)*	*0.0 (0)*	*0.0 (0)*
Annual concentration ($\mu g/m^3$)	12 $\mu g/m^3$ (state)	9.5	9.3	8.4
	12.0 $\mu g/m^3$ (federal)	9.4	9.2	8.3

Sources: CARB 2016d; EPA 2016c.

Notes: — = not available; µg/m3 = micrograms per cubic meter; ND = insufficient data available to determine the value; ppm = parts per million

Data taken from CARB iADAM (http://www.arb.ca.gov/adam) and EPA AirData (http://www.epa.gov/airdata/) represent the highest concentrations experienced over a given year.

Exceedances of federal and state standards are only shown for O_3 and particulate matter. Daily exceedances for particulate matter are estimated days because PM_{10} and $PM_{2.5}$ are not monitored daily. All other criteria pollutants did not exceed federal or state standards during the years shown. There is no federal standard for 1-hour ozone, annual PM_{10}, or 24-hour SO_2, nor is there a state 24-hour standard for $PM_{2.5}$.

Chula Vista Monitoring Station is located at 80 E. J Street, Chula Vista, California 91910.

The El Cajon-Redwood Avenue Station is located at 1155 Redwood Avenue, El Cajon, California 92019.

San Diego – Beardsley Street Monitoring Station is located at 1110A Beardsley Street, San Diego, California 92112.

[a] Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

2.5 Thresholds of Significance

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, which provides guidance that a project would have a significant environmental impact if it would:

1. Conflict with or obstruct the implementation of the applicable air quality plan;
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for O_3 precursors);
4. Expose sensitive receptors to substantial pollutant concentrations; or
5. Create objectionable odors affecting a substantial number of people.

Criteria Pollutants

The City of Chula Vista evaluates project emissions based on the quantitative emission thresholds established by the South Coast Air Quality Management District (SCAQMD) (SCAQMD 2015). The SCAQMD set forth quantitative emission significance thresholds below which a project would not have a significant impact on ambient air quality. It should be noted that the use of these significance thresholds is conservative as the SCAQMD's significance thresholds were originally based on the South Coast Air Basin's extreme ozone nonattainment status for the 1-hour NAAQS, whereas the SDAB was designated as an attainment area for the 1-hour NAAQS.

Project-related air quality impacts estimated in this environmental analysis pursuant to Significance Threshold (2), above, would be considered significant if any of the applicable significance thresholds presented in Table 7 are exceeded. For these pollutants, if emissions exceed the thresholds shown in Table 7, the project could have the potential to result in a cumulatively considerable net increase in these pollutants and thus could have a significant impact on the ambient air quality pursuant to Significance Threshold (3), above.

Table 7
City of Chula Vista Air Quality Significance Thresholds

Pollutant	Construction	Operation
Criteria Pollutants Mass Daily Thresholds		
VOC	75 lbs/day	55 lbs/day
NO_x	100 lbs/day	55 lbs/day
CO	550 lbs/day	550 lbs/day
SO_x	150 lbs/day	150 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day

Source: SCAQMD 2015.
VOC – volatile organic compounds, NO_x – oxides of nitrogen, CO – carbon monoxide, SO_x – sulfur oxides, PM_{10} – particulate matter less than or equal to 10 microns, $PM_{2.5}$ – particulate matter less than or equal to 2.5 microns

2.6 Impact Analysis

2.6.1 Would the project conflict with or obstruct implementation of the applicable air quality plan?

As mentioned in Section 2.3, Regulatory Setting, the SDAPCD and SANDAG are responsible for developing and implementing the clean air plans for attainment and maintenance of the ambient air quality standards in the SDAB—specifically, the State Implementation Plan (SIP) and RAQS.[3] The federal O_3 maintenance plan, which is part of the SIP, was adopted in 2012. The SIP includes a demonstration that current strategies and tactics will maintain acceptable air quality in the SDAB based on the NAAQS. The RAQS was initially adopted in 1991 and is updated on a triennial basis (most recently in 2016). The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for O_3. The SIP and RAQS rely on information from the California Air Resources Board (CARB) and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in the County and the cities in the County, to project future emissions and to determine from them the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population, vehicle trends, and land use plans developed by the County and the cities in the County as part of the development of their general plans.

[3] For the purpose of this discussion, the relevant federal air quality plan is the ozone maintenance plan (SDAPCD 2012). The RAQS is the applicable plan for purposes of state air quality planning. Both plans reflect growth projections in the basin.

If a project proposes development that is greater than that anticipated in the local plan and SANDAG's growth projections, the project might be in conflict with the SIP and RAQS and may contribute to a potentially significant cumulative impact on air quality. The project site is zoned Planned Community (P-C), which allows the site to be developed with residential, industrial, and commercial development. The proposed project would be consistent with the General Plan land use designation for the site and would not require a general plan amendment.

Furthermore, the Otay Ranch GDP was adopted on October 28, 1993 and was later amended on May 26, 2015, with the concept to create a complete and balanced community, clustered into villages with conveniently located housing, shops, work places, schools, parks, civic facilities and open spaces. The General Development Plan/Subregional Plan (GDP/SRP) is an integrated policy document which combines the requirements of the City of Chula Vista and the County of San Diego. Village Four was designed to contain a maximum of 350 single-family residential units, with a build-out population of approximately 1,141. The proposed project would include 73 single family residential units and 277 multifamily units for a total of 350 residential units, resulting in a service population of 958 persons which is less than the build-out population of approximately 1,141. Therefore, the proposed project would not result in an increase in land use intensity or an increase in vehicle trips that has not been anticipated in local air quality plans; therefore, the proposed project would be consistent at a regional level with the underlying growth forecasts, development, and associated vehicle trips as anticipated in the RAQS.

Because the growth forecasts and development assumptions upon which the RAQS is based would not be exceeded, the proposed project would not conflict with or obstruct implementation of the applicable air quality plan. Therefore, because the proposed project would not exceed the growth projections in the RAQS, impacts would be **less than significant**.

2.6.2 Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Construction

Construction of the proposed project would result in a temporary, short-term addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. Emissions resulting from construction of the proposed project would be temporary because construction activities would occur intermittently over the construction phase of the project, and construction activities and associated emissions would cease following project buildout. Construction emissions can vary substantially from day to day depending on the level of activity, the specific type of operation and, for dust, prevailing weather conditions. For the purposes of modeling, a worst-case maximum daily emission scenario for proposed project construction activities is analyzed. Fugitive dust (PM_{10} and $PM_{2.5}$) emissions would primarily result from grading and site preparation activities. NO_x and CO emissions would primarily result from the use of construction equipment and motor vehicles. VOC emissions would primarily result from asphalt and architectural coating off-gassing.

Emissions from the construction phase of the project were estimated using CalEEMod and AP-42.

As indicated in Section 1.2, construction of the proposed project is anticipated to commence in January 2018 and construction would occur intermittently over the course of approximately 22 months. A detailed description of construction subphases (grading, infrastructure, paving, building construction, and architectural coatings), as well as other assumptions made for the purposes of modeling, is included in Appendix A.

For the analysis, it was generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 5 days per week (22 days per month), during project construction. CalEEMod model assumptions for construction equipment were used in calculating construction emissions as equipment and machinery mix would be typical of residential development. Additional project-specific assumptions regarding vehicle trips, construction schedule, soil export, and architectural coatings are included in Appendix A. The equipment mix is meant to represent a reasonably conservative estimate of construction activity.

The proposed project is subject to SDAPCD Rule 55 – Fugitive Dust Control. This requires that the project take steps to restrict visible emissions of fugitive dust beyond the property line. Compliance with Rule 55 would limit any fugitive dust (PM_{10} and $PM_{2.5}$) that may be generated during grading and construction activities. To account for dust control measures in the calculations, it was assumed that the active sites would be watered at least three times daily, resulting in an approximately 61% reduction of particulate matter.

The proposed project is also subject to SDAPCD Rule 67.0.1 – Architectural Coatings. This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

Blasting Emissions

Blasting would generally occur twice per week over a 30-week period. Blasting would generate emissions of NO_x, CO, SO_X from the explosive and PM_{10} and $PM_{2.5}$ from fugitive dust generated by the blast. An estimated 8.2 tons of explosive would be used per day which is this is based on a study by Revey Associates, Inc. (2015). Using the methodology described in Section 1.3, the emissions of NO_x, CO, SO_X, PM_{10}, and $PM_{2.5}$ are presented in Table 8. As noted in Section 1.3, methane is the primary hydrocarbon reported, and methane is not considered to be VOC; thus, no VOC emissions are reported in Table 8. Detailed emissions calculations are provided in Appendix C.

Table 8
Blasting Emissions

Activity	VOC	NO_x	CO	SO_X	PM_{10}	$PM_{2.5}$
	Pounds Per Day					
Blasting (January 2018 – July 2018)	—	139.40	549.40	16.40	45.23	2.61

Source: Appendix C
VOC = volatile organic compound; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter

Rock Crushing Emissions

As noted in Section 1.3, rock crushing facilities may be installed to provide capping material and other construction materials for roads and landscaping. The rock crushing emission estimates assume that the processing equipment would consist of a feed hopper into which blasted rock would be loaded using a large front-end loader, a primary and secondary crusher, two screens to capture capping (“6 inch minus”) and other construction materials, and several conveyors for inter-device transfers and stacking into stockpiles. The crushers, screens, and conveyors would be equipped with water sprays; thus, the AP-42 controlled emission factors were used, except for the emissions associated with loading the feed hopper. A maximum daily processing rate of 2,500 cubic yards or 5,650 tons per day per crushing facility was assumed for the emission calculations.

Each diesel engine-generator to power the equipment was assumed to be rated at 750 kilowatts (or approximately 1,000 horsepower). It is assumed that each engine-generator would operate up to 8 hours per day. As discussed in Section 1.3, the emission calculations were based on the CalEEMod emission factors for a typical off-road engine operating in 2018 (the first year of construction).

The daily emissions by phase for the rock crushing operation and associated diesel engine-generators are shown by phase in Table 9. Emission calculations are provided in Appendix C.

Table 9
Rock Crushing Emissions

Source	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
	Pounds Per Day					
Rock Crushing (January 2018 – July 2018)						
Rock Crushing	—	—	—	—	16.83	2.24
Diesel Generators	7.75	112.28	31.21	0.14	2.63	2.63
Total	7.75	112.28	31.21	0.14	19.46	4.87

Source: Appendix C
VOC = volatile organic compound; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter

Approximately, 260,534 cubic yards of soil export would be required. Fugitive dust from soil and excavated material truck loading were estimated using AP-42 emissions factors for drop operations. All grading activities, blasting, and rock crushing operations are anticipated to be completed by July 2018; therefore, emissions generated after in August 2018 and thereafter would only result from general construction activities including infrastructure, building construction, paving, and architectural coating. See Appendix A and Appendix C for construction schedule and additional details.

Table 10 shows the estimated unmitigated maximum daily construction emissions associated with the construction of the proposed project. The maximum daily emissions for each pollutant may occur during different phases of construction; however, maximum daily emissions reflect the worst-case day accounting for overlapping construction subphases. It was conservatively assumed that maximum daily construction activities from overlapping construction phases, such as that resulting from grading could occur concurrently with blasting and rock crushing activities. It should be noted that while these activities may occur on the same day, activities could occur in various locations across the project site, which would vary on a daily basis. Therefore, maximum daily emissions shown in Table 10 reflect a conservative, worst-case construction scenario.

Table 10
Estimated Maximum Daily Construction Criteria Air Pollutant Emissions - Unmitigated

Activity	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
	Pounds Per Day					
2018						
Construction Activities	9.47	141.49	64.08	0.26	11.30	6.32
Blasting	—	139.40	549.40	16.40	45.23	2.61
Rock Crushing	7.75	112.28	31.21	0.14	18.58	4.74

Table 10
Estimated Maximum Daily Construction Criteria Air Pollutant Emissions - Unmitigated

Activity	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
	Pounds Per Day					
Maximum Daily Emissions	17.22	393.17	644.69	16.80	75.11	13.67
2019						
Construction Activities	44.01	41.83	40.92	0.11	7.29	3.03
Maximum Daily Emissions During Any Construction Year	*44.01*	*393.17*	*644.69*	*16.80*	*75.11*	*13.67*
City of Chula Vista Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Threshold Exceeded?	No	Yes	Yes	No	No	No

Source: See Appendix A for detailed results.
Notes: The values shown are the maximum summer or winter daily emissions results from CalEEMod.
These estimates reflect control of fugitive dust required by SDAPCD Rule 55 and compliance with SDAPCD Rule 67, which limits VOC content of architectural coatings.
VOC = volatile organic compound; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter

As shown in Table 10, daily construction emissions would exceed the threshold for NO_x and CO. Impacts for these pollutants would be **potentially significant**. Daily construction emissions would not exceed the threshold for VOCs, SO_x, PM_{10} and $PM_{2.5}$.

Operation

Following the completion of construction activities, the proposed project would generate VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$ emissions from mobile and stationary sources, including vehicular traffic and area sources (water heating and landscaping).

Vehicular Traffic

The proposed project would impact air quality through the vehicular traffic generated by project residents. CalEEMod Version 2016.3.1 was utilized to estimate daily emissions from proposed vehicular sources (refer to Appendix A). CalEEMod default data, including temperature, trip characteristics, variable start information, and emissions factors, were conservatively used for the model inputs. Project-related traffic was assumed to be comprised of a mixture of vehicles in accordance with the model outputs for traffic. Emission factors representing the vehicle mix and emissions for 2020 were used to estimate emissions.

Energy

As represented in CalEEMod, energy sources include emissions associated with building electricity and natural gas usage (non-hearth). Electricity use would contribute indirectly to criteria air pollutant emissions; however, the emissions from electricity use are only quantified for GHGs in CalEEMod, since criteria pollutant emissions occur at the site of the power plant, which is typically off site. The proposed project is expected to meet the 2016 Title 24 standards, which requires that new residential development are required to achieve a 28% energy savings compared with 2013 Title 24 standards (CEC 2015).

Area Sources

CalEEMod was used to estimate operational emissions from area sources, including emissions from consumer product use, architectural coatings, and landscape maintenance equipment. Emissions associated with natural gas usage in space heating, water heating, and stoves are calculated in the building energy use module of CalEEMod, as described in the following text. CalEEMod was also used to estimate emissions from the project area stationary sources, which include natural gas appliances, hearths, landscaping, and consumer products. It was assumed all residential units would be constructed with natural gas fireplaces and no wood-burning fire places would be constructed. Similar to construction-related architectural coating emission estimates, VOC emissions generated from architectural coatings were estimated based on the number of residential dwelling units and VOC content per SDAPCD Rule 67.0 to determine the VOC emissions.

Table 11 presents the maximum daily emissions associated with the operation of the proposed project after all phases of construction have been completed. The values shown are the maximum summer or winter daily emissions results from CalEEMod. Complete details of the emissions calculations are provided in Appendix A.

Table 11
Estimated Daily Maximum Daily Operational Criteria Air Pollutant Emissions

Emission Source	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
	Pounds Per Day					
Area Sources	11.42	6.14	31.44	0.04	0.63	0.63
Energy	0.11	0.93	0.39	0.01	0.08	0.08
Motor Vehicles	4.54	16.91	42.24	0.12	9.66	2.66
Total	16.07	23.98	74.07	0.17	10.37	3.37
City of Chula Vista Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Threshold Exceeded?	No	No	No	No	No	No

Source: See Appendix A for detailed results.
Notes: The values shown are the maximum summer or winter daily emissions results from CalEEMod.
These estimates reflect compliance with SDAPCD Rule 67, which limits VOC content of architectural coatings, assumed no wood burning devices, adjustments to the trip generation rates and trip lengths as provided in the TIA (Fehr and Peers 2016), improving the pedestrian network, and providing traffic calming measures.

VOC = volatile organic compound; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter

As shown in Table 11, daily operational emissions for all criteria pollutants would not exceed the City's significance thresholds; therefore, impacts during operation would be **less than significant**.

2.6.3 Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

In analyzing cumulative impacts from the proposed project, the analysis must specifically evaluate a project's contribution to the cumulative increase in pollutants for which the SDAB is designated as nonattainment for the CAAQS and NAAQS. If the proposed project does not exceed thresholds and is determined to have less-than-significant project-specific impacts, it may still contribute to a significant cumulative impact on air quality if the emissions from the project, in combination with the emissions from other proposed or reasonably foreseeable future projects, are in excess of established thresholds. However, the project would only be considered to have a significant cumulative impact if the project's contribution accounts for a significant proportion of the cumulative total emissions (i.e., it represents a "cumulatively considerable contribution" to the cumulative air quality impact).

Additionally, for the SDAB, the RAQS serves as the long-term regional air quality planning document for the purpose of assessing cumulative operational emissions in the basin to ensure the SDAB continues to make progress toward NAAQS- and CAAQS-attainment status. As such, cumulative projects located in the San Diego region would have the potential to result in a cumulative impact to air quality if, in combination, they would conflict with or obstruct implementation of the RAQS. Similarly, individual projects that are inconsistent with the regional planning documents upon which the RAQS is based would have the potential to result in cumulative operational impacts if they represent development and population increases beyond regional projections.

The SDAB has been designated as a federal nonattainment area for O_3, a federal maintenance area for CO, and a state nonattainment area for O_3, PM_{10}, and $PM_{2.5}$. PM_{10} and $PM_{2.5}$ emissions associated with construction generally result in near-field impacts. The nonattainment status is the result of cumulative emissions from all sources of these air pollutants and their precursors within the SDAB. Construction of cumulative projects simultaneously with the proposed project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance and hauling activities, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials and worker vehicular trips. Fugitive dust (PM_{10} and $PM_{2.5}$) emissions would primarily result from site preparation activities. NO_x and CO emissions would primarily result from the use of construction equipment and motor vehicles, the latter of which would generally be dispersed over a large area where the vehicles are traveling. The closest cumulative projects to be constructed in the vicinity of the project site are Village Three to the west, and Village Eight West and Village Eight East located immediately east of the site. Village Two is also located to the north and is currently under construction; therefore, the potential exists for various construction phases of these projects to occur concurrently, resulting in cumulatively considerable air emissions.

As discussed in 2.6, the emissions of NO_x and CO would exceed the applicable significance threshold levels during construction. To reduce NO_x and CO emissions, mitigation measures MM-AQ-1 through MM-AQ-3 would be implemented. Following implementation of mitigation, emissions would not be reduced to a level below the City's significance thresholds. As such, effects regarding NO_x and CO emissions during construction activities would be significant and unavoidable. Additionally, emissions of PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs generated during project construction would be primarily localized to the proposed project site. Moreover, the proposed project would be required to comply with SDAPCD Rule 55 regarding fugitive dust emissions. Although emissions would be below the thresholds at the project level, generation of these criteria pollutant emissions when combined with other cumulative projects, particularly those occurring simultaneously during various construction periods of the proposed project, could potentially result in a temporary significant cumulative impact to air quality. Mitigation measures MM-AQ-1 and MM-AQ-2 would be implemented to reduce fugitive dust emissions.

Should other projects occur in the vicinity of the proposed project, significant effects related to NO_x and CO emissions would be further intensified due to exhaust emissions from construction equipment, worker vehicles (resulting in increased NO_x and CO emissions) and truck trips associated with material deliveries and on-site hauling activities. While construction would be short-term and temporary in nature occurring over an approximate 22-month period, the proposed project's temporary cumulative construction effects relative to NO_x and CO emissions would be **significant and unavoidable** following project-specific mitigation when considered in combination with reasonably foreseeable future projects under the cumulative scenario.

Regarding long-term cumulative operational emissions in relation to consistency with local air quality plans, the SIP and RAQS serve as the primary air quality planning documents for the state and SDAB, respectively. The SIP and RAQS rely on SANDAG growth projections based on population, vehicle trends, and land use plans developed by the cities and the County as part of the development of their general plans. Therefore, projects that propose development that is consistent with the growth anticipated by local plans would be consistent with the SIP and RAQS and would not be considered to result in cumulatively considerable impacts from operational emissions. As stated previously, the proposed project would be consistent with the existing zoning and land use designation for the site, and would not result in significant regional growth that is not accounted for within the RAQS. Because the proposed project would not result in an increase in land use intensity or an increase in vehicle trips that has not been anticipated in local air quality plans; it would also be consistent at a regional level with the underlying growth forecasts, development, and associated vehicle trips as anticipated in the RAQS. Furthermore, operational emissions generated by the proposed project would not exceed the significance thresholds for VOC, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$, and would not cause a significant impact. Therefore, impacts associated with project operations would not be cumulatively considerable.

2.6.4 Would the project expose sensitive receptors to substantial pollutant concentrations?

Air quality varies as a direct function of the amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. Air quality problems arise when the rate of pollutant emissions exceeds the rate of dispersion. Reduced visibility, eye irritation, and adverse health impacts upon those persons termed "sensitive receptors" are the most serious hazards of existing air quality conditions in the area. Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. Sensitive receptors include residences, schools, playgrounds, child-care centers, athletic facilities, long-term health-care facilities, rehabilitation centers, convalescent centers, and retirement homes. The closest sensitive receptors are located north and east of the site. Olympian High School and Wolf Canyon Elementary School are located approximately 0.5 miles northeast of the project site. The closest existing single-family residences are located 0.6 miles north of the site. Additionally, future residential receptors would be located to the east, adjacent to the site as part of the Village 8 West development.

Table 12 presents a list of the criteria pollutants and other related pollutants of concern, emission sources, associated health effects, and current SDAB attainment status.

Table 12
Pollutants, Sources, Health Effects, and Attainment Status

Pollutant	Sources	Health Effects	Attainment Status	
			NAAQS	*CAAQS*
O_3	Formed when VOCs and NO_x react in the presence of sunlight. VOC sources include any source that burns fuels (e.g., gasoline, natural gas, wood, oil); solvents; petroleum processing and storage.	Breathing difficulties, lung tissue damage, vegetation damage, damage to rubber and some plastics.	Attainment	Nonattainment
PM_{10}	Road dust, windblown dust, agriculture and construction, fireplaces. Also formed from other pollutants (NO_x, SO_x, organics). Incomplete combustion.	Increased respiratory disease, lung damage, cancer, premature death, reduced visibility, surface soiling.	Unclassifiable	Nonattainment
$PM_{2.5}$	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning. Also formed from reaction of other pollutants (NO_x, SO_x, organics, and NH_3).	Increases respiratory disease, lung damage, cancer, and premature death, reduced visibility, surface soiling. Particles can aggravate heart diseases such as congestive heart failure and coronary artery disease	Attainment	Nonattainment
CO	Any source that burns fuel such as automobiles, trucks, heavy construction and farming equipment, residential heating.	Chest pain in heart patients, headaches, reduced mental alertness.	Attainment	Attainment
NO_2	See carbon monoxide.	Lung irritation and damage. Reacts in the atmosphere to form ozone and acid rain.	Unclassifiable/ Attainment	Attainment
Lead	Metal smelters, resource recovery, leaded gasoline, deterioration of lead paint.	Learning disabilities, brain and kidney damage.	Attainment	Attainment
SO_2	Coal or oil burning power plants and industries, refineries, diesel engines.	Increases lung disease and breathing problems for asthmatics. Reacts in the atmosphere to form acid rain.	Attainment	Attainment
Sulfates	Produced by reaction in the air of SO_2, (see SO_2 sources), a component of acid rain.	Breathing difficulties, aggravates asthma, reduced visibility.	(no federal standard)	Attainment
Hydrogen Sulfide	Geothermal power plants, petroleum production and refining, sewer gas.	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations).	(no federal standard)	Unclassified

Table 12
Pollutants, Sources, Health Effects, and Attainment Status

Pollutant	Sources	Health Effects	Attainment Status	
Visibly Reducing Particles	See $PM_{2.5}$	Reduced visibility (e.g., obscures mountains and other scenery), reduced airport safety.	(no federal standard)	Unclassified
Vinyl Chloride	Exhaust gases from factories that manufacture or process vinyl chloride (construction, packaging, and transportation industries)	Central nervous system effects (e.g., dizziness, drowsiness, headaches), kidney irritation, liver damage, liver cancer.	N/A	N/A
TAC	Combustion engines (stationary and mobile), diesel combustion, storage and use of TAC-containing substances (i.e., gasoline, lead smelting, etc.)	Depends on TAC, but may include cancer, mutagenic and/or teratogenic effects, other acute or chronic health effects	N/A	N/A

Source: County of San Diego 2007.
O_3 = ozone; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; CO = carbon monoxide; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; TAC = toxic air contaminant

Health Impacts of Toxic Air Contaminants

In addition to impacts from criteria pollutants, project impacts may include emissions of pollutants identified by the state and federal government as TACs or HAPs. State law has established the framework for California's TAC identification and control program, which is generally more stringent than the federal program and aimed at TACs that are a problem in California. The state has formally identified more than 200 substances as TACs, including the federal HAPs, and is adopting appropriate control measures for sources of these TACs. The greatest potential for TAC emissions during construction would be diesel particulate emissions from heavy equipment operations and heavy-duty trucks and the associated health impacts to sensitive receptors. The following measures are required by state law to reduce diesel particulate emissions:

- Fleet owners of mobile construction equipment are subject to the CARB Regulation for In-use Off-road Diesel Vehicles (Title 13 California Code of Regulations, Chapter 9, Section 2449), the purpose of which is to reduce diesel particulate matter (DPM) and criteria pollutant emissions from in-use (existing) off-road diesel-fueled vehicles.
- All commercial diesel vehicles are subject to Title 13, Section 2485 of the California Code of Regulations, limiting engine idling time. Idling of heavy-duty diesel construction equipment and trucks during loading and unloading shall be limited to five minutes; electric auxiliary power units should be used whenever possible.

Health effects from carcinogenic air toxics are usually described in terms of cancer risk. The SDAPCD recommends an incremental cancer risk threshold of 10 in a million (SDAPCD 2014). "Incremental cancer risk" is the net increased likelihood that a person continuously exposed to concentrations of TACs resulting from a project over a 9-, 30-, and 70-year exposure period will contract cancer based on the use of standard Office of Environmental Health Hazard Assessment (OEHHA) risk-assessment methodology. The proposed project would not require the extensive use of heavy-duty construction equipment, which is subject to a CARB Airborne Toxics Control Measure for in-use diesel construction equipment to reduce diesel particulate emissions and would not involve extensive use of diesel trucks, which are also subject to a CARB Airborne Toxics Control Measure.

As shown in Table 10, maximum daily particulate matter (PM_{10} or $PM_{2.5}$) emissions generated by construction equipment operation and haul-truck trips during construction (exhaust particulate matter, or DPM), combined with fugitive dust generated by equipment operation and vehicle travel, would be well below the applicable daily thresholds. Moreover, total construction of the proposed project would last approximately 22 months, after which project-related TAC emissions would cease. Thus, the proposed project would not result in a long-term (i.e., 9-year, 30-year, or 70-year) source of TAC emissions. No residual TAC emissions and corresponding cancer risk are anticipated after construction, and no long-term sources of TAC emissions are anticipated during operation of the proposed project. Therefore, the exposure of project-related TAC emission impacts to sensitive receptors would be less than significant.

Additionally, CARB has published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB 2005), which identifies certain types of facilities or sources that may emit substantial quantities of TACs and therefore could conflict with sensitive land uses, such as "schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities." The *Air Quality and Land Use Handbook* is a guide for siting of new sensitive land uses, but it does not mandate specific separation distances to avoid potential health impacts. The enumerated facilities or sources include the following:

- High-traffic freeways and roads
- Distribution centers
- Rail yards
- Ports
- Refineries
- Chrome plating facilities

- Dry cleaners
- Large gas dispensing facilities.

CARB recommends that sensitive receptors not be located downwind or in proximity to such sources to avoid potential health hazards.

The proposed project would neither include any of the previously listed land uses nor generate substantial TAC emissions that would conflict with surrounding sensitive receptors. Additionally, the proposed project would not expose nearby inhabitants to TAC emissions from these sources. Impacts would be **less than significant**.

Health Impacts of Carbon Monoxide

Mobile-source impacts occur on two scales of motion. Regionally, project-related travel will add to regional trip generation and increase the vehicle-miles travelled (VMT) within the SDAB. Locally, proposed project traffic will be added to the City's roadway system. If such traffic occurs during periods of poor atmospheric ventilation, consists of a large number of vehicles "cold-started" and operating at pollution-inefficient speeds, and operates on roadways already crowded with non-project traffic, there is a potential for the formation of microscale CO "hotspots" in the area immediately around points of congested traffic. Because of continued improvement in mobile emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the basin is steadily decreasing (CARB 2004).

The proposed project's TIA (Fehr and Peers 2016) evaluated 12 key intersections and 21 roadway segments in the proposed project vicinity to assess existing conditions, near-term 2018, mid-term 2020, and long-term 2035 conditions. Four study intersections are forecast to operate at deficient levels of service under one or more scenario analyzed: Interstate 805 (I-805) Southbound Ramps and Olympic Parkway, I-805 Northbound Ramps and Olympic Parkway, Olympic Parkway and Brandywine Avenue, and Olympic Parkway and Heritage Road. However, all impacts were identified as cumulative as the thresholds of significance were not exceeded on any of the identified study intersections. Payment toward the Transportation Development Impact Fees (TDIF) program will mitigate project impacts at the City owned intersections; however, impacts identified on California Department of Transportation (Caltrans) owned facilities cannot be mitigated through payment of TDIF fees. At the time the TIA was prepared, no feasible mitigation measures or fee programs were in place to mitigate the identified impacts at the I-805 and Olympic Parkway ramps or through the interchange. Therefore, the TIA determined that these impacts are forecast to be significant.

Projects contributing to adverse traffic impacts may result in the formation of CO hotspots. To verify that the proposed project would not cause or contribute to a violation of the CO standard, a screening evaluation of the potential for CO hotspots was conducted. The potential impact of the proposed project on local CO levels was assessed at these intersections with the Caltrans CL4 interface, based on the California LINE Source Dispersion Model (CALINE4), which allows microscale CO concentrations to be estimated along each roadway corridor or near intersections (Caltrans 1998a).

In accordance with the CO Protocol, CO hotspots are typically evaluated when (1) the LOS of an intersection or roadway decreases to LOS E or worse, (2) signalization and/or channelization is added to an intersection, and (3) sensitive receptors such as residences, schools, and hospitals are located in the vicinity of the affected intersection or roadway segment.

For the mid-term 2020 conditions, two intersections would result in LOS E or worse requiring a qualitative CO hotspot analysis. These intersections include the following:

1. Intersection #1 – I-805 SB ramp and Olympic Parkway for both AM and PM peak hour
2. Intersection #2 – I-805 NB ramp and Olympic Parkway for both AM and PM peak hour

The modeling analysis was performed for worst-case wind angle, in which the model selects the wind angles that produce the highest CO concentrations at each of the receptors. The suburban land classification of 40 inches (100 centimeters) was used for the aerodynamic roughness coefficient, which determines the amount of local air turbulence that affects plume spreading. The at-grade option was used in the analysis; for at-grade sections, CALINE4 does not permit the plume to mix below ground level. The mixing zone, which is defined as the width of the roadway plus 10 feet (3 meters) on either side, was estimated for each roadway using Google Earth (2016). The calculations assume a mixing height of 3,280 feet (1,000 meters), a flat topographical condition between the source and the receptor (link height of 0 meters), and a meteorological condition of little to almost no wind (3.3 feet (1 meter) per second), consistent with Caltrans guidance (Caltrans 1998b).

The vehicle emission factor was predicted using CARB's mobile source emissions inventory model, EMFAC2014, and represents the weighted average emission rate of the local San Diego County vehicle fleet expressed in grams per mile per vehicle. Consistent with the traffic report, emission factors for 2020, representing the mid-term 2020 with roadway connection traffic conditions, were used in the CALINE4 model. Emission factors were based on a 5-mile-per-hour (mph) average speed for all of the intersections, a temperature of 49°F,[4] and an average humidity of 55%. The hourly traffic volume anticipated to travel on each link, in units of vehicles per hour, was based on the traffic report. Since project-generated traffic would have a direct impact for all of the intersections in the PM peak hours, vehicle counts for the PM hours were used. Modeling assumptions are outlined in Appendix B.

Four receptor locations at each intersection were modeled to determine CO ambient concentrations. A receptor was assumed on the sidewalk at each corner of the modeled intersections, for a total of four receptors adjacent to the intersection, to represent the possibility of extended outdoor exposure. CO concentrations were modeled at these locations to assess the maximum potential CO exposure that could occur in 2020. A receptor height of 5.9 feet (1.8 meters) was used in accordance with Caltrans recommendations for all receptor locations (Caltrans 1998b).

The maximum 1-hour CO background concentration of 3.0 ppm, as measured in 2012 (see Table 4), was assumed in the CALINE4 model. The model provides predicted concentrations in parts per million at each of the receptor locations. To estimate an 8-hour average CO concentration, a persistence factor of 0.6, as is recommended for suburban locations, was applied to the output values.

The results of the model are shown in Table 13. Model input and output data are provided in Appendix B.

Table 13
CALINE4 Predicted Carbon Monoxide Concentrations

Intersection	Maximum Modeled Impact Long-Term 2020 (ppm)	
	1-hour	*8-hour*
I-805 SB ramp and Olympic Parkway	3.8	2.3
I-805 NB ramp and Olympic Parkway	3.8	2.3

Source: Caltrans 1998a (CALINE4).
Notes: CO = carbon monoxide; ppm = parts per million.
Modeled concentrations reflect background 1-hour concentration of 3.0 ppm.
8-hour concentrations were obtained by multiplying the 1-hour concentration by a factor of 0.6, as referenced in Caltrans 1997, Table B.15.

4 The Caltrans Institute of Transportation Studies *Transportation Project-Level Carbon Monoxide Protocol* (CO Protocol) (Caltrans 1997) guidance is to use the smallest mean minimum temperature observed in January over the past 3 years plus the temperature adjustment for the geographic location and time period. The smallest mean minimum at the Chula Vista station was 48.71°F in January 2014 (WRCC 2016). Assuming a 5°F correction factor for both AM and PM traffic conditions, average morning and evening temperature would be approximately 53.71°F (Caltrans 1997).

As shown in Table 13, maximum CO concentrations predicted for the 1-hour averaging period would be 3.8 ppm, which is below the state 1-hour CO standard of 20 ppm (see Table 1 for state standards). Maximum predicted 8-hour CO concentrations of 2.3 ppm would be below the state CO standard of 9 ppm. Neither the 1-hour nor 8-hour state standard would be equaled or exceeded at any of the intersections studied. Accordingly, CO hotspot impacts would be **less than significant**.

Health Impacts of Other Criteria Air Pollutants

While operation of the proposed project would not result in emissions that exceed the City's emission thresholds for any criteria air pollutants including VOC, NO_x, CO, SO_x, PM_{10} or $PM_{2.5}$, construction of the proposed project would exceed the City's NO_x and CO thresholds even after implantation of mitigation. Regarding VOCs, some VOCs would be associated with motor vehicles and construction equipment, while others are associated with architectural coatings, the emissions of which would not result in the exceedances of the City's thresholds as shown in Table 7. Additionally, SDAPCD Rule 67.0.1 restricts the VOC content of coatings for both construction and operational applications.

In addition, VOCs and NO_x are precursors to O_3, for which the SDAB is designated as nonattainment with respect to the NAAQS and CAAQS (the SDAB is designated by the EPA as an attainment area for the 1-hour O_3 NAAQS standard and 1997 8-hour NAAQS standard). The health effects associated with O_3, as discussed in Section 2.2, are generally associated with reduced lung function. The contribution of VOCs and NO_x to regional ambient O_3 concentrations is the result of complex photochemistry. The increases in O_3 concentrations in the SDAB due to O_3 precursor emissions tend to be found downwind from the source location to allow time for the photochemical reactions to occur. However, the potential for exacerbating excessive O_3 concentrations would also depend on the time of year that the VOC emissions would occur because exceedances of the O_3 AAQS tend to occur between April and October when solar radiation is highest. The holistic effect of a single project's emissions of O_3 precursors is speculative due to the lack of quantitative methods to assess this impact. Nonetheless, the VOC emissions associated with project construction could minimally contribute to regional O_3 concentrations and the associated health impacts. Due to the minimal contribution during construction and operation, as well as the existing good air quality in coastal San Diego areas, health impacts would be considered **less than significant**.

Regarding nitrogen dioxide, according to the construction emissions analysis, construction of the proposed project would contribute to exceedances of the NAAQS and CAAQS for NO_2. As described in Section 2.2, NO_2 and NO_x health impacts are associated with respiratory irritation, which may be experienced by nearby receptors during the periods of heaviest use of off-road construction equipment. However, off-road construction equipment would be operating at various portions of the site and would not be concentrated in one portion of the site at any one time. Additionally, rock crushing activities was assumed to require two stationary emission sources (diesel generators). These activities combined with grading and blasting activities would create substantial, localized NO_x impacts. Mitigation measures MM-AQ-1 through MM-AQ-3 would be implemented by the proposed project to reduce NO_x emissions. However, following implementation of mitigation, emissions would not be reduced to a level below the City's significance thresholds. Therefore, health impacts would be considered **significant and unavoidable**.

Similar to O_3, construction of the proposed project would not exceed thresholds for PM_{10} or $PM_{2.5}$ and would not contribute to exceedances of the NAAQS and CAAQS for particulate matter. The project would also not result in substantial DPM emissions during construction and operation and therefore, would not result in significant health effects related to DPM exposure. Due to the minimal contribution of particulate matter during construction and operation, health impacts would be considered **less than significant**.

In summary, construction and operation of the proposed project would not result in exceedances of City's emission-based thresholds for criteria pollutants. The VOC and NO_x emissions, as described previously, would minimally contribute to regional O_3 concentrations and the associated health effects. In addition to O_3, NO_x emissions would not contribute to potential exceedances of the NAAQS and CAAQS for NO_2. As shown in Table 4, the existing NO_2 concentrations in the area are well below the NAAQS and CAAQS standards. Thus, it is not expected the project's operational NO_x emissions would result in exceedances of the NO_2 standards or contribute to the associated health effects. CO tends to be a localized impact associated with congested intersections. The associated CO "hotspots" were discussed previously as a less-than-significant impact. Thus, the project's CO emissions would not contribute to significant health effects associated with this pollutant. PM_{10} and $PM_{2.5}$ would not contribute to potential exceedances of the NAAQS and CAAQS for particulate matter and would not obstruct the SDAB from coming into attainment for these pollutants and would not contribute to significant health effects associated with particulates. Therefore, health impacts associated with criteria air pollutants would be considered **less than significant**.

2.6.5 Would the project create objectionable odors affecting a substantial number of people?

Odors would be generated from vehicles and/or equipment exhaust emissions during construction of the proposed project. Odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment and architectural coatings. Such odors are temporary and generally occur at magnitudes that would not affect substantial numbers of people. Therefore, impacts associated with odors during construction would be considered less than significant.

Land uses and industrial operations associated with odor complaints include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project involves residential uses and would not result in the creation of a land use that is commonly associated with odors. Therefore, project operations would result in an odor impact that is **less than significant**.

2.7 Mitigation Measures

Mitigation Measures MM-AQ-1 through MM-AQ-3 are provided to reduce VOC, NO_x, CO, PM_{10} and $PM_{2.5}$ emissions to the extent feasible.

MM-AQ-1 Prior to approval of any construction-related permits, the project applicant or its designee shall place the following requirements on all plans, which shall be implemented during grading of each phase of the project to minimize CO and NO_x emissions:

- Heavy-duty diesel-powered construction equipment shall be equipped with Tier 4 Final or better diesel engines, except where Tier 4 Final or better engines are not available for specific construction equipment. The County shall verify and approve all pieces within the construction fleet that would not meet Tier 4 Final standards;
- Minimize simultaneous operation of multiple construction equipment units. During construction, vehicles in loading and unloading queues shall not idle for more than 5 minutes and shall turn their engines off when not in use to reduce vehicle emissions;
- All construction equipment shall be properly tuned and maintained in accordance with manufacturer's specifications;
- The use of electrical or natural gas-powered construction equipment shall be employed where feasible including forklifts and other comparable equipment types;
- The use of catalytic reduction for gasoline-powered equipment shall be employed where feasible;

- Electrical hookups shall be provided on site for the use of hand tools such as saws, drills, and compressors used for building construction to reduce the need for electric generators and other fuel-powered equipment;
- All diesel-fueled on-road construction vehicles shall meet the emission standards applicable to the most current year to the greatest extent possible. To achieve this standard, new vehicles shall be used, or older vehicles shall use post-combustion controls that reduce pollutant emissions to the greatest extent feasible;
- The effectiveness of the latest diesel emission controls is highly dependent on the sulfur content of the fuel. Therefore, diesel fuel used by on- and off-road construction equipment shall be low sulfur (less than 15 ppm) or other alternative, low-polluting diesel fuel formulation.

MM-AQ-2 Prior to approval of any grading permits, and during project construction, the project applicant or its designee shall require implementation of the City's Standard Construction Best Management Practices (BMPs) to minimize PM_{10} and $PM_{2.5}$ emissions, including:

- Water or utilize another acceptable SDAPCD dust control agent on, the grading areas at least twice daily to minimize fugitive dust;
- Stabilize grading areas as quickly as possible to minimize fugitive dust;
- Install wheel washers adjacent to a paved apron prior to vehicle entry on public roads;
- Wet wash the construction access point at the end of the workday if any vehicle travel on unpaved surfaces has occurred;
- Provide sufficient perimeter erosion control to prevent washout of silty material onto public roads;
- Cover haul trucks or maintain at least 12 inches of freeboard to reduce blow-off during hauling;
- Suspend all soil disturbance and travel on unpaved surfaces if winds exceed 25 miles per hour (mph);
- Cover/water on-site stockpiles of excavated material;
- Enforce a 20 mph speed limit on unpaved surfaces;
- Pave permanent roads as quickly as possible to minimize dust.

MM-AQ-3 The following measure shall be included as part of the proposed project's Fugitive Dust Plan to reduce emissions associated with blasting and rock crushing activities:

a. During blasting activities, the construction contractor shall implement all feasible engineering controls to control fugitive dust including exhaust ventilation, blasting cabinets and enclosures, vacuum blasters, drapes, water curtains or wet blasting. Watering methods, such as water sprays and water applications shall be implemented during blasting, rock crushing, cutting, chipping, sawing, or any activity that would release dust particles to reduce fugitive dust emissions.

a. During rock crushing transfer and conveyance activities, material shall be watered prior to entering the crusher. Crushing activities shall not exceed an opacity limit of 20% (or Number 1 on the Ringelmann Chart) as averaged over a 3 minute period in any period of 60 consecutive minutes, in accordance with SDAPCD Rule 50, Visible Emissions. A qualified opacity observer shall monitor opacity from crushing activities once every 30 days while crushers are employed on site to ensure compliance with SDAPCD Rule 50. Water sprayers, conveyor belt enclosures or other mechanisms shall be employed to reduce fugitive dust generated during to transfer and conveyance of crush material.

Table 14 shows maximum daily emissions following implementation of mitigation measures MM-AQ-1 through MM-AQ-3. It should be noted that not all mitigation measures are quantifiable; therefore, Table 14 presents emission estimates following implementation of site watering two times per day (MM-AQ-2), reduction of vehicle speeds on unpaved roads to 20 miles per hour (MM-AQ-2), and use of Tier 4 Final equipment (MM-AQ-1).

Table 14
Estimated Daily Maximum Construction Emissions - Mitigated

Activity	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
	Pounds Per Day					
2018						
Construction Activities	4.01	74.18	59.48	0.26	7.79	3.05
Blasting	—	139.40	549.40	16.40	48.56	2.80
Rock Crushing	7.75	112.28	31.21	0.14	18.58	4.74
Maximum Daily Emissions	11.76	325.86	640.09	16.80	74.93	10.59
2019						
Construction Activities	41.74	21.28	41.72	0.12	5.92	1.73

Table 14
Estimated Daily Maximum Construction Emissions - Mitigated

Activity	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
	Pounds Per Day					
Maximum Daily Emissions During Any Construction Year	*41.74*	*325.86*	*640.09*	*16.80*	*74.93*	*10.59*
Pollutant Threshold	*75*	*250*	*550*	*250*	*100*	*55*
Threshold Exceeded?	No	Yes	Yes	No	No	No

Source: See Appendix A for detailed results.
Notes: The values shown are the maximum summer or winter daily emissions results from CalEEMod.
These estimates reflect control of fugitive dust required by SDAPCD Rule 55, compliance with SDAPCD Rule 67 which limits VOC content of architectural coatings, and use of Tier 4 Final EPA engine standards.
VOC = volatile organic compound; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter

The emissions associated with construction would be temporary, lasting approximately 2 years. As shown in Table 14, daily construction emissions would still exceed the thresholds for NO_x and CO following implementation of mitigation measures MM-AQ-1 through MM-AQ-3. It should be noted that not all reductions that would result from implementation of mitigation provided in measures MM-AQ-1 through MM-AQ-3 are quantifiable; therefore, emissions shown in Table 14 are overestimated and emissions would be further reduced on a daily basis but not to a level below significance. Impacts would remain **significant and unavoidable**.

3 GREENHOUSE GAS EMISSIONS

3.1 Existing Conditions

3.1.1 The Greenhouse Effect

The greenhouse effect is the trapping and buildup of heat in the atmosphere (troposphere) near the Earth's surface. The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth, the Earth emits a portion of this energy in the form of long-wave radiation, and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth.

The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Without it, the temperature of the Earth would be about 0 degrees Fahrenheit (°F) (−18 degrees Celsius (°C)) instead of its present 57°F (14°C). If the atmospheric concentrations of GHGs rise, the average temperature of the lower atmosphere will gradually increase. Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect.

3.1.2 Greenhouse Gases

GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), O_3, water vapor, hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as HFCs, HCFCs, PFCs, and SF_6, which are associated with certain industrial products and processes. A summary of the most common GHGs and their sources is included in the following text.[5]

Carbon Dioxide. CO_2 is a naturally occurring gas and a by-product of human activities and is the principal anthropogenic GHG that affects the Earth's radiative balance. Natural sources of CO_2 include respiration of bacteria, plants, animals, and fungus; evaporation from oceans, volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO_2 are from the combustion of coal, oil, natural gas, and wood.

5 The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (1995), IPCC Fourth Assessment Report (2007), CARB's Glossary of Terms Used in GHG Inventories (2015), and EPA's Glossary of Climate Change Terms (2016).

Methane. CH_4 is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Nitrous Oxide. Sources of N_2O include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and the use of N_2O as a propellant (such as in rockets, racecars, aerosol sprays).

Fluorinated Gases. Fluorinated gases are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Several prevalent fluorinated gases include the following:

- **Hydrofluorocarbons:** HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals that are used as alternatives to O_3-depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.
- **Hydrochlorofluorocarbons:** HCFCs are compounds containing hydrogen, fluorine, chlorine, and carbon atoms. HFCs are synthetic chemicals that are used as alternatives to ozone depleting substances (chlorofluorocarbons (CFCs)).
- **Chlorofluorocarbons.** CFCs are synthetic chemicals that have been used as cleaning solvents, refrigerants, and aerosol propellants. CFCs are chemically unreactive in the lower atmosphere (troposphere) and the production of CFCs was prohibited in 1987 due to the chemical destruction of stratospheric O_3.
- **Perfluorocarbons:** PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, along with HFCs, to the O_3 depleting substances. The two main sources of PFCs are primarily aluminum production and semiconductor manufacturing. Since PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.
- **Sulfur Hexafluoride:** SF_6 is a colorless gas that is soluble in alcohol and ether and slightly soluble in water. SF_6 is used for insulation in electric power transmission and distribution equipment, semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.
- **Nitrogen trifluoride:** NF_3 is used in the manufacture of a variety of electronics, including semiconductors and flat panel displays.

Black Carbon. Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Black carbon is a short-lived species that varies spatially, which makes it difficult to quantify the global warming potential. DPM emissions are a major source of black carbon and are also TACs that have been regulated and controlled in California for several decades to protect public health. In relation to declining DPM from CARB's regulations pertaining to diesel engines, diesel fuels, and burning activities, the CARB estimates that annual black carbon emissions in California have reduced by 70% between 1990 and 2010, with 95% control expected by 2020 (CARB 2014).

Water Vapor. The primary source of water vapor is evaporation from the ocean, with additional vapor generated by sublimation (change from solid to gas) from ice and snow, evaporation from other water bodies, and transpiration from plant leaves. Water vapor is the most important, abundant, and variable GHG in the atmosphere and maintains a climate necessary for life.

Ozone. Tropospheric O_3, which is created by photochemical reactions involving gases from both from natural sources and from human activities, acts as a GHG. Stratospheric O_3, which is created by the interaction between solar ultraviolet radiation and molecular oxygen (O_2), plays a decisive role in the stratospheric radiative balance. Depletion of stratospheric O_3, due to chemical reactions that may be enhanced by climate change, results in an increased ground-level flux of ultraviolet-B radiation.

Aerosols. Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

3.1.3 Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA 2015).

The Intergovernmental Panel on Climate Change (IPCC) developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in metric tons of CO_2 equivalent (MT CO_2E).

The current version of the California Emissions Estimator Model (CalEEMod) (version 2016.3.1) assumes that the GWP for CH_4 is 25 (which means that emissions of 1 MT of CH_4 are equivalent to emissions of 25 MT of CO_2), and the GWP for N_2O is 298, based on the IPCC Fourth Assessment Report (IPCC 2007). The GWP values identified in CalEEMod were applied to the project.

3.1.4 Contributions to Greenhouse Gas Emissions

In 2014, total U.S. GHG emissions were 6,870.5 million metric tons (MMT) CO_2E (EPA 2016e). Total U.S. emissions have increased by 7.4% from 1990 to 2014, and emissions increased from 2013 to 2014 by 1.0% (70.5 MMT CO_2E). Additionally, relatively cool winter conditions led to an increase in fuels for the residential and commercial sectors for heating. In 2014, there also was an increase in industrial production across multiple sectors resulting in increases in industrial sector emissions. Lastly, transportation emissions increased because of a small increase in VMT and fuel use across on-road transportation modes. Since 1990, U.S. emissions have increased at an average annual rate of 0.3%. The primary GHG emitted by human activities in the U.S. was CO_2, representing approximately 80.9% of total GHG emissions (5,556.0 MMT CO_2E). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.7% of CO_2 emissions in 2014 (5,208.2 MMT CO_2E) (EPA 2016e).

According to the 2016 GHG inventory data compiled by CARB for the California Greenhouse Gas Inventory for 2000–2014, California emitted 441.5 MMT CO_2E of GHGs in 2014, including emissions resulting from out-of-state electrical generation (CARB 2016e). The primary contributors to GHG emissions in California are transportation, industry, electric power production from both in-state and out-of-state sources, agriculture, and other sources, which include commercial and residential activities. These primary contributors to California's GHG emissions and their relative contributions in 2014 are presented in Table 15.

Table 15
GHG Sources in California

Source Category	Annual GHG Emissions (MMT CO_2E)	% of Total[a]
Agriculture	36.11	8.2%
Commercial uses	12.62	2.9%
Electric power	88.24	20.0%

Table 15
GHG Sources in California

Source Category	Annual GHG Emissions (MMT CO_2E)	% of Total[a]
Industrial uses	93.32	21.1%
Recycling and waste	8.85	2.0%
Residential uses	23.73	5.4%
Transportation	159.53	36.1%
High GWP substances	17.15	3.9%
Totals[c]	441.54	100%

Source: CARB 2016e.
Notes: Emissions reflect the 2014 California GHG inventory.
MMT CO_2E = million metric tons of carbon dioxide equivalent
a Percentage of total has been rounded.
b Includes emissions associated with imported electricity, which account for 36.51 MMT CO_2E annually.
c Totals may not sum due to rounding.

During the 2000 to 2014 period, per capita GHG emissions in California have continued to drop from a peak in 2001 of 13.9 metric tons (MT) per person to 11.4 MT per person in 2014, representing an 18% decrease. In addition, total GHG emissions in 2014 were 2.8 MMT CO_2E less than 2013 emissions. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California is on track to meet the statewide 2020 target of 431 MMT CO_2E established by Assembly Bill 32, discussed in the following text (CARB 2016e).

3.1.5 Potential Effects of Human Activity on Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The 2014 *Intergovernmental Panel on Climate Change Synthesis Report* indicated that warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice have, and rising sea levels (IPCC 2014).

In California, climate change impacts have the potential to affect sea level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, and electricity demand and supply (CCCC 2006). The primary effect of global climate change has been a 0.2°C rise in average global tropospheric temperature per decade, determined from meteorological measurements worldwide between 1990 and 2005. Scientific modeling predicts that continued emissions of GHGs at or above current rates would induce more extreme climate changes during the twenty-first century than were observed during the twentieth century. A warming of about

0.2°C (0.36°F) per decade is projected, and there are identifiable signs that global warming could be taking place.

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The average temperatures in California have increased, leading to more extreme hot days and fewer cold nights; shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year; sea levels have risen; and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010).

An increase in annual average temperature is a reasonably foreseeable effect of climate change. Observed changes over the last several decades across the western United States reveal clear signals of climate change. Statewide average temperatures increased by about 1.7°F from 1895 to 2011, and warming has been greatest in the Sierra Nevada (CCCC 2012). By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century. By 2100, average temperatures could increase by 4.1°F to 8.6°F, depending on emissions levels. Springtime warming—a critical influence on snowmelt—will be particularly pronounced. Summer temperatures will rise more than winter temperatures, and the increases will be greater in inland California, compared to the coast. Heat waves will be more frequent, hotter, and longer. There will be fewer extremely cold nights (CCCC 2012). A decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California, by 30% to as much as 90% is predicted over the next 100 years (CAT 2006).

Model projections for precipitation over California continue to show the Mediterranean pattern of wet winters and dry summers with seasonal, year-to-year, and decade-to-decade variability. For the first time, however, several of the improved climate models shift toward drier conditions by the mid-to-late 21st century in Central and, most notably, Southern California. By late-century, all projections show drying, and half of them suggest 30-year average precipitation will decline by more than 10% below the historical average (CCCC 2012).

A summary of current and future climate change impacts to resource areas in California, as discussed in the *Safeguarding California: Reducing Climate Risk* (CNRA 2014), is provided in the following text.

Agriculture. The impacts of climate change on the agricultural sector are far more severe than the typical variability in weather and precipitation patterns that occur year to year. Some of the specific challenges faced by the agricultural sector and farmers include more drastic and unpredictable precipitation and weather patterns; extreme weather events that range from severe flooding to extreme drought, to destructive storm events; significant shifts in water availably and water quality; changes in pollinator lifecycles; temperature fluctuations, including extreme heat stress and decreased chill hours; increased risks from invasive species and weeds, agricultural pests and plant diseases; and disruptions to the transportation and energy infrastructure supporting agricultural production. These challenges and associated short-term and long-term impacts can have both positive and negative effects on agricultural production. Nonetheless, it is predicted that current crop and livestock production will suffer long-term negative effects resulting in a substantial decrease in the agricultural sector if not managed or mitigated (CNRA 2014).

Biodiversity and Habitat. The state's extensive biodiversity stems from its varied climate and assorted landscapes, which have resulted in numerous habitats where species have evolved and adapted over time. Specific climate change challenges to biodiversity and habitat include species migration in response to climatic changes, range shift, and novel combinations of species; pathogens, parasites and disease; invasive species; extinction risks; changes in the timing of seasonal life-cycle events; food web disruptions; and threshold effects (i.e., a change in the ecosystem that results in a "tipping point" beyond which irreversible damage or loss has occurs). Habitat restoration, conservation, and resource management across California and through collaborative efforts amongst public, private and nonprofit agencies has assisted in the effort to fight climate change impacts on biodiversity and habitat. One of the key measures in these efforts is ensuring species' ability to relocate as temperature and water availability fluctuate as a result of climate change, based on geographic region.

Energy. The energy sector provides California residents with a supply of reliable and affordable energy through a complex integrated system. Specific climate change challenges for the energy sector include temperature, fluctuating precipitation patterns, increasing extreme weather events and sea level rise. Increasing temperatures and reduced snowpack negatively impact the availability of a steady flow of snowmelt to hydroelectric reservoirs. Higher temperatures also reduce the capacity of thermal power plants since power plant cooling is less efficient at higher ambient temperatures. Natural gas infrastructure in coastal California is threatened by sea level rise and extreme storm events (CNRA 2014).

Forestry. Forests occupy approximately 33% of California's 100 million acres and provide key benefits such as wildlife habitat, absorption of CO_2, renewable energy and building materials. The most significant climate change related risk to forests is accelerated risk of wildfire and more frequent and severe droughts. Droughts have resulted in more large scale mortalities and combined with increasing temperatures have led to an overall increase in wildfire risks. Increased wildfire intensity subsequently increases public safety risks, property damage, fire suppression and emergency response costs, watershed and water quality impacts and vegetation conversions. These factors contribute to decreased forest growth, geographic shifts in tree distribution, loss of fish and wildlife habitat and decreased carbon absorption. Climate change may result in increased establishment of non-native species, particularly in rangelands where invasive species are already a problem. Invasive species may be able to exploit temperature or precipitation changes, or quickly occupy areas denuded by fire, insect mortality or other climate change effects on vegetation (CNRA 2014).

Ocean and Coastal Ecosystems and Resources. Sea level rise, changing ocean conditions and other climate change stressors are likely to exacerbate long-standing challenges related to ocean and coastal ecosystems in addition to threatening people and infrastructure located along the California coastline and in coastal communities. Sea level rise in addition to more frequent and severe coastal storms and erosion are threatening vital infrastructure such as roads, bridges, power plants, ports and airports, gasoline pipes, and emergency facilities, as well as negatively impacting the coastal recreational assets such as beaches and tidal wetlands. Water quality and ocean acidification threaten the abundance of seafood and other plant and wildlife habitats throughout California and globally (CNRA 2014).

Public Health. Climate change can impact public health through various environmental changes and is the largest threat to human health in the twenty-first century. Changes in precipitation patterns affect public health primarily through potential for altered water supplies, and extreme events such as heat, floods, droughts, and wildfires. Increased frequency, intensity and duration of extreme heat and heat waves is likely to increase the risk of mortality due to heat related illness as well as exacerbate existing chronic health conditions. Other extreme weather events are likely to negatively impact air quality and increase or intensify respiratory illness such as asthma and allergies. Additional health impacts that may be impacted by climate change include cardiovascular disease, vector-borne diseases, mental health impacts, and malnutrition injuries. Increased frequency of these ailments is likely to subsequently increase the direct risk of injury and/or mortality (CNRA 2014).

Transportation. Residents of California rely on airports, seaports, public transportation and an extensive roadway network to gain access to destinations, goods and services. While the transportation industry is a source of GHG emissions it is also vulnerable to climate change risks. Particularly, sea level rise and erosion threaten many coastal California roadways, airports, seaports, transit systems, bridge supports, and energy and fueling infrastructure. Increasing temperatures and extended periods of extreme heat threaten the integrity of the roadways and rail lines. High temperatures cause the road surfaces to expand which leads to increased pressure and pavement buckling. High temperatures can also cause rail breakages, which could lead to train derailment. Other forms of extreme weather events, such as extreme storm events, can negatively impact infrastructure which can impair movement of peoples and goods, or potentially block evacuation routes and emergency access roads. Increased wildfires, flooding, erosion risks, landslides, mudslides, and rockslides can all profoundly impact the transportation system and pose a serious risk to public safety (CNRA 2014).

Water. Water resources in California support residences, plants, wildlife, farmland, landscapes and ecosystems and bring trillions of dollars in economic activity. Climate change could seriously impact the timing, form, amount of precipitation, runoff patterns, and frequency and severity of precipitation events. Higher temperatures reduce the amount of snowpack and lead to earlier snowmelt, which can impact water supply availability, natural ecosystems and winter recreation. Water supply availability during the intense dry summer months is heavily dependent on the snowpack accumulated during the winter time. Increased risk of flooding has a variety of public health concerns including water quality, public safety, property damage, displacement and post-disaster mental health problems. Prolonged and intensified droughts can also negatively groundwater reserves and result in increased overdraft and subsidence. Droughts can also negatively impact agriculture and farmland throughout the state. The higher risk of wildfires can lead to increased erosion, which can negatively impact watersheds and result in poor water quality. Water temperatures are also prone to increase, which can negatively impact wildlife that rely on a specific range of temperatures for suitable habitat (CNRA 2014).

3.2 Regulatory Setting

3.2.1 Federal

Massachusetts vs. EPA. On April 2, 2007, in *Massachusetts v. EPA*, the Supreme Court directed the EPA Administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA Administrator is required to follow the language of Section 202(a) of the federal Clean Air Act. On December 7, 2009, the Administrator signed a final rule with the following two distinct findings regarding GHGs under Section 202(a) of the Clean Air Act:

- The Administrator found that elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The Administrator further found the combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the Clean Air Act.

Energy Independence and Security Act. On December 19, 2007, President George W. Bush signed the Energy Independence and Security Act of 2007. Among other key measures, the Act would do the following, which would aid in the reduction of national GHG emissions:

1. Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
2. Set a target of 35 miles per gallon (mpg) for the combined fleet of cars and light trucks by model year 2020 and direct NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
3. Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

Federal Vehicle Standards. In response to the U.S. Supreme Court ruling discussed previously, the Bush Administration issued Executive Order 13432 in 2007 directing the EPA, the Department of Transportation (DOT), and the Department of Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011, and in 2010, the EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the DOT, DOE, EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon (mpg) if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described previously, in 2011, the EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6%–23% over the 2010 baselines.

In August 2016, the EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans and all types of sizes of buses and work trucks. The final standards are expected to lower CO_2 emissions by approximately 1.1 billion MT and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program (EPA and NHTSA 2016).

Climate Action Plan. In June 2013, President Obama issued a national Climate Action Plan (Plan) that consisted of a wide variety of executive actions and had three pillars: (1) cut carbon in America, (2) prepare the U.S. for impacts of climate change, and (3) lead international efforts to combat global climate change and prepare for its impacts (EOP 2013).

The Plan outlines 75 goals within the three main pillars.

1. ***Cut Carbon in America*** – The Plan consists of actions to help cut carbon by deploying clean energy, such as cutting carbon from power plants, promoting renewable energy, and unlocking long-term investment in clean energy innovation. In addition, the Plan includes actions designed to help build a 21st century transportation sector; cut energy waste in homes, businesses, and factories; and reduce other GHG emissions, such as HFCs and methane. The Plan commits to lead in clean energy and energy efficiency at the federal level.
2. ***Prepare the U.S. for Impacts of Climate Change*** – The Plan consists of actions to help prepare for the impacts of climate change through building stronger and safer communities and infrastructure, supporting climate resilient investments, supporting communities and tribal areas as they prepare for impacts, and boosting resilience of building and infrastructure; protecting the economy and natural resources by identifying vulnerabilities, promoting insurance leadership, conserving land and water resources, managing drought, reducing wildfire risks, and preparing for future floods; and using sound science to manage climate impacts.
3. ***Lead International Efforts*** – The Plan consists of actions to help the U.S. lead international efforts through working with other countries to take action by enhancing multilateral engagements with major economies, expanding bilateral cooperation with

major emerging economies, combating short-lived climate pollutants, reducing deforestation and degradation, expanding clean energy use and cutting energy waste, global free trade in environmental goods and services, and phasing out subsidies that encourage wasteful use of fossil fuels and by leading efforts to address climate change through international negotiations.

In June 2014, the Center for Climate and Energy Solutions (C2ES) published a 1-year review of progress in implementation of the Plan (C2ES 2014). The C2ES found that the administration had made marked progress in its initial implementation. The administration made at least some progress on most of the Plan's 75 goals, and many of the specific tasks outlined had been completed. Notable areas of progress included steps to limit carbon pollution from power plants; improve energy efficiency; reduce CH_4 and HFC emissions; help communities and industry become more resilient to climate change impacts; and end U.S. lending for coal-fired power plants overseas.

U.N. Framework Convention on Climate Change Pledge. On March 31, 2015, the State Department submitted the U.S. target to cut net GHG emissions to the United Nations Framework Convention on Climate Change. The submission, referred to as an Intended Nationally Determined Contribution, is a formal statement of the U.S. target, announced in China last year, to reduce our emissions by 26%–28% below 2005 levels by 2025, and to make best efforts to reduce by 28% (C2ES 2016).

The target reflects a planning process that examined opportunities under existing regulatory authorities to reduce emissions in 2025 of all GHGs from all sources in every economic sector. Several U.S. laws, as well as existing and proposed regulations thereunder, are relevant to the implementation of the U.S. target, including the Clean Air Act (42 U.S.C. 7401 et seq.), the Energy Policy Act (42 U.S.C. 13201 et seq.), and the Energy Independence and Security Act (42 U.S.C. 17001 et seq.).

Clean Power Plan and New Source Performance Standards for Electric Generating Units. On October 23, 2015, EPA published a final rule (effective December 22, 2015) establishing the Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (80 FR 64510–64660), also known as the Clean Power Plan. These guidelines prescribe how states must develop plans to reduce GHG emissions from existing fossil-fuel-fired electric generating units. The guidelines establish CO_2 emission performance rates representing the best system of emission reduction for two subcategories of existing fossil-fuel-fired electric generating units: (1) fossil-fuel-fired electric utility steam-generating units, and (2) stationary combustion turbines. Concurrently, EPA published a final rule (effective October 23, 2015) establishing Standards of Performance for Greenhouse Gas Emissions from New, Modified, and

Reconstructed Stationary Sources: Electric Utility Generating Units (80 FR 64661–65120). The rule prescribes CO_2 emission standards for newly constructed, modified, and reconstructed affected fossil-fuel-fired electric utility generating units. Implementation of the Clean Power Plan has been stayed by the U.S. Supreme Court pending resolution of several lawsuits.

3.2.2 State

The statewide GHG emissions regulatory framework is summarized below by category: state climate change targets, building energy, renewable energy and energy procurement, mobile sources, solid waste, water, and other state regulations and goals. The following text describes executive orders (EO), assembly bills (AB), senate bills (SB), and other regulations and plans that would directly or indirectly reduce GHG emissions.

State Climate Change Targets

EO S-3-05. EO S-3-05 (June 2005) established the following goals: GHG emissions should be reduced to 2000 levels by 2010, GHG emissions should be reduced to 1990 levels by 2020, and GHG emissions should be reduced to 80% below 1990 levels by 2050. Under EO S-3-05, the California Environmental Protection Agency is directed to report biannually on progress made toward meeting the GHG targets and the impacts to California due to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. The Climate Action Team was formed, which subsequently issued the *2006 Climate Action Team Report* to *Governor Schwarzenegger and the Legislature* (CAT 2006).

The *2009 Climate Action Team Biennial Report* (CAT 2010b) expands on the policy outlined in the 2006 assessment. The 2009 report identifies the need for additional research in several different aspects that affect climate change to support effective climate change strategies. Subsequently, the *2010 Climate Action Team Report to Governor Schwarzenegger and the California Legislature* (CAT 2010a) reviews past climate action milestones including voluntary reporting programs, GHG standards for passenger vehicles, the Low Carbon Fuel Standard, a statewide renewable energy standard, and the cap-and-trade program.

AB 32 and CARB Climate Change Scoping Plan. In furtherance of the goals established in EO S-3-05, the legislature enacted AB 32 (Núñez and Pavley), the California Global Warming Solutions Act of 2006 (September 27, 2006). AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020, representing a reduction of approximately 15% below emissions expected under a "business-as-usual" (BAU) scenario (i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations).

CARB has been assigned responsibility for carrying out and developing the programs and requirements necessary to achieve the goals of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions. This program will be used to monitor and enforce compliance with the established standards. CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 also authorized CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted. These efforts target GHG emission reductions from cars and trucks, electricity production, fuels, and other sources. The full implementation of AB 32 will help mitigate risks associated with climate change while improving energy efficiency, expanding the use of renewable energy resources and cleaner transportation, and reducing waste.

Of relevance to this analysis, in 2007, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline (427 MMT CO_2E). CARB's adoption of this limit is in accordance with Health and Safety Code Section 38550. In addition to the 1990 emissions inventory, CARB also adopted regulations requiring mandatory reporting of GHGs for the large facilities that account for 94% of GHG emissions from industrial and commercial stationary sources in California.

Further, in 2008, CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (Scoping Plan) in accordance with Health and Safety Code, Section 38561. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020. The 2020 emissions limit was set at 427 MMT of CO_2E. The Scoping Plan establishes an overall framework for a suite of measures that will be adopted to sharply reduce California's GHG emissions. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction features by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan include the following (CARB 2008):

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
2. Achieving a statewide renewable energy mix of 33%
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions

4. Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets
5. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard
6. Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation

In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5% from the otherwise projected 2020 BAU emissions level. For example, in further explaining CARB's BAU methodology, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards.

In the 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7% (down from 28.5%) from the BAU conditions. When the 2020 emissions level projection also was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewable Portfolio Standard (12% to 20%), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16% (down from 28.5%) from the BAU conditions.

In 2014, CARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* (First Update; CARB 2014). The stated purpose of the First Update is to "highlight California's success to date in reducing its GHG emissions and lay the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80% below 1990 levels by 2050." The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80% below 1990 levels by 2050 if the state realizes the expected benefits of existing policy goals.

In conjunction with the First Update, CARB identified "six key focus areas comprising major components of the state's economy to evaluate and describe the larger transformative actions that will be needed to meet the state's more expansive emission reduction needs by 2050." Those six areas are: (1) energy; (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure); (3) agriculture; (4) water; (5) waste management; and, (6) natural and working lands. The First Update identifies key recommended actions for each sector that will facilitate achievement of Executive Order S-3-05's 2050 reduction goal.

Based on CARB's research efforts presented in the First Update, CARB has a "strong sense of the mix of technologies needed to reduce emissions through 2050." Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings and industrial machinery; decarbonizing electricity and fuel supplies; and, the rapid market penetration of efficient and clean energy technologies.

As part of the First Update, CARB recalculated the state's 1990 emissions level using more recent global warming potentials identified by the Intergovernmental Panel on Climate Change. Using the recalculated 1990 emissions level (431 MMT CO_2E) and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15% (instead of 28.5% or 16%) from the BAU conditions. The update also recommends that a statewide mid-term target and mid-term and long-term sector targets be established toward meeting the 2050 goal established by EO S-3-05 (i.e., reduce California's GHG emissions to 80% below 1990 levels), although no specific recommendations are made. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California is on track to meet the 2020 target of 431 MMT CO_2E (CARB 2016e).

On January 20, 2017, CARB released The 2017 Climate Change Scoping Plan Update (Second Update) for public review and comment (CARB 2016f). This update to the scoping plan proposes the CARB's strategy for achieving the State's 2030 GHG target, including continuing the Cap-and-Trade Program through 2030 and includes a new approach to reduce GHGs from refineries by 20 percent. The Second Update incorporates approaches to cutting super pollutants from the Short Lived Climate Pollutants Strategy and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon. During development of the Second Update, CARB held a number of public workshops in the Natural and Working Lands, Agriculture, Energy and Transportation sectors to inform development of the 2030 Scoping Plan Update. When discussing project-level GHG emissions reduction actions and thresholds, the Second Update states "achieving no net increase in GHG emissions is the correct overall objective, but it may not be appropriate or feasible for every development project. And the inability to mitigate a project's GHG emissions to zero does not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA." The deadline to submit comments on the Second Update is March 6, 2017. It is expected that the Second Update will be heard by the CARB at the April 27 and 28, 2017 CARB hearing.

EO B-30-15. EO B-30-15 (April 2015) identified an interim GHG reduction target in support of targets previously identified under EO S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80% below 1990 levels by 2050 as set forth in S-3-05. To facilitate achievement of this goal, EO B-30-15 calls for an update to CARB's Scoping Plan to express the 2030 target in terms of MMT CO_2E. The EO also calls for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets. Sector-specific agencies in transportation, energy, water, and forestry were required to prepare GHG reduction plans by September 2015, followed by a report on action taken in relation to these plans in June 2016. EO B-30-15 does not require local agencies to take any action to meet the new interim GHG reduction threshold. It is important to note that EO B-30-15 was not adopted by a public agency through a public review process that requires analysis pursuant to the California Environmental Quality Act (CEQA) Guidelines, Section 15064.4, and that it has not been subsequently validated by a statute as an official GHG reduction target of California. EO B-30-15 itself states it is "not intended to create, and does not, create any rights of benefits, whether substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person."

SB 32 and AB 197. SB 32 and AB 197 (enacted in 2016) are companion bills that set a new statewide GHG reduction targets; make changes to CARB's membership, and increase legislative oversight of CARB's climate change-based activities; and expand dissemination of GHG and other air quality-related emissions data to enhance transparency and accountability. SB 32 codified the 2030 emissions reduction goal of Executive Order B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, in order to provide ongoing oversight over implementation of the state's climate policies. AB 197 also added two members of the Legislature to CARB as nonvoting members; requires CARB to make available and update (at least annually via its website) emissions data for GHGs, criteria air pollutants, and TACs from reporting facilities; and, requires CARB to identify specific information for GHG emissions reduction measures when updating the scoping plan.

EO B-18-12. EO B-18-12 (April 2012) directs state agencies, departments, and other entities under the governor's executive authority to take action to reduce entity-wide GHG emissions by at least 10% by 2015 and 20% by 2020, as measured against a 2010 baseline. EO B-18-12 also established goals for existing state buildings for reducing grid-based energy purchases and water use.

SB 605. SB 605 (September 2014) required CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the state no later than January 1, 2016. As defined in the statute, short-lived climate pollutant means "an agent that has a relatively short lifetime in the atmosphere, from a few days to a few decades, and a warming influence on the climate that is more potent than that of carbon dioxide" (SB 605). SB 605, however, does not prescribe specific compounds as short-lived climate pollutants or add to the list of GHGs regulated under AB 32. In developing the strategy, the CARB must complete an inventory of sources and emissions of short-lived climate pollutants in the state based on available data, identify research needs to address any data gaps, identify existing and potential new control measures to reduce emissions, and prioritize the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other criteria air pollutants that impact community health and benefit disadvantaged communities. The *Proposed Short-Lived Climate Pollution Reduction Strategy* released by CARB in April 2016 focuses on CH_4, black carbon, and fluorinated gases, particularly HFCs, as important short-lived climate pollutants (CARB 2016g). The strategy recognizes emission reduction efforts implemented under AB 32 (e.g., refrigerant management programs) and other regulatory programs (e.g., in-use diesel engines, solid waste diversion) along with additional measures to be developed.

Building Energy

Title 24, Part 6. Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes Building Energy Efficiency Standards that are designed to ensure new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality. The California Energy Commission (CEC) is required by law to adopt standards every 3 years that are cost effective for homeowners over the 30-year lifespan of a building. These standards are updated to consider and incorporate new energy efficient technologies and construction methods. As a result, these standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment.

The current Title 24 standards are the 2013 standards, which became effective on July 1, 2014. Buildings constructed in accordance with the 2013 standards will use 25% less energy for lighting, heating, cooling, ventilation, and water heating than the 2008 standards (CEC 2014).

The 2016 Title 24 building energy efficiency standards, which will be effective January 1, 2017, will further reduce energy used and associated GHG emissions. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and nonresidential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015). The proposed project would be required to comply with 2016 Title 24 standards because its building construction phase would commence after January 1, 2017.

Title 24, Part 11. In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CALGreen, and establishes minimum mandatory standards as well as voluntary standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality. The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings and schools and hospitals. The CALGreen 2016 standards will become effective January 1, 2017. The mandatory standards require the following (24 CCR Part 11):

- Mandatory reduction in indoor water use through compliance with specified flow rates for plumbing fixtures and fittings
- Mandatory reduction in outdoor water use through compliance with a local water efficient landscaping ordinance or the California Department of Water Resources' Model Water Efficient Landscape Ordinance
- 65% of construction and demolition waste must be diverted from landfills
- Mandatory inspections of energy systems to ensure optimal working efficiency
- Inclusion of electric vehicle charging stations or designated spaces capable of supporting future charging stations
- Low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and implemented at the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements, stricter water conservation, 65% diversion of construction and demolition waste, 10% recycled content in building materials, 20% permeable paving, 20% cement reduction, and cool/solar-reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements, stricter water conservation, 65% diversion of nonhazardous construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 25% cement reduction, and cool/solar-reflective roofs.

The California Public Utilities Commission (CPUC), CEC, and CARB also have a shared, established goal of achieving zero net energy for new construction in California. The key policy timelines include: (1) all new residential construction in California will be zero net energy by 2020, and (2) all new commercial construction in California will be zero net energy by 2030.[6]

Title 20. Title 20 of the California Code of Regulations requires manufacturers of appliances to meet state and federal standards for energy and water efficiency. Performance of appliances must be certified through the CEC to demonstrate compliance with standards. New appliances regulated under Title 20 include refrigerators, refrigerator-freezers, and freezers; room air conditioners and room air-conditioning heat pumps; central air conditioners; spot air conditioners; vented gas space heaters; gas pool heaters; plumbing fittings and plumbing fixtures; fluorescent lamp ballasts; lamps; emergency lighting; traffic signal modules; dishwaters; clothes washers and dryers; cooking products; electric motors; low voltage dry-type distribution transformers; power supplies; televisions and consumer audio and video equipment; and battery charger systems. Title 20 presents protocols for testing for each type of appliance covered under the regulations and appliances must meet the standards for energy performance, energy design, water performance, and water design. Title 20 contains the following three types of standards for appliances: federal and state standards for federally regulated appliances, state standards for federally regulated appliances, and state standards for non-federally regulated appliances.

Mobile Sources

AB 1493. In a response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 (Pavley) was enacted in July 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles that are primarily used for noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a

6 See CPUC's California's Zero Net Energy Policies and Initiatives (Sept. 18, 2013) (http://www.cpuc.ca.gov/NR/rdonlyres/C27FC108-A1FD-4D67-AA59- 7EA82011B257/0/3.pdf). It is expected that achievement of the zero net energy goal will occur via revisions to the Title 24 standards.

reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30%.

EO S-1-07. Issued on January 18, 2007, EO S-1-07 sets a declining Low Carbon Fuel Standard for GHG emissions measured in CO_2E grams per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in April 2009. The regulation is expected to increase the production of biofuels, including those from alternative sources, such as algae, wood, and agricultural waste. In addition, the Low Carbon Fuel Standard would drive the availability of plug-in hybrid, battery electric, and fuel-cell power motor vehicles. The Low Carbon Fuel Standard is anticipated to lead to the replacement of 20% of the fuel used in motor vehicles with alternative fuels by 2020.

SB 375. SB 375 (Steinberg) (September 2008) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans, was enacted into law. SB 375 required CARB to adopt regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035. Regional metropolitan planning organizations are then responsible for preparing a Sustainable Communities Strategy within their Regional Transportation Plan. The goal of the Sustainable Communities Strategy is to establish a forecasted development pattern for the region that, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If a Sustainable Communities Strategy is unable to achieve the GHG reduction target, a metropolitan planning organization must prepare an Alternative Planning Strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

Pursuant to Government Code Section 65080(b)(2)(K), a sustainable communities strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it. Nonetheless, SB 375 makes regional and local planning agencies responsible for developing those strategies as part of the federally required metropolitan transportation planning process and the state-mandated housing element process.

In 2010, CARB adopted the SB 375 targets for the regional metropolitan planning organizations. The targets for SANDAG are a 7% reduction in emissions per capita by 2020 and a 13% reduction by 2035.

SANDAG completed and adopted its *2050 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS) in October 2011. In November 2011, CARB, by resolution, accepted SANDAG's GHG emissions quantification analysis and determination that, if implemented, the SCS would achieve CARB's 2020 and 2035 GHG emissions reduction targets for the region.

After SANDAG's 2050 RTP/SCS was adopted, a lawsuit was filed by the Cleveland National Forest Foundation and others. In November 2014, Division One of the Fourth District Court of Appeal issued its decision in *Cleveland National Forest Foundation v. SANDAG*, Case No. D063288. In its decision, the Fourth District held that SANDAG abused its discretion when it certified the environmental impact report (EIR) for the 2050 RTP/SCS because it did not adequately analyze and mitigate GHG emission levels after year 2020. The 2050 RTP/SCS EIR complied with CARB's AB 32–related GHG reduction target through 2020, but the EIR found that plan-related emissions would substantially increase after 2020 and through 2050. The majority of the Fourth District in the *Cleveland National* decision found SANDAG's EIR deficient because, although the EIR used three significance thresholds authorized by CEQA Guidelines, Section 15064.4(b), it did not assess the 2050 RTP/SCS's consistency with the 2050 GHG emissions goal identified in Executive Order S-03-05, which the majority construed as "state climate policy." The Fourth District did not require the set aside of SANDAG's 2050 RTP/SCS itself. In March 2015, the California Supreme Court granted SANDAG's petition for review of the Fourth District's decision (Case No. S223603), and the matter currently is pending before the state's highest court.

Although the EIR for SANDAG's 2050 RTP/SCS is still pending before the California Supreme Court, SANDAG recently adopted the next iteration of its RTP/SCS in accordance with statutorily mandated timelines. More specifically, in October 2015, SANDAG adopted *San Diego Forward: The Regional Plan*. Like the 2050 RTP/SCS, this planning document meets CARB's 2020 and 2035 reduction targets for the region (SANDAG 2015).

Advanced Clean Cars Program. In January 2012, CARB approved the Advanced Clean Cars program, a new emissions-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package. The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars (CARB 2012). To improve air quality, CARB has implemented new emission standards to reduce smog-forming emissions beginning with 2015 model year vehicles. It is estimated that in 2025 cars will emit 75% less smog-forming pollution than the average new car sold today. To reduce GHG emissions, CARB, in conjunction with the EPA and the NHTSA, has adopted new GHG standards for model year 2017 to 2025 vehicles; the new standards are estimated to reduce GHG emissions by 34% in 2025. The zero-emission vehicle program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of zero-emission vehicles and plug-in hybrid electric vehicles in the 2018 to 2025 model years. The Clean Fuels Outlet regulation will ensure that fuels such as electricity and hydrogen are available to meet the fueling needs of the new advanced technology vehicles as they come to the market.

EO B-16-12. EO B-16-12 (March 2012) directs state entities under the Governor's direction and control to support and facilitate development and distribution of zero-emission vehicles. This EO also sets a long-term target of reaching 1.5 million zero-emission vehicles on California's roadways by 2025. On a statewide basis, EO B-16-12 also establishes a GHG emissions reduction target from the transportation sector equaling 80% less than 1990 levels by 2050.

Renewable Energy and Energy Procurement

Senate Bill (SB) 1078. SB 1078 (Sher) (September 2002) established the Renewable Portfolio Standard (RPS) program, which requires an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated by SB 107, requiring utilities to obtain 20% of their power from renewable sources by 2010.

SB 1368. In September 2006, Governor Schwarzenegger signed SB 1368, which requires the CEC to develop and adopt regulations for GHG emission performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the CPUC. This effort will help protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low as or lower than new combined-cycle natural gas plants by requiring imported electricity to meet GHG performance standards in California and by requiring that the standards be developed and adopted in a public process.

EO S-14-08. EO S-14-08 (November 2008) focuses on the contribution of renewable energy sources to meet the electrical needs of California while reducing the GHG emissions from the electrical sector. This EO requires that all retail suppliers of electricity in California serve 33% of their load with renewable energy by 2020. Furthermore, the EO directs state agencies to take appropriate actions to facilitate reaching this target. The CNRA, through collaboration with the CEC and California Department of Fish and Wildlife (formerly the California Department of Fish and Game), is directed to lead this effort. Pursuant to a Memorandum of Understanding between the CEC and California Department of Fish and Wildlife regarding creating the

Renewable Energy Action Team, these agencies will create a "one-stop" process for permitting renewable energy power plants.

EO S-21-09. EO S-21-09 (September 2009) directed CARB to adopt a regulation consistent with the goal of EO S-14-08 by July 31, 2010. CARB is further directed to work with the CPUC and CEC to ensure that the regulation builds upon the RPS program and is applicable to investor-owned utilities, publicly owned utilities, direct access providers, and community choice providers. Under this order, CARB is to give the highest priority to those renewable resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health and can be developed the most quickly in support of reliable, efficient, cost-effective electricity system operations. On September 23, 2010, CARB adopted regulations to implement a Renewable Electricity Standard, which would achieve the goal of the EO with the following intermediate and final goals: 20% for 2012–2014, 24% for 2015–2017, 28% for 2018–2019, and 33% for 2020 and beyond. Under the regulation, wind; solar; geothermal; small hydroelectric; biomass; ocean wave, thermal, and tidal; landfill and digester gas; and biodiesel would be considered sources of renewable energy. The regulation would apply to investor-owned utilities and public (municipal) utilities.

SB X1 2. SB X1 2 (April 2011) expanded the RPS by establishing a goal of 20% of the total electricity sold to retail customers in California per year by December 31, 2013, and 33% by December 31, 2020, and in subsequent years. Under the bill, a renewable electrical generation facility is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and that meets other specified requirements with respect to its location. In addition to the retail sellers covered by SB 107, SB X1 2 adds local, publicly owned electric utilities to the RPS. By January 1, 2012, the CPUC is required to establish the quantity of electricity products from eligible renewable energy resources to be procured by retail sellers to achieve targets of 20% by December 31, 2013; 25% by December 31, 2016; and 33% by December 31, 2020. The statute also requires that the governing boards for local, publicly owned electric utilities establish the same targets, and the governing boards would be responsible for ensuring compliance with these targets. The CPUC will be responsible for enforcement of the RPS for retail sellers, while the CEC and CARB will enforce the requirements for local publicly owned electric utilities.

SB 350. SB 350 (October 2015) expands the RPS by establishing a goal of 50% of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 includes the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses on which an energy-efficiency program is focused) of retail customers through energy conservation and efficiency.

The bill also requires the CPUC, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal. SB 350 also provides for the transformation of the California Independent System Operator into a regional organization to promote the development of regional electricity transmission markets in the western states and to improve the access of consumers served by the California Independent System Operator to those markets, pursuant to a specified process.

Water

EO B-29-15. In response to the ongoing drought in California, EO B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the EO extended through February 28, 2016, although many of the directives have become permanent water-efficiency standards and requirements. The EO includes specific directives that set strict limits on water usage in the state. In response to EO B-29-15, the California Department of Water Resources has modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

Solid Waste

AB 939 and AB 341. In 1989, AB 939, known as the Integrated Waste Management Act (California Public Resources Code Section 40000 et seq.), was passed because of the increase in waste stream and the decrease in landfill capacity. The statute established the California Integrated Waste Management Board, which oversees a disposal reporting system. AB 939 mandated a reduction of waste being disposed where jurisdictions were required to meet diversion goals of all solid waste through source reduction, recycling, and composting activities of 25% by 1995 and 50% by the year 2000.

AB 341 (Chapter 476, Statutes of 2011 (Chesbro)) amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the state that not less than 75% of solid waste generated be source-reduced, recycled, or composted by the year 2020, and annually thereafter. In addition, AB 341 required the California Department of Resources Recycling and Recovery (CalRecycle) to develop strategies to achieve the state's policy goal. CalRecycle conducted several general stakeholder workshops and several focused workshops and in August 2015 published a discussion document titled *AB 341 Report to the Legislature*, which identifies five priority strategies that CalRecycle believes would assist the state in reaching the 75% goal by 2020, legislative and regulatory recommendations, and an evaluation of program effectiveness.

Increasing the amount of commercial solid waste that is recycled, reused, or composted will reduce GHG emissions primarily by (1) reducing the energy requirements associated with the extraction, harvest, and processing of raw materials; and (2) using recyclable materials that require less energy than raw materials to manufacture finished products (CalRecycle 2015). Increased diversion of organic materials (green and food waste) will also reduce GHG emissions (CO_2 and CH_4) resulting from decomposition in landfills by redirecting this material to processes that use the solid waste material to produce vehicle fuels, heat, electricity, or compost.

Other State Regulations and Goals

EO S-13-08. EO Order S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea-level rise. It directs state agencies to take specified actions to assess and plan for such impacts. It directs the CNRA, in cooperation with the California Department of Water Resources, CEC, California's coastal management agencies, and the Ocean Protection Council, to request that the National Academy of Sciences prepare a Sea Level Rise Assessment Report by December 1, 2010. The Ocean Protection Council, California Department of Water Resources, and CEC, in cooperation with other state agencies, are required to conduct a public workshop to gather information relevant to the Sea Level Rise Assessment Report. The Business, Transportation, and Housing Agency was ordered to assess within 90 days of issuance of the EO the vulnerability of the state's transportation systems to sea-level rise. The Governor's Office of Planning and Research and the CNRA are required to provide land use planning guidance related to sea-level rise and other climate change impacts. The EO also required the other state agencies to develop adaptation strategies by June 9, 2009, to respond to the impacts of global climate change that are predicted to occur over the next 50 to 100 years. A discussion draft adaptation strategies report was released in August 2009, and the final *2009 California Climate Adaptation Strategy* report was issued in December 2009 (CNRA 2009). An update to the 2009 report, *Safeguarding California: Reducing Climate Risk*, was issued in July 2014 (CNRA 2014). To assess the state's vulnerability, the report summarizes key climate change impacts to the state for the following areas: agriculture, biodiversity and habitat, emergency management, energy, forestry, ocean and coastal ecosystems and resources, public health, transportation, and water.

2015 State of the State Address. In January 2015, Governor Brown in his inaugural address and annual report to the Legislature established supplementary goals which would further reduce GHG emissions over the next 15 years. These goals include an increase in California's renewable energy portfolio from 33% to 50%, a reduction in vehicle petroleum use for cars and trucks by up to 50%, measures to double the efficiency of existing buildings, and decreasing emissions associated with heating fuels.

2016 State of the State Address. In his January 2016 address, Governor Brown established a statewide goal to bring per capita GHG emission down to 2 tons per person, which reflects the goal of the Global Climate Leadership Memorandum of Understanding (Under 2 MOU; OPR 2016) to limit global warming to less than 2°C by 2050. The Under 2 MOU agreement pursues emission reductions of 80% to 95% below 1990 levels by 2050 and/or reach a per capita annual emissions goal of less than two metric tons by 2050. A total of 135 jurisdictions representing 32 countries and 6 continents, including California, have signed or endorsed the Under 2 MOU (OPR 2016).

3.2.3 Local

2050 Regional Transportation Plan. On October 28, 2011, the SANDAG Board of Directors adopted the 2050 Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS), which articulates future plans for San Diego's regional transportation system over the next 40 years. The SCS, which is included as part of the RTP, details the regional strategy for reducing GHG emissions to state-mandated levels over time as required by SB 375, including measures encouraging infill development. The San Diego region is the first in California to produce an RTP with a SCS.

Most recently, SANDAG prepared *San Diego Forward: The Regional Plan*, which has united two of SANDAG's major planning efforts into one with the next update of the RTP/SCS and an update of the Regional Comprehensive Plan (RCP) that was adopted in 2004. The updated RTP/SCS was adopted by the SANDAG Board of Directors on October 9, 2015.

City of Chula Vista

ICLEI Local Governments for Sustainability. In 1992, the City of Chula Vista participated in the Cities for Climate Protection Program, which was aimed at developing municipal action plans for the reduction of GHGs. This program was sponsored and developed by the International Council of Environmental Initiatives (ICLEI) and the United Nations Environment Program in response to the United Nations Framework Convention on Climate Change, while recognizing that all local planning and development has direct consequences on energy consumption and cities exercise key powers over urban infrastructure, including neighborhood design, and over transportation infrastructure such as roads, streets, pedestrian areas, bicycle lanes and public transport.

Chula Vista Carbon Dioxide (CO_2) Reduction Plan. Each participant in the ICLEI program was to create local policy measures to ensure multiple benefits to the City and at the same time identify a carbon reduction goal through the implementation of those measures. The carbon reduction goal was to fit within the realm of international climate treaty reduction goals.

In its CO_2 Reduction Plan, developed in 1996 and officially adopted in 2000, Chula Vista committed to lowering its CO_2 emissions by diversifying its transportation system and using energy more efficiently in all sectors. To focus efforts in this direction, Chula Vista adopted the international CO_2 reduction goal of returning to pre-1990 levels by 2010. In order to achieve this goal, eight actions were identified, which when fully implemented, were anticipated to save 100,000 tons of CO_2 each year.

As a result of the 2005 GHG Emissions Inventory Report, in May 2007, staff reported to City Council that citywide GHG emissions had increased by 35 percent (mainly due to residential growth) from 1990 to 2005, while emissions on a per capita basis and from municipal operations decreased by 17 percent and 18 percent, respectively. The City Council directed staff to convene a climate change working group to develop recommendations to reduce the community's GHGs in order to meet the City's 2010 GHG emissions reduction targets.

As a result of the 2012 GHG Emissions Inventory Report, staff reported to City Council that citywide GHG levels are 1,011,481 MT CO_2E. Compared to 2005, Chula Vista's citywide GHG emissions have increased by 8%. However, 2012 per capita emissions are approximately 5% below 2005 levels and 33% below 1990 levels. Unlike the last two inventories, 2009 & 2010, there was a slight increase in citywide energy consumption over the last couple years due most likely to local economic recovery. As with past inventories, community transportation activity has continued increasing with 2012 VMT about 29% higher than in 2005. In order to reach the current community emissions reduction goal of 20% below 1990 emission levels, the City will have to reduce its GHG emissions by more than 359,332 MT CO_2E (35%); however, statewide initiatives are expected to help achieve some of these reductions by 2020.

Climate Change Working Group. The Climate Change Working Group (CCWG), which is composed of residents, businesses, and community organization representatives, helps the city in developing climate-related programs and policies. In 2008, the group reviewed over 90 carbon reduction measures and ultimately chose seven measures to recommend for adoption to the City Council, which the council subsequently adopted. The measures were designed to reduce or mitigate climate change impacts by reducing GHG emissions within Chula Vista to 20 percent below 1990 levels, in keeping with its CO_2 Reduction Plan and United Nations Framework Convention on Climate Change goals.

In October 2009, the City Council directed the group to evaluate how the City could adapt to potential climate change impacts. The group met throughout 2011 to develop recommendations based on the City's vulnerabilities and risks to climate change. In May 2011, the group adopted the Climate Adaptation Strategies – Implementation Plans, described below; and in 2014, the group released the 2014 Climate Action Plan Update – Recommendations, described below.

Chula Vista Climate Adaptation Strategies – Implementation Plans. The Climate Adaptation Strategies – Implementation Plans document developed by the CCWG includes eleven strategies to facilitate Chula Vista's adaptation to the potential impacts of global climate change related to energy and water supply, public health, wildfires, ecosystem management, coastal infrastructure, and local economy sectors. The strategies include cool paving, shade trees, cool roofs, local water supply and reuse, storm water pollution prevention and reuse, education and wildfires, extreme heat plans, open space management, wetlands preservation, sea level rise and land development codes, and green economy. For each strategy, the plans outline specific implementation components, critical steps, costs, and timelines. In order to limit the necessary staffing and funding required to implement the strategies, the plans were also designed to build upon existing municipal efforts rather than create new, stand-alone policies or programs. Initial implementation of all eleven strategies is intended to be phased in over a three-year period from plan adoption.

Chula Vista Climate Protection Measures. On July 10, 2008, the City Council adopted implementation plans for seven climate protection measures to reduce GHG emissions to 20 percent below 1990 levels by 2012. The implementation plans outline the detailed strategy for initiating, funding, and tracking the following measures:

1. **Clean Vehicle Replacement Policy for City Fleet:** When City fleet vehicles are retired, they will be replaced through the purchase or lease of alternative fuel or hybrid substitutes. In addition, the City fleet will begin to pursue installing new fuel tanks to allow heavy-duty vehicles to convert to biodiesel fuel immediately.
2. **Clean Vehicle Replacement Policy for City-Contracted Fleets:** As contracts for City-contracted fleet services (such as transit buses, trash haulers and street sweeper trucks) are renewed, the City will encourage contractors to replace their vehicles with alternative fuel or hybrid substitutes through the contract bid process. In addition, the City will pursue implementing two hydrogen vehicle demonstration projects.
3. **Business Energy Evaluations:** Businesses with storefronts or offices need to participate in a no cost energy assessment of their facilities to help identify opportunities for them to reduce monthly energy costs. The business assessment will be integrated into the existing business licensing process and codified through a new municipal ordinance.
4. **Green Building Standard:** Chula Vista will implement a citywide, mandatory green building standard for new residential and non-residential construction projects and major renovations. The standard includes four components: 1) adopting a citywide Green Building Standard, 2) adopting a citywide Enhanced Energy Efficiency Standard, 3) launching a Green Building Awareness program for builders, permit applicants and the general public, and 4) develop design guidelines for sustainable development.

5. **Solar and Energy Efficiency Conversion Program:** The City will create a community program to provide residents and businesses a streamlined, cost effective opportunity to implement energy efficiency improvements and to install solar/renewable energy systems on their properties. The City will develop a funding mechanism to allow program participants to voluntarily choose to place the improvement costs on their property's tax rolls, thereby avoiding large upfront capital costs. In addition, the program will promote vocational training, local manufacturing, and retail sales opportunities for environmental products and services. To help stimulate the private-sector renewable market and lower the cost for installing renewable energy systems on new homes, the City will require all new residential buildings to include pre-wiring and pre-plumbing for solar photovoltaic and solar hot water systems, respectively.
6. **Smart Growth Around Trolley Stations:** The City will continue to implement the smart growth design principles, which promote mixed-use and walkable and transit-friendly development, particularly in and around the E, H, and Palomar trolley stations. These principles were emphasized in the revised Chula Vista General Plan and the Urban Core Specific Plan. In particular, the City will initiate site planning, design studies and specific area plan development to further support smart growth development that complements GHG reductions.
7. **Turf Lawn Conversion Program:** The City will create a community program to provide residents and businesses a streamlined, cost-effective opportunity to replace their turf lawns with water-saving landscaping and irrigation systems. Some municipal turf lawn areas (such as medians, fire stations and non-recreational park areas) will also be converted to act as public demonstration sites and to reduce monthly water costs. The City will establish the model for water-wise landscaping for new development through an update of the Chula Vista Municipal Landscape Ordinance and Water Conservation Plan (WCP) guidelines.

Chula Vista Climate Protection Measures – 2013 Progress Report. Since 2000, Chula Vista has been implementing a Climate Action Plan to address the threat of climate change to the local community. This original plan has been revised to incorporate new climate mitigation (2008) and adaptation (2011) measures to strengthen the City's climate action efforts and to facilitate the numerous community co-benefits such as utility savings, better air quality, reduced traffic congestion, local economic development, and improved quality of life. Based on available funding, staff has been implementing the 18 climate-related actions and their 57 associated components. Overall, 70% of the components have been successfully completed and/or are being implemented on an ongoing basis, which represents a 7% increase since the last reporting period. Another 26% are still being actively pursued, while only two components remain on-hold (City of Chula Vista 2013).

2014 Climate Action Plan Update – Recommendations by the Climate Change Working Group. The CCWG has been evaluating new opportunities to help reach the Chula Vista Climate Action Plan's GHG gas reduction goal of 30% below 2005 levels. As such, they have identified the following 12 action areas that could generate up to 166,000 metric tons in reductions by 2020, while improving local air quality, generating utility savings, reducing traffic congestion, and promoting a healthier community (City of Chula Vista 2014):

***Water Conservation & Reuse* – Estimated Annual GHG Reductions = 6,000 MT CO_2E**

1. Water Education & Enforcement
   - Expand education and enforcement (through fines) targeting landscape water waste.
2. Water Efficiency Upgrades
   - Use sewer ratepayer funds to incentivize indoor water conservation and provide on-bill financing opportunities.
   - Update the City's Landscape Water Conservation Ordinance to promote more water-wise landscaping designs.
   - Require water-savings retrofits in existing buildings at a specific point in time (not point of sale).
3. Water Reuse Plan & System Installations
   - Develop a Water Reuse Master Plan to maximize the use of storm water, recycled water (such as indoor commercial use), and on-site water reclamation.
   - Promote graywater through a Laundry-to-Landscape installation program and by simplifying complex systems' permit review.

***Water Reduction*- Estimated Annual GHG Reductions = 32,000 MT CO_2e**

4. Zero Waste Plan
   - Develop a Zero Waste Plan (with special emphasis on zero waste events, business certifications, and building deconstruction) to supplement statewide green waste, recycling, and plastic bag ban efforts.

***Renewable & Efficient Energy* – Estimated Annual GHG Reductions = 32,000 MT CO_2e**

5. Energy Education & Enforcement
   - Expand education targeting key community segments (i.e., do-it-yourself (DIY) and Millennials) and facilitating energy performance disclosure (i.e., Green Leases & Home Energy Ratings).
   - Leverage the building inspection process to distribute energy-related information and to deter unpermitted, low performing energy improvements.
6. Clean Energy Sources
   - Incorporate solar photovoltaic into all new residential and commercial buildings (on a project level basis).
   - Provide more grid-delivered clean energy (up to 100%) through Community Choice Aggregation or other mechanism.
7. Energy Efficiency Upgrades
   - Expand the City's "cool roof" standards to include re-roofs and western areas.
   - Streamline the permit process for energy-saving improvements by offering bundled and over-the-counter options.
   - Facilitate more energy upgrades in the community through tax breaks, rebates, and more local energy efficiency programming.
   - Require energy-savings retrofits in existing buildings at a specific point in time (not at point of sale).
8. Robust Urban Forests
   - Plant more shade trees to save energy, address heat island issues, and improve air quality.

***Smart Growth & Transportation* – Estimated Annual GHG Reductions = 49,000 MT CO_2e**

9. Complete Streets & Neighborhoods
   - Incorporate "Complete Streets" principles into the Bicycle and Pedestrian Master Plans and Capital Improvement Program.

- Encourage higher density and mixed-use development in Smart Growth areas, especially around trolley stations and other transit nodes.
- Synchronize traffic signals to help ensure efficient traffic flow.

10. Flexible Parking Requirements
    - Allow flexibility in meeting parking requirements by incorporating bike facilities, transit access/passes, and other Transportation Demand Management offerings.
11. Alternative Fuel Vehicle Readiness
    - Support the installation of more local alternative fueling stations and designate preferred parking for alternative fuel vehicles.
    - Design all new residential and commercial buildings to be "Electric Vehicle Ready."
12. Multi-Modal Options
    - Amend the Growth Management Ordinance to include considerations for alternative transportation options and to de-emphasize vehicular level of service.
    - Expand bike-sharing, car-sharing, and other "last mile" transportation options, especially in eastern areas.

Chula Vista Green Building Standards. Consistent with Measure 4 of the Chula Vista Climate Protection Measures, the City Council adopted the Green Building Standards (GBS) Ordinance (Ordinance No. 3140) on October 6, 2009, which became effective November 5, 2009. The GBS ordinance includes standards for energy efficiency, pollutant controls, interior moisture control, improved indoor air quality and exhaust, indoor water conservation, storm water management, and construction waste reduction and recycling.

Building permit applications are required to indicate on project construction plans and specifications the GBS measures that comply with the ordinance. Prior to final building approval or issuance of a certificate of occupancy, the Building Official reviews the information submitted by the applicant and determines whether the applicant has constructed the project in accordance with the permitted plans and documents, and whether the plans are in compliance with the GBS. In 2013, Chula Vista adopted the Green Building Code (CalGreen) for Residential and Non-residential development effective January 1, 2014.

Chapter 15.12 Green Building Standards. Title 24, Part 11, was adopted as the green building code of the City of Chula Vista for enhancing the design and construction of buildings, building additions and alterations through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices, excepting such portions as are hereinafter deleted, modified, or amended.

Chula Vista Increased Energy Efficiency Standards. On January 26, 2010, the City Council adopted the Increased Energy Efficiency Standards Ordinance (Ordinance No. 3149). This ordinance became effective February 26, 2010 as Section 15.26 of the municipal code. Permit applications are required to comply with these energy efficiency standards.

Chula Vista Municipal Code (CVMC) Section 15.26.030 requires permit applications to comply with increased energy efficiency standards that achieve 15 to 20 percent greater efficiency than the requirements of the Title 24 2008 standards, depending on climate zone. The City falls within two climate zones, Zone 7 and Zone 10. The project site is within Zone 7. For Zone 7, the code requires:

- All new low-rise residential building or additions, remodels or alterations to existing low-rise residential buildings where the additions, remodels or alterations are greater than 1,000 square feet of conditional floor area, shall use at least 15 percent less energy than the 2008 Title 24 Building Energy Efficiency Standards allow; and
- All new non-residential, high-rise residential or hotel/motel buildings, or additions, remodels or alterations to existing non-residential, high-rise residential or hotel/motel buildings where the additions, remodels or alterations are greater than 10,000 square feet of conditioned floor area, shall use at least 15 percent less energy than the 2008 Title 24 Building Energy Efficiency Standards.
- No city building permit shall be issued unless the permit application demonstrates to the Building Official compliance with the requirements of Section 15.26.030. Compliance is to be demonstrated based on a performance approach, using a CEC-approved energy compliance software program, as specified in the Title 24 2008 Building Energy Efficiency Standards.

In 2013, Chula Vista adopted the Energy Code for Residential and Non-Residential development, effective July 1, 2014. Energy Efficiency measures adopted by the CVMC are as follows:

- ***Section 15.26.010 - California Energy Code***. The California Energy Code is adopted as the energy code of the City of Chula Vista for the purpose of regulating building design and construction standards to increase efficiency in the use of energy for new residential and nonresidential buildings.

- ***Section 15.26.020 – Outdoor Lighting Zones***. The City has adopted an outdoor lighting zones map amending state default lighting zones as applied to certain areas of the City. The location of outdoor lighting zones in the City are per the adopted Outdoor Lighting Zones Map, dated September 2, 2005, and kept on file with the City Planning and Building Department.
- ***Section 15.28.015 Solar Water Heater Pre-plumbing (specific to Chula Vista)***. All new residential units shall include plumbing specifically designed to allow the later installation of a system which utilizes solar energy as the primary means of heating domestic potable water. No building permit shall be issued unless the requirements of this section and the Chula Vista Solar Water Heater Pre-Plumbing Installation Requirements are incorporated into the approved building plans.
- ***Section 15.24.065 Pre-wiring for Photovoltaic (specific to Chula Vista)***. All new residential units shall include electrical conduit specifically designed to allow the later installation of a photovoltaic (PV) system which utilizes solar energy as a means to provide electricity. No building permit shall be issued unless the requirements of this section and the Chula Vista Photovoltaic Pre-Wiring Installation Requirements are incorporated into the approved building plans.
- ***Section 15.28.020 Residential Graywater Stub-out (specific to Chula Vista)***. All new detached single-family dwellings and duplexes shall include a single-source clothes washer graywater outlet and an outside stub-out to allow the later installation of a clothes washer graywater irrigation system that complies with the requirements of Section 1602.1.1 of the 2013 California Plumbing Code. The outlet and stub-out shall be installed in accordance with the Chula Vista Clothes Washer Graywater Pre-Plumbing and Stub-Out for New Residential Construction or an equivalent alternate method and/or material approved by the Building Official.

City of Chula Vista Mandatory Construction and Demolition Debris Recycling Ordinance. Section 8.25.095 of the CVMC requires that 90 percent of inert materials and a minimum of 50 percent of all other materials be recycled and/or reused from certain covered projects. Covered projects include:

- Any project requiring a permit for demolition or construction, which has a project valuation of $20,000 or more.
- Housing subdivision construction or demolition and/or any sequenced development will be considered a project in its entirety and not a series of individual projects.

- Tenant improvements greater than 1,000 square feet but less than 10,000 square feet and individual single-family home construction, remodel, addition or renovation, shall submit a Waste Management Report only (no deposit required).
- All City projects.

Covered projects must submit a waste management plan to the Chula Vista Public Works Department, Environmental Services Division, which must be reviewed and approved prior to the issuance of a demolition or building permit. The waste management plan will indicate how the applicant will recycle and/or reuse 90 percent of inert materials and at least 50 percent of the remaining construction and demolition debris generated from the project.

City of Chula Vista Clean Transportation Energy Roadmap (2012). The Clean Transportation Energy Roadmap ("Roadmap") can serve as a resource for the City of Chula Vista as it continues to promote clean transportation measures, both in its municipal operations and in the community. The Roadmap identifies petroleum reduction measures and tools, specific to the City, that generally result in cost savings and benefits to the environment, including:

- An assessment of alternative fuel vehicles and fuel availability for the City's vehicle fleet.
- Commuter programs, including vanpools, carpools, and teleworking that the City could promote to its employees.
- Online tools to establish a baseline of petroleum consumed and GHGs emitted from employee commutes, as well as annual tracking tools.
- Smart growth and active transportation policies that enhance local walking and biking options.
- Outreach materials on Clean Transportation programs that can be shared with local residents, schools, and businesses.

The Roadmap also recognizes the significant steps that the City has taken already. Since 2000, Chula Vista has been implementing a Climate Action Plan that includes measures to reduce energy and fuel use at municipal facilities and throughout the community.

City of Chula Vista General Plan. The City of Chula Vista General Plan (City of Chula Vista 2005) includes various policies related to reducing GHG emissions (both directly and indirectly). Applicable policies include the following:

Land Use and Transportation Element

- **Policy LUT-23.1:** Encourage the use of bicycles and walking as alternatives to driving.

- **Policy LUT-23.2:** Foster the development of a system of inter-connecting bicycle routes throughout the City and region.
- **Policy LUT-23.5:** Provide linkages between bicycle facilities that utilize circulation element alignments and open space corridors.
- **Policy LUT-23.8:** Provide and maintain a safe and efficient system of sidewalks, trails, and pedestrian crossings.
- **Policy LUT-23.14:** Require new development projects to provide internal bikeway systems with connections to the citywide bicycle networks.

Environmental Element

- **Policy E-6.1:** Encourage compact development featuring a mix of uses that locate residential areas within reasonable walking distance to jobs, services, and transit.
- **Policy E-6.5:** Ensure that plans development to meet the City's energy demand use the least polluting strategies, wherever practical. Conservation, clean renewables, and clean distributed generation should be considered as part of the City's energy plan, along with larger natural gas-fired plants.
- **Policy E-6.7:** Encourage innovative energy conservation practices and air quality improvements in new development and redevelopment projects consistent with the City's Air Quality Improvement Plan Guidelines or its equivalent, pursuant to the City's Growth Management Program.
- **Policy E-6.8:** Support the use of alternative fuel transit, City fleet and private vehicles in Chula Vista.
- **Policy E-7.1:** Promote development of regulations and building design standards that maximize energy efficiency through appropriate site and building design and through the use of energy-efficient materials, equipment, and appliances.
- **Policy E-7.6:** Encourage the construction and operation of green buildings, considering such programs as the Leadership in Energy and Environmental Design (LEED) Green Building Rating System.
- **Policy E-7.8:** Ensure that residential and non-residential construction complies with all applicable City of Chula Vista energy efficiency measures and other green building measures that are in effect at the time of discretionary permit review and approval or building permit issuance, whichever is applicable.

- **Policy E-8.1:** Promote efforts to reduce waste, minimize the need for additional landfills, and provide economically and environmentally sound resource recovery, management, and disposal facilities.
- **Policy E-8.3:** Implement source reduction strategies, including curbside recycling, use of small collection facilities for recycling, and composting.

3.3 Thresholds of Significance

The State of California has developed guidelines to address the significance of climate change impacts based on Appendix G of the CEQA Guidelines, which provides guidance that a project would have a significant environmental impact if it would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Neither the State of California nor the SDAPCD has adopted emission-based thresholds of significance for GHG emissions under CEQA.

OPR's Technical Advisory titled *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review* states that "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to a significant, cumulative climate change impact" (OPR 2008). Furthermore, the advisory document states that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice" (OPR 2008).

An efficiency threshold sets a per capita emissions limit. The total emissions from a given project are summed and divided by a project's service population[7] (SP) to determine emissions per capita and are compared to the efficiency threshold. Efficiency thresholds have been proposed by various agencies and air districts including both the Bay Area Air Quality Management District (BAAQMD) and South Coast Air Quality Management District

7 Service population is defined as the number of residents plus the number of employees within the City.

(SCAQMD). The BAAQMD and SCAQMD have each developed an efficiency threshold of 6.6 MT CO_2E/SP for plan level developments. Additionally, the BAAQMD suggested a project level efficiency threshold of 4.6 MT CO_2E/SP, while the SCAQMD suggested a project level efficiency threshold of 4.8 MT CO_2E/SP. The fault in these proposed thresholds is that they rely on CARB's scoping plan reduction goal and statewide population for 2020. The California Supreme Court's decision on the *Center for Biological Diversity vs. California Department of Fish and Wildlife* (CBD vs. CDFW) determined project level analyses should not rely on statewide data. A more localized efficiency threshold must be developed based on the population at the City level. These thresholds were developed assuming compliance with AB 32 2020 goals.

To develop an efficiency threshold that would satisfy the requirements of CBD vs. CDFW and EO B-30-15, the City's 1990 emissions inventory, less 40%, must be divided by the City's 2030 population. Project level emissions can then be directly evaluated against a threshold based on local emission reduction goals and local population densities in accordance with the Court's decision on CBD vs. CDFW.

As provided in the City's *2012 Greenhouse Gas Emissions Inventory*, the City's 1990 GHG emissions inventory totals approximately 847,166 MT CO_2E. Consistent with EO B-30-15, the City's 2030 goal is 508,300 MT CO_2E (847,166 x [1-0.40]). Based on SANDAG Series 12 model from October 2011, the City's SP in 2030 is estimated at 389,979 (288,978 residents + 101,001 employees). Dividing the City's 2030 goal by the City's 2030 population results in an efficiency threshold of 1.3 MT CO_2E/SP, which was used to determine significance of the proposed project's GHG emissions. Notably, the efficiency threshold is based on out-of-date information. SANDAG Series 13 model from October 2013 has estimated a Chula Vista SP of 370,126 in 2020, and 426,224 in 2035. A linear growth progression could be used to estimate a 2030 SP of 407,525. Using this estimate, the efficiency threshold would be reduced to 1.25 MT CO_2E/SP.

3.4 Impact Analysis

This section evaluates the GHG emissions impacts associated with the proposed project. The City's significance criteria described in Section 3.3, Thresholds of Significance, were used to evaluate impacts associated with the construction and operation of the proposed project.

3.4.1 Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Construction Impacts

Construction of the proposed project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. GHG emissions associated with temporary construction activity were quantified using CalEEMod. A detailed depiction of the construction schedule—including information regarding phasing, equipment utilized during each phase, haul trucks, vendor trucks, and worker vehicles—is included in Section 1.3, Construction Assumptions and Methodology, of this report.

Table 16 shows the estimated annual GHG construction emissions associated with the proposed project.

Table 16
Estimated Annual Construction Greenhouse Gas Emissions

Activity	CO_2	CH_4	N_2O	CO_2E
	Metric Tons per Year			
2018				
Construction Activities	2,210.63	0.33	0.00	2,218.94
Rock Crushing	—	—	—	1,978.00
2019				
Construction Activities	1,093.29	0.11	0.00	1,096.02
Total	3,303.92	0.44	0.00	5,292.96

Notes: See Appendix A for detailed results.
MT = metric tons; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2E = carbon dioxide equivalent

Estimated annualized project-generated construction emissions would be approximately 176 MT CO_2E over a 30-year project life. However, since there is no established GHG threshold for construction, the evaluation of significance is discussed in the operational emissions analysis below.

Operational Impacts

Operation of the proposed project would result in GHG emissions from vehicular traffic, area sources (e.g., natural gas combustion and landscaping), electrical generation, water supply, and solid waste as described below.

Vehicular Traffic

The proposed project would generate GHG emissions through the vehicular traffic generated by the proposed project. GHG emissions associated with project-generated daily traffic were estimated using CalEEMod and were based on the proposed project's traffic report prepared by Fehr and Peers, which anticipates that the proposed project would result in a total of 2,950 trips per day[8] and an average trip length of 4.82 miles which would result in a daily VMT of 14,219 miles after the extension of Main Street (Fehr and Peers 2016).

CalEEMod default data, including temperature, trip characteristics, variable start information, and emissions factors were conservatively used for the model inputs (Section 1.4 Operational Assumptions and Methodology).

The proposed project would also provide pedestrian and bicycle infrastructure along Main Street and within project site. These signals, bicycle lanes, and planned sidewalks and crosswalks will connect the residential community to activity centers such as the Town Center planned in Village 8 West and the community park planned west of La Media Road at Santa Luna as well as transit service planned along La Media Road and Main Street. However, no bicycle lanes will be provided within the project site as the roads are designed to be low volume, low speed streets.

Area Sources

In addition to estimating mobile source emissions, CalEEMod was also used to estimate emissions from project area sources, and appliances, and landscape maintenance. Consumer product use and architectural coatings result in volatile organic compound emissions, which are analyzed in air quality analyses only, and result in little to no GHG emissions. Refer to Appendix A for additional information.

The default CalEEMod hearth data was updated to reflect no wood burning fireplaces. In addition, the CalEEMod default value for wood burning fireplaces was distributed into the natural gas and no fireplace and was based on the default proportion of how fireplaces were allocated. Default CalEEMod values for landscape maintenance equipment were used for the analysis.

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8 Notably, there is a slight discrepancy between the trip generation in the TIA and what is included in the CalEEMod outputs. The traffic analysis was based on older project plans and assumed a total of 75 single-family dwelling units and 275 apartments with 2,950 daily trip generation, whereas the current project plans include a reduction of single-family dwelling units to 73 and an increase in apartments to 277 with a daily trip generation of 2,946. The criteria air pollutant and GHG emissions analysis uses the trip rates and trip lengths described in the TIA, but updated the land use assumptions to match the revised project description.

Electrical Generation

The generation of electricity through combustion of fossil fuels typically results in emissions of CO_2 and to a smaller extent CH_4 and N_2O. Annual electricity emissions were estimated using the reported CO_2 emissions per kilowatt-hour for SDG&E as utilized in CalEEMod. Energy efficiency assumptions utilized in CalEEMod Version 2016.3.1 is based on 2013 Title 24 standards. The 2016 Title 24 standards will go effect January 1, 2017 and would be implemented as part of the proposed project. The 2016 Title 24 standards are 28% more efficient than the 2013 Title 24 standards for lighting, heating, cooling, ventilation, and water heating (CEC 2015).

Additionally, the proposed project scenario also takes into account the procurement of renewable energy by SDG&E to meet the required 33% RPS by 2020.

Natural Gas

CalEEMod was used to estimate emissions from natural gas combustion, using the default energy input ratios for Title 24 and non-Title 24 natural gas consumption, the natural gas energy intensity factors were updated to reflect the 2016 Title 24 standards.

Solid Waste

The proposed project would generate solid waste, and therefore, result in CO_2E emissions associated with landfill off-gassing. Solid waste generation was derived from the CalEEMod default rates for the proposed land uses and emission estimates associated with solid waste were estimated using CalEEMod. Pacific Waste Services serves the City and is responsible for the removal, conveyance and disposal of any non-recyclable waste. As provided in their Premier Refuse and Recycling Collection Program for the 21st Century presentation, their goal is to increase waste diversion from 34% to 50% within the City (CalRecycle 2016). The CalEEMod modeling conservatively assumes that the proposed project would meet a 34% reduction of waste disposed.

Water Supply and Wastewater

Water supplied to the proposed project requires the use of electricity. Accordingly, the supply, conveyance, treatment, and distribution of water would indirectly result in GHG emissions through use of electricity. The proposed project was assumed to use potable water for indoor use and recycled (i.e., reclaimed) water for outdoor use. For the project scenario, as provided in the Water Conservation Plan by Dexter Engineering, the proposed project would reduce water consumption by 42%. Utility emission factors consistent with the 33% RPS by 2020, were also assumed. Additional water reduction features for the proposed single family and multifamily residential land uses are estimated in the proposed project's Water Conservation Plan.

Table 17 shows the operational GHG emissions associated with the proposed project.

Table 17
Estimated Annual Operational Greenhouse Gas Emissions

Emission Source	CO_2	CH_4	N_2O	CO_2E
	Metric Tons per Year			
Area	279.92	0.01	0.01	281.67
Energy	630.96	0.03	0.01	634.16
Mobile	1,966.77	0.12	0.00	1,969.76
Solid Waste	28.55	1.69	0.00	70.73
Water and Wastewater	87.65	0.03	0.02	93.95
Amortized Construction Emissions	—	—	—	176.43
Total	2,993.85	1.96	0.04	3,226.70
Project Service Population	—	—	—	956
Service Person/Per Capita GHG Efficiency	—	—	—	3.4

Source: See Appendix A for detailed results.
Notes: Project emissions includes compliance with 2016 Title 24 standards, meeting 33% RPS, incorporation of water conservation features including 100% reclaimed water for outdoor use, 34% solid waste diversion rate, improving the pedestrian network, and providing traffic calming measures.
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2E = carbon dioxide equivalent

As shown in Table 17, the proposed project would result in an increase of 3,227 MT CO_2E per year relative to existing conditions. Based on the City's General Plan, a household size of 3.33 persons per single-family unit and 2.58 persons per multi-family unit was used to calculate the proposed project service population. With a service population of approximately 956 persons, the proposed project would result in per capita GHG emissions of approximately 3.4 MT CO_2E/SP. Implementation of mitigation measure MM-GHG-1 would minimize GHG emissions associated with project operations. However, approximately 61% of the project's annual GHG emissions are from mobile sources. Consequently, to reduce GHG emissions to a less than significant level, the project would need to reduce its total GHG emissions by approximately 62% to reduce the amount of GHG emissions generated by the proposed project below the City's efficiency threshold. Because the proposed project's service population-based emissions would be more than the City's proposed efficiency metric of 1.3 MT CO_2E/SP, GHG emissions would be considered **significant and unavoidable**.

3.4.2 Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The City of Chula Vista has developed a number of strategies and plans aimed at improving air quality while also addressing global climate change. In November 2002, Chula Vista adopted the CO_2 Reduction Plan to lower the community's major GHG emissions, strengthen the local economy, and improve the global environment. The proposed project would be compliant with all applicable action measures proposed within the Reduction Plan as shown in Table 18. In 2008, the City's CCWG comprised of residents, businesses, and community representatives completed adopted the established seven additional measures as a part of the Climate Mitigation Plan, which built on the previous Reduction Plan. In order for the City to meet their 2010 GHG reduction targets the mitigation measures included an analysis of each measure's funding needs, financing options, timeline, and performance criteria. Of the mitigation measures proposed in the Climate Mitigation Plan, most were applicable towards the City reducing GHG emissions. However, several of the mitigation measures would be applicable to the project including a requirement for new development to comply with the green building standard, implemented as an ordinance addition, and for projects to meet outdoor water conservation requirements. In 2011, the City completed its Climate Adaptation Strategies, which included an additional 11 strategies to be phased over the three following years. These strategies were developed to address climate change in relation to energy and water supply, public health, wildfires, ecosystem management, coastal infrastructure, and the economy. Most of the measures proposed within the Climate Adaptation Strategies require that the City evaluate the municipal code to address climate change issues therefore, are not directly applicable to the proposed project. In summary, the proposed project would not conflict with any of the measures developed by the City which would reduce GHG emissions.

Table 18
Compliance with Chula Vista CO_2-Reduction Plan

Action Measure	Project/Community Design Features	Describe How Project Design Will Implement CO_2 Reduction Action Measures
Measure 6 (Enhanced Pedestrian connections to Transit): Installation of walkways and crossings between bus stops and surrounding land uses.	Class II bicycle lanes in each direction and a buffered five foot pedestrian walkway on each side of the roadway on Main Street; 5 to 6 foot buffered pedestrian sidewalks on Village internal roadways and joint on-street parking/bicycle lanes in each direction on parkway residential roadways.	The Project will implement the design features which will enhance the pedestrian connection to transit stops located with the SPA Plan area and the planned local and Rapid Bus stops on Main Street.
Measure 7 (Increased Housing Density near Transit): General increase in land use and	High Density multi-family residential in neighborhoods of 11 to 18 dwelling units per acre.	The increased density on the project site is within ¼ mile of the planned local bus stop.

Table 18
Compliance with Chula Vista CO_2-Reduction Plan

Action Measure	Project/Community Design Features	Describe How Project Design Will Implement CO_2 Reduction Action Measures
zoning designations to reach an average of at least 14-18 dwelling units per net acre within ¼ mile of major transit facilities.		
Measure 8 (Site Design with Transit Orientation): Placement of buildings and circulation routes to emphasize transit rather than auto access; also includes bus turn-outs and other transit stop amenities.	Village 4 North SPA Transit Plan / Centrally-located local bus stop at Village Core; P.C. District Regulations – building setbacks.	The site design is located in proximity to a centrally located mixed use core with a transit stop accessible to most residents. The project will provide for pedestrian-scaled building frontages to encourage walking. Local bus stop shelters will be all-weather and provide seating.
Measure 9 (Increased Land Use Mix): Provide a greater dispersion/variety of land uses such as siting of neighborhood commercial uses in residential areas and inclusion of housing in commercial and light industrial areas.	Mixed Use Village Core in proximity to site.	The Village Core located in proximity to the site provides a mix of uses including office, commercial and park uses in a residential area, consistent with Measure 9.
Measure 10 (Reduced Commercial Parking Requirements): Lower parking space requirements; allowance for shared lots and shared parking; allowance for on-street spaces.	On street parking on Village internal roadways.	The project includes on-street parking spaces throughout the Village internal roadways and nearby Village Core which reduces the need for large, paved parking lots.
Measure 11 (Site Design with Pedestrian/bicycle Orientation): Placement of buildings and circulation routes to emphasize pedestrian and bicycle access without excluding autos; includes pedestrian benches, bike paths, and bike racks.	P.C. District Regulations – building setbacks	The building setback requirements in the PC District Regulations and Village Design Plan policies will provide for pedestrian-scaled building frontages to encourage walking and bicycling. Bike racks will be provided at parks as well as at the nearby elementary school and the mixed use commercial/retail center in the village core. Garages are discouraged in fronts of homes.

Table 18
Compliance with Chula Vista CO_2-Reduction Plan

Action Measure	Project/Community Design Features	Describe How Project Design Will Implement CO_2 Reduction Action Measures
Measure 12 (Bicycle Integration with Transit and Employment): Provide storage at major transit stops and employment areas. Encourage employers to provide showers at the place of employment near major transit nodes.	P.C. District Regulations – Bicycle storage	The P.C. District Regulations include requirements for bicycle storage and shower/changing facilities in nearby businesses such that future employees may bike to work.
Measure 13 (Bike Lanes, paths, and Routes): Continued implementation of the City's bicycle master plan. Emphasis is to be given to separate bike paths as opposed to striping bike lanes on streets.	Class II bicycle lanes in each direction and a buffered five foot pedestrian walkway on each side of the roadway on Main Street; 5 to 6 foot buffered pedestrian sidewalks on Village internal roadways and joint on-street parking/bicycle lanes in each direction on parkway residential roadways.	The project provides bike lanes and bike parking on project roadways.
Measure 14 (Energy Efficient Landscaping): Installation of shade trees for new single-family homes as part of an overall city-wide tree planting effort to reduce ambient temperatures, smog formation, energy use, and CO_2.	Otay Ranch Street Tree Program.	The Village 4 street sections provide for landscaped parkways with street trees. The Water Conservation Plan identifies appropriate tree which are water efficient.
Measure 15 (Solar Pool Heating): Mandatory building code requirement for solar heating of new pools or optional motorized insulated pool cover.	Compliance with Municipal Code	Any installation of a pool will comply with the City's Municipal Code.
Measure 16 (Traffic Signal & System Upgrades): Provide high-efficiency LED lamps or similar as approved by the City Engineer.	Compliance with City Program	All traffic signals will comply with the requirements of the City's Traffic Signal Program.
Measure 18 (Energy Efficient Building	Compliance with Municipal Code	All new construction will comply with the Municipal Code requirement to exceed Title 24 by 15%.

Table 18
Compliance with Chula Vista CO_2-Reduction Plan

Action Measure	Project/Community Design Features	Describe How Project Design Will Implement CO_2 Reduction Action Measures
Recognition Program): Reducing CO_2 emissions by applying building standards that exceed current Title 24 Energy Code requirements.		
Measure 20 (Increased Employment Density Near Transit): General increase in land-use and zoning designations to focus employment-generating land-uses within ¼ mile of major transit stops throughout the City.	Nearby Mixed-use Commercial/Retail and Office adjacent to local bus stop.	The project site is located nearby a commercial/retail and office center in the Village Core near the planned future local bus stop.

Source: City of Chula Vista 2000.
Notes: The first five measures are not included are intended for municipalities.

The proposed project would promote walkability and use of public transportation, which would serve to reduce GHG impacts. In addition, the General Plan contains the following policies which are applicable to the proposed project that would reduce emissions in the following categories:

- Motor vehicle emissions, through encouraging infill development and increasing pedestrian, transit, and bicycle usage: LUT-23.1, LUT-23.2, LUT-23.5, LUT-23.8, LUT-23.14, and E-6.1.
- Electricity and natural gas emissions through energy efficiency and green building: E-6.5, E-6.7, E-6.8, E-7.1, E-7.6, and E-7.8.
- Waste: E-8.1 and E-8.3.

As seen above, most of the applicable policies applicable to the proposed project are transportation based. Some of the notable policies which the proposed project would meet include promoting alternative methods of transportation, i.e. use of bicycles and pedestrian walkways and meeting the City's energy efficiency standards and other green building measures.

The Climate Change Scoping Plan, approved by CARB on December 12, 2008, provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. As such, the Scoping Plan is not directly applicable to specific projects. Moreover, the Final Statement of Reasons for the amendments to the CEQA Guidelines reiterates the statement in the Initial Statement of Reasons that "[t]he Scoping Plan may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan" (CNRA 2009). Under the Scoping Plan, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (hybrid, electric, and more fuel-efficient vehicles) and associated fuels, among others. However, Table 19 highlights measures that have been, or will be, developed under the Scoping Plan and the proposed project's consistency with Scoping Plan measures. To the extent that these regulations are applicable to the proposed project, its inhabitants, or uses, the proposed project would comply will all regulations adopted in furtherance of the Scoping Plan to the extent required by law.

Table 19
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Transportation Sector		
Advanced Clean Cars	T-1	The project's residents would purchase vehicles in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase.
Low Carbon Fuel Standard	T-2	Motor vehicles driven by the project's residents would use compliant fuels.
Regional Transportation-Related GHG Targets	T-3	The project's design is oriented around providing higher density residential land uses near transportation hubs. The project's location near mass transit services would reduce dependence on passenger vehicle trips and shorter trip lengths, which would reduce GHG emissions.
Vehicle Efficiency Measures 1. Tire Pressure 2. Fuel Efficiency Tire Program 3. Low-Friction Oil 4. Solar-Reflective Automotive Paint and Window Glazing	T-4	Motor vehicles driven by the project's residents would maintain proper tire pressure when their vehicles are serviced. The project's residents would replace tires in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase. Motor vehicles driven by the project's residents would use low-friction oils when their vehicles are serviced. The project's residents would purchase vehicles in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase.
Ship Electrification at Ports (Shore Power)	T-5	Not applicable.

Table 19
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Goods Movement Efficiency Measures 1. Port Drayage Trucks 2. Transport Refrigeration Units Cold Storage Prohibition 3. Cargo Handling Equipment, Anti-Idling, Hybrid, Electrification 4. Goods Movement Systemwide Efficiency Improvements 5. Commercial Harbor Craft Maintenance and Design Efficiency 6. Clean Ships 7. Vessel Speed Reduction	T-6	Not applicable.
Heavy-Duty Vehicle GHG Emission Reduction 1. Tractor-Trailer GHG Regulation 2. Heavy-Duty Greenhouse Gas Standards for New Vehicle and Engines (Phase I)	T-7	Not applicable.
Medium- and Heavy-Duty Vehicle Hybridization Voucher Incentive Project	T-8	Not applicable.
High-Speed Rail	T-9	Not applicable.
Electricity and Natural Gas Sector		
Energy Efficiency Measures (Electricity)	E-1	The project will comply with current Title 24, Part 6, of the California Code of Regulations energy efficiency standards for electrical appliances and other devices at the time of building construction.
Energy Efficiency (Natural Gas)	CR-1	The project will comply with current Title 24, Part 6, of the California Code of Regulations energy efficiency standards for natural gas appliances and other devices at the time of building construction.
Solar Water Heating (California Solar Initiative Thermal Program)	CR-2	The project would allow for active solar energy systems and promotes renewable energy technologies.
Combined Heat and Power	E-2	Not applicable.
Renewable Portfolios Standard (33% by 2020)	E-3	The electricity used by the project will benefit from reduced GHG emissions resulting from increased use of renewable energy sources.
SB 1 Million Solar Roofs (California Solar Initiative, New Solar Home Partnership, Public Utility Programs) and Earlier Solar Programs	E-4	This measure is to increase solar throughout California, which is being done by various electricity providers and existing solar programs. The project would allow for the use of solar.
Water Sector		
Water Use Efficiency	W-1	The project would use 100% reclaimed water for outdoor water use. Additionally, the project would incorporate water efficient fixtures and implement water efficient irrigation.

Table 19
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Water Recycling	W-2	The project would use 100% reclaimed water for outdoor water use.
Water System Energy Efficiency	W-3	This is applicable for the transmission and treatment of water, but it is not applicable for the project.
Reuse Urban Runoff	W-4	The project would use 100% reclaimed water for outdoor water use.
Renewable Energy Production	W-5	The proposed project would incorporate several water conservation features in order to reduce water consumption an d increase recycled water use.
Green Buildings		
1. State Green Building Initiative: Leading the Way with State Buildings (Greening New and Existing State Buildings)	GB-1	The project would be required to be constructed in compliance with state or local green building standards in effect at the time of building construction.
2. Green Building Standards Code (Greening New Public Schools, Residential and Commercial Buildings)	GB-1	The project would meet green building standards that are in effect at the time of design and construction.
3. Beyond Code: Voluntary Programs at the Local Level (Greening New Public Schools, Residential and Commercial Buildings)	GB-1	The project would be required to be constructed in compliance with local green building standards in effect at the time of building construction.
4. Greening Existing Buildings (Greening Existing Homes and Commercial Buildings)	GB-1	This is applicable for existing buildings only. It is not applicable for the project except as future standards may become applicable to existing buildings.
Industry Sector		
Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	I-1	Not applicable.
Oil and Gas Extraction GHG Emission Reduction	I-2	Not applicable.
GHG Emissions Reduction from Natural Gas Transmission and Distribution	I-3	Not applicable.
Refinery Flare Recovery Process Improvements	I-4	Not applicable.
Work with the local air districts to evaluate amendments to their existing leak detection and repair rules for industrial facilities to include methane leaks	I-5	Not applicable.
Recycling and Waste Management Sector		
Landfill Methane Control Measure	RW-1	Not applicable.
Increasing the Efficiency of Landfill Methane Capture	RW-2	Not applicable.
Mandatory Commercial Recycling	RW-3	During both construction and operation of the project, the project would comply with all state regulations related to solid

Table 19
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
		waste generation, storage, and disposal, including the California Integrated Waste Management Act, as amended. During construction, all wastes would be recycled to the maximum extent possible.
Increase Production and Markets for Compost and Other Organics	RW-3	Not applicable.
Anaerobic/Aerobic Digestion	RW-3	Not applicable.
Extended Producer Responsibility	RW-3	Not applicable (applicable to product designer and producers).
Environmentally Preferable Purchasing	RW-3	Not applicable (applicable to product designer and producers).
Forests Sector		
Sustainable Forest Target	F-1	Not applicable.
High GWP Gases Sector		
Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Servicing	H-1	The project's residents would be prohibited from performing air conditioning repairs and would be required to use professional servicing.
SF_6 Limits in Non-Utility and Non-Semiconductor Applications	H-2	Not applicable.
Reduction of Perfluorocarbons in Semiconductor Manufacturing	H-3	Not applicable.
Limit High GWP Use in Consumer Products	H-4	The project's residents would use consumer products that would comply with the regulations that are in effect at the time of manufacture.
Air Conditioning Refrigerant Leak Test During Vehicle Smog Check	H-5	Motor vehicles driven by the project's residents would comply with the leak test requirements during smog checks.
Stationary Equipment Refrigerant Management Program – Refrigerant Tracking/Reporting/Repair Program	H-6	Not applicable.
Stationary Equipment Refrigerant Management Program – Specifications for Commercial and Industrial Refrigeration	H-6	Not applicable.
SF_6 Leak Reduction Gas Insulated Switchgear	H-6	Not applicable.
Agriculture Sector		
Methane Capture at Large Dairies	A-1	Not applicable.

Source: CARB 2014.
Notes: CARB = California Air Resources Board; CCR = California Code of Regulations; GHG = greenhouse gas; GWP = global warming potential; LEED = Leadership in Energy and Environmental Design; SB = Senate Bill; SF6 = sulfur hexafluoride

Based on the analysis in Table 19, the proposed project would be consistent with the applicable strategies and measures in the Scoping Plan.

At the regional level, SANDAG's RTP/SCS has been adopted for the purpose of reducing GHG emissions attributable to passenger vehicles in the San Diego region. SANDAG recently adopted the next iteration of its RTP/SCS in accordance with statutorily-mandated timelines. More specifically, in October 2015, SANDAG adopted *San Diego Forward: The Regional Plan* (Regional Plan). Like the 2050 RTP/SCS, this planning document meets CARB's 2020 and 2035 reduction targets for the region. While the Regional Plan does not regulate land use or supersede the exercise of land use authority by SANDAG's member jurisdictions (i.e., the City), the Regional Plan is a relevant regional reference document for purposes of evaluating the intersection of land use and transportation patterns and the corresponding GHG emissions. The Regional Plan is not directly applicable to the project because the underlying purpose of the Regional Plan is to provide direction and guidance on future regional growth (i.e., the location of new residential and non-residential land uses) and transportation patterns throughout the City and greater San Diego County, as stipulated under SB 375. CARB has recognized that the approved Regional Plan is consistent with SB 375 (CARB 2015). The proposed project would develop residential land uses that is more walkable, transit-oriented, and compact. Furthermore, the average daily trip rate for the proposed project of 4.82 miles would be less than the regional average trip length of 5.8 miles. Therefore, the proposed project would not conflict with the applicable policy objectives of the Regional Plan.

Regarding consistency with SB 32 (goal of reducing GHG emissions to 40% below 1990 levels by 2030) and EO S-3-05 (goal of reducing GHG emissions to 80% below 1990 levels by 2050), there are no established protocols or thresholds of significance for that future year analysis. However, project-generated GHG emissions would exceed the efficiency threshold established in impact criterion 3.4.1, therefore, the proposed project would potentially conflict with the state's trajectory toward future GHG reductions. Since the specific path to compliance for the state with regards to the long-term goals will likely require development of technology or other changes that are not currently known or available, specific additional mitigation measures for the proposed project would be speculative and cannot be identified at this time.

Based on the preceding considerations, the proposed project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. While mitigation measure MM-GHG-1 would help reduce GHG emissions of the proposed project, however, most mitigation is not quantifiable and/or the extent to which some measures would apply to the project is unknown. The proposed project's GHG emissions would therefore result in a **significant and unavoidable** impact.

3.5 Mitigation Measures

MM-GHG-1 **Greenhouse Gas Emissions Reduction Measures.** The following GHG emissions reduction measures shall be implemented:

- Use of 100% reclaimed water for outdoor water use (project design feature)
- Use low-flow toilet and showers and faucets (project design feature)
- Use of low speed vehicles (LSV) as alternative modes of travel between the Otay Ranch Villages (project design feature)
- Provide preferential parking for carpool, shared, electric, and hydrogen vehicles.
- Exceed Title 24 Building Energy Efficiency Standards by 10%.
- Equip the pool(s) and spa(s) with active solar water heating systems.
- Implement energy-efficient design practices such as high-performance glazing, Energy Star compliant systems and appliances, radiant heat roof barriers, insulation on all pipes, programmable thermostats, solar access, and sealed ducts.
- Prohibit use of chlorofluorocarbon refrigerants.
- Minimize turf areas and encourage alternative ground covers.
- Use native species and drought tolerant species for a minimum of 50% of the ornamental plant palette in non-turf areas for to minimize water demand.
- Ensure recycling of construction debris and waste through administration by an on-site recycling coordinator and presence of recycling/separation areas.

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4 REFERENCES

24 CCR Part 11. 2013 California Green Building Standards Code (CALGreen). Sacramento, California: California Building Standards Commission. July 2013. ISBN 978-1-60983-462-3. http://codes.iccsafe.org/app/book/toc/2015/california/2013%20california%20green %20building% 20standards,%20supplement%20july%202015/index.html.

14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

42 U.S.C. 13201–13574. Title 42: The Public Health and Welfare; Chapter 134: Energy Policy.

42 U.S.C. 17001–17386. Title 42: The Public Health and Welfare; Chapter 152: Energy Independence and Security.

42 U.S.C. 7401–7671q. Title 42: The Public Health and Welfare; Chapter 85: Air Pollution Prevention and Control.

Atlantis Group. 2017. Draft Non-Renewable Energy Conservation Plan.

C2ES (Center for Climate and Energy Solutions). 2014. *President Obama's Climate Action Plan: One Year Later*. June 2014. Accessed October 2016. http://www.c2es.org/docUploads/climate-action-plan-one-year-later-7-15-14.pdf.

C2ES. 2016. *Achieving the United States' Intended Nationally Determined Contribution*. July 2016. Accessed October 2016. http://www.c2es.org/docUploads/achieving-us-indc.pdf.

CalRecycle (California Department of Resources, Recycling and Recovery). 2015. *AB 341 Report to the Legislature*. August 2015.

CalRecycle. 2016. Premier Refuse and Recycling Collection Program for the 21st Century Pacific Waste in partnership with the City of Chula Vista. www.calrecycle.ca.gov/LGCentral/Library/SingleStream/ChulaVista.ppt.

CAPCOA (California Air Pollution Control Officers Association). 2008. *CEQA and Climate Change Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act.* http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf.

CAPCOA. 2009. *Health Risk Assessments for Proposed Land Uses.* http://www.capcoa.org/wp-content/uploads/downloads/2010/05/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf.

CAPCOA. 2010. *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures.* August 2010.

Caltrans (California Department of Transportation). 1997. *Transportation Project-Level Carbon Monoxide Protocol*. Appendix B, Table B.2. Prepared by the Institute of Transportation Studies, University of California, Davis. Revised December 1997.

Caltrans. 1998a. CALINE4 - A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadways. Version 1.32. Written by Sonoma Technology, Inc. Petaluma, CA. Sponsored by the University of California, Davis Institute of Transportation Studies and Caltrans. http://www.dot.ca.gov/hq/InfoSvcs/EngApps/.

Caltrans. 1998b. *User's Guide for CL4: A User-Friendly Interface for the CALINE4 Model for Transportation Project Impact Assessments*. http://www.dot.ca.gov/hq/env/air/documents/CL4Guide.pdf.

CARB (California Air Resources Board). 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October 2000. http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf.

CARB. 2004. 2004 Revision to the California State Implementation Plan for Carbon Monoxide. Updated Maintenance Plan for Ten Federal Planning Areas. Table 2, Statewide CO Emission Trends, and Table 3, Total CO Emissions in Each Maintenance Area – San Diego. July 22, 2004. Accessed April 29, 2015. http://www.arb.ca.gov/planning/sip/co/final_2004_co_plan_update.pdf.

CARB. 2008. *Climate Change Proposed Scoping Plan: A Framework for Change*. October, approved December 12, 2008. http://www.arb.ca.gov/cc/scopingplan/document/psp.pdf.

CARB. 2011. California's Advanced Clean Cars Program. https://www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/consumer_acc.htm.

CARB. 2012. "News Release: California Air Resources Board Approves Advanced Clean Car Rules." January 27, 2012. Accessed October 2016. https://www.arb.ca.gov/newsrel/newsrelease.php?id=282.

CARB. 2014. First Update to the Climate Change Scoping Plan: Building on the Framework. May 2014. http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

CARB. 2015. Executive Order G-15-075. San Diego Association of Governments (SANDAG), Sustainable Communities Strategy (SCS). CARB Acceptance of GHG Quantification Determination. December 2015.

CARB. 2016a. "Glossary of Air Pollutant Terms". Accessed October 12, 2016. http://www.arb.ca.gov/html/gloss.htm.

CARB. 2016b. "Ambient Air Quality Standards." May 4, 2016. Accessed at: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

CARB. 2016c. "Area Designation Maps/State and National." Last updated May 5, 2016. http://www.arb.ca.gov/desig/adm/adm.htm.

CARB. 2016d. "iADAM Air Quality Data Statistics." Accessed October 12, 2016. http://arb.ca.gov/adam.

CARB. 2016e. "California Greenhouse Gas Inventory for 2000-2014." March 30, 2016. Accessed October 2016. https://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_2000-14.pdf.

CARB. 2016f. Timeline of AB 32 Scoping Plan Activities. Last updated September 7, 2016. https://www.arb.ca.gov/cc/scopingplan/timeline.htm.

CARB. 2016g. *Short-Lived Climate Pollutant Reduction Strategy*. https://www.arb.ca.gov/cc/shortlived/concept_paper.pdf.

CARB. 2017. The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target. Accessed January 2017. https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf.

CAT (California Climate Action Team). 2006. *Final 2006 Climate Action Team Report to the Governor and Legislature*. Sacramento, California: CAT. March 2006.

CAT. 2010a. *Climate Action Team Report to Governor Schwarzenegger and the California Legislature*. Sacramento, California: CAT. December 2010. Accessed January 2015. http://www.energy.ca.gov/2010publications/CAT-1000-2010-005/CAT-1000-2010-005.PDF.

CAT. 2010b. *Climate Action Team Biennial Report.* California Environmental Protection Agency, Climate Action Team. April 2010. Accessed October 2016. http://www.energy.ca.gov/2010publications/CAT-1000-2010-004/CAT-1000-2010-004.PDF.

CCCC (California Climate Change Center). 2006. *Our Changing Climate: Assessing the Risks to California*. CEC-500-2006-077. July 2006. Accessed February 2014. http://www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF.

CCCC. 2012. *Our Changing Climate 2012: Vulnerability & Adaptation to the Increasing Risks from Climate Change in California*. July 2012. http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf.

CEC (California Energy Commission). 2012. "New Title 24 Standards Will Cut Residential Energy Use by 25 Percent, Save Water, and Reduce Greenhouse Gas Emissions." Released July 1, 2014. http://www.energy.ca.gov/releases/2014_releases/2014-07-01_new_title24_standards_nr.html.

CEC. 2015. "2016 Building Efficiency Standards Adoption Hearing Presentation." June 2015. Accessed August 2016. http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2015-06-10_hearing/2015-06-10_Adoption_Hearing_Presentation.pdf#page=8.

City of Chula Vista. 2000. CO_2 Reduction Plan.

City of Chula Vista. 2005. City of Chula Vista General Plan. Amended March 2015.

City of Chula Vista. 2013. City of Chula Climate Action Plan Implementation Progress Report.

City of Chula Vista. 2014. Climate Change Working Group 2014 Climate Action Plan Update - Recommendations.

CNRA (California Natural Resources Agency). 2009. *2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008.* Accessed August 2016. http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf.

CNRA. 2014. Safeguarding California: Reducing Climate Risk. An update to the 2009 California Climate Adaptation Strategy. http://resources.ca.gov/docs/climate/Final_Safeguarding_CA_Plan_July_31_2014.pdf.

County of San Diego. 2007. Guidelines for Determining Significance and Report and Format and Content Requirements – Air Quality. Land Use and Environment Group. Department of Planning and Land Use. Department of Public Works. March 19, 2007.

County of San Diego. 2011. *County of San Diego General Plan: A Plan for Growth, Conservation, and Sustainability*. August 2011. Accessed October 2016. http://www.sandiegocounty.gov/content/sdc/pds/generalplan.html.

Dexter Wilson Engineering, Inc. 2016. Otay Ranch Village 4 South II.8 Water Conservation.

EOP (Executive Office of the President). 2013. *The President's Climate Action Plan*. https://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf.

EPA (U.S. Environmental Protection Agency). 1980. "Explosives Detonation." Section 13.3 in *Compilation of Air Pollutant Emission Factors*. Update to 5th ed. AP-42. Research Triangle Park, North Carolina: EPA; Office of Air and Radiation; Office of Air Quality Planning and Standards. February 1980 (Reformatted January 1995). http://www.epa.gov/ttn/chief/ap42/ch13/index.html.

EPA. 1998. "Western Surface Coal Mining." Section 11.9 in *Compilation of Air Pollutant Emission Factors*. Update to 5th ed. AP-42. Research Triangle Park, North Carolina: EPA; Office of Air and Radiation; Office of Air Quality Planning and Standards. October 1998). http://www.epa.gov/ttn/chief/ap42/ch11/index.html

EPA. 2004. "Crushed Stone Processing and Pulverized Mineral Processing." Section 11.19.2 of *Compilation of Air Pollutant Emission Factors.* Update to 5th ed. AP-42. Research Triangle Park, North Carolina: EPA; Office of Air and Radiation; Office of Air Quality Planning and Standards. August 2004. http://www.epa.gov/ttn/chief/ap42/ch11/index.html

EPA. 2006. "Aggregate Handling and Storage Piles." Chap. 13.2.4 in *Compilation of Air Pollutant Emission Factors. Vol. 1, Stationary Point and Area Sources*. Update to 5th ed. AP-42. Research Triangle Park, North Carolina: EPA, Office of Air and Radiation, Office of Air Quality Planning and Standards. November 2006. http://www.epa.gov/ttn/chief/ap42/ch13/index.html.

EPA. 2016a. "Criteria Air Pollutants" Last updated October 19, 2016. https://www.epa.gov/criteria-air-pollutants.

EPA. 2016b. "Region 9: Air Quality Analysis, Air Quality Maps." Last updated April 27, 2016. http://www.epa.gov/region9/air/maps/.

EPA. 2016c. "AirData: Access to Air Pollution Data." Last updated September 14, 2016. https://www.epa.gov/outdoor-air-quality-data/monitor-values-report.

EPA. 2016d. "Glossary of Climate Change Terms." August 9, 2016. Accessed August 2016. https://www3.epa.gov/climatechange/glossary.html.

EPA. 2016e. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014* EPA 430-R-16-002. Washington, D.C.: EPA. April 15, 2016. Accessed October 2016. https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf.

EPA. 2016f. "Learn About Smartway." Last updated September 16, 2016. https://www.epa.gov/smartway/learn-about-smartway.

EPA and NHTSA (Department of Transportation's National Highway Traffic Safety Administration). 2016. Regulations and Standards: Heavy-Duty. EPA and DOT Finalize Greenhouse Gas and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles. Last updated on August 30, 2016. https://www3.epa.gov/otaq/climate/regs-heavy-duty.htm.

Fehr and Peers. 2016. Otay Ranch Village 4 South Draft Final TIA.

IPCC (Intergovernmental Panel on Climate Change). 2007. *Climate Change 2007: The Physical Science Basis*, Summary for Policymakers. http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4_SPM_PlenaryApproved.pdf.

IPCC (Intergovernmental Panel on Climate Change). 2014. "Summary for Policymakers." In *Climate Change 2014 Synthesis Report.* Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the IPCC. Edited by The Core Writing Team, R.K. Pachauri, and L. Meyer. A Report of the IPCC. Geneva, Switzerland. http://www.ipcc.ch/report/ar5/syr/.

National Climatic Data Center. 2015. "Global Warming Frequently Asked Questions." Asheville, North Carolina: National Climatic Data Center. Accessed January 2015. http://lwf.ncdc.noaa.gov/oa/climate/globalwarming.html.

OPR (Governor's Office of Planning and Research). 2016. *Global Climate Leadership Memorandum of Understanding (MOU).* Accessed October 2016. http://under2mou.org/wp-content/uploads/2015/04/Under-2-MOU-English.pdf.

Otay Ranch GDP. 1993. *Otay Ranch General Development Plan*. Adopted by County of San Diego Board of Supervisors. Amended May 26, 2015.

SANDAG (San Diego Association of Governments). 2015. San Diego Forward: The Regional Plan. http://www.sdforward.com/pdfs/RP_final/The%20Plan%20-%20combined.pdf.

SCAQMD (South Coast Air Quality Management District). 2015. http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2.

SDAPCD (San Diego Air Pollution Control District). 1969. Rules and Regulations. Regulation IV. Prohibitions. Rule 51. Nuisance. Effective January 1, 1969. http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Rules_and_Regulations/Prohibitions/APCD_R50-1-51.pdf.

SDAPCD. 2005. Measures to Reduce Particulate Matter in San Diego County. http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Air%20Quality%20Planning/PM-Measures.pdf.

SDAPCD. 2009. Rules and Regulations. Regulation IV. Prohibitions. Rule 55. Fugitive Dust. Adopted June 24, 2009; effective December 24, 2009. http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Rules_and_Regulations/Prohibitions/APCD_R55.pdf.

SDAPCD. 2014. Air Toxics “Hot Spots” Program Report for San Diego County.

SDAPCD. 2015. Rules and Regulations. Regulation IV. Prohibitions. Rule 67.0.1. Architectural Coatings. Revised June 24, 2015. http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Rules_and_Regulations/Prohibitions/APCD_R67-0-1.pdf.

SDAPCD. 2016a. *2016 Revision of the Regional Air Quality Strategy for San Diego County*.

SDAPCD. 2016b. *2008 Eight-hour Ozone Attainment Plan for San Diego County*.

Rehm, D. 2017. Email communication between D. Rehm (Hunsaker & Associates San Diego, Inc.) and Brian Grover (Dudek). April 27, 2017.

WRCC (Western Regional Climate Center). 2016. Chula Vista, CA (041758), Monthly Average of Minimum Daily Temperature. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca1758. Accessed October 31, 2016.

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APPENDIX A

CalEEMod Version 2016.3.1 Modeling and Estimated Emissions

CalEEMod Version: CalEEMod.2016.3.1

Date: 3/6/2017 10:08 AM

Otay Ranch Village 4 - San Diego County, Annual

Otay Ranch Village 4

San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	14.08	Acre	14.08	613,324.80	0
Other Non-Asphalt Surfaces	117.22	Acre	117.22	0.00	0
Apartments High Rise	117.00	Dwelling Unit	6.66	117,000.00	335
Apartments Mid Rise	160.00	Dwelling Unit	12.53	160,000.00	458
Single Family Housing	73.00	Dwelling Unit	15.54	131,400.00	209

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2020
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	536.36	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Otay Ranch Village 4 Project. San Diego County (San Diego Air Basin). CO2 intensity factor update for effect of 33% RPS.

Land Use - Project includes 73 single family residences and 277 multi-family residences on approximately 34.73 acres. Remainder of the 166.02-acre site would be for CPF (1.60 acres), roadways (12.48 acres), open space (19.73 acres), and MSCP (97.49 acres).

Construction Phase - Construction would begin January 2018 and would be completed by November 2019.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Trips and VMT - Rounded trips. Update haul trip length to reflect distance to quarry.

Grading - Export of 260,534 cubic yards of soil.

Architectural Coating - Comply with SDAPCD Rule 67.0.1.

Vehicle Trips - 8 trips/du for apartments and 10 trips/du for single-family. Updated trip lengths to 4.82 miles. Adjusted all trips to primary to match VMT of TIA.

Woodstoves - All gas fireplaces.

Area Coating - Comply with SDAPCD Rule 67.0.1.

Water And Wastewater - 100% aerobic.

Construction Off-road Equipment Mitigation - Water twice daily.

Mobile Land Use Mitigation - Neighborhood enhancements.

Energy Mitigation - Exceed 2013 Title 24 by 28% to reflect compliance with 2016 Title 24 standards.

Water Mitigation - per Dexter Wilson, March 2015 - 100% recycled water for irrigation

Waste Mitigation - 34% waste diversion per Pacific Waste Services (Goals for 21st Century Collection Program).

Operational Off-Road Equipment - Default

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Parking	250	50
tblAreaCoating	Area_EF_Residential_Exterior	250	100
tblAreaCoating	Area_EF_Residential_Interior	250	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	20
tblConstructionPhase	NumDays	220.00	86.00
tblConstructionPhase	NumDays	3,100.00	261.00
tblConstructionPhase	NumDays	310.00	152.00
tblConstructionPhase	NumDays	310.00	23.00
tblConstructionPhase	NumDays	220.00	66.00
tblConstructionPhase	PhaseEndDate	4/2/2020	11/28/2019
tblConstructionPhase	PhaseEndDate	9/2/2019	10/31/2019
tblConstructionPhase	PhaseEndDate	12/3/2019	12/31/2018
tblConstructionPhase	PhaseStartDate	12/4/2019	8/1/2019
tblConstructionPhase	PhaseStartDate	9/1/2018	11/1/2018
tblConstructionPhase	PhaseStartDate	9/3/2019	10/1/2018
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	64.35	115.00
tblFireplaces	NumberGas	88.00	160.00
tblFireplaces	NumberGas	40.15	75.00
tblFireplaces	NumberNoFireplace	11.70	0.00
tblFireplaces	NumberNoFireplace	16.00	0.00
tblFireplaces	NumberNoFireplace	7.30	0.00
tblFireplaces	NumberWood	40.95	0.00

tblFireplaces	NumberWood	56.00	0.00
tblFireplaces	NumberWood	25.55	0.00
tblFleetMix	FleetMixLandUseSubType	Other Asphalt Surfaces	Apartments High Rise
tblFleetMix	FleetMixLandUseSubType	Other Non-Asphalt Surfaces	Apartments Mid Rise
tblFleetMix	FleetMixLandUseSubType	Apartments High Rise	Other Asphalt Surfaces
tblFleetMix	FleetMixLandUseSubType	Apartments Mid Rise	Other Non-Asphalt Surfaces
tblGrading	MaterialExported	0.00	260,534.00
tblLandUse	BuildingSpaceSquareFeet	5,106,103.20	0.00
tblLandUse	LandUseSquareFeet	5,106,103.20	0.00
tblLandUse	LotAcreage	1.89	6.66
tblLandUse	LotAcreage	4.21	12.53
tblLandUse	LotAcreage	23.70	15.54
tblProjectCharacteristics	CO2IntensityFactor	720.49	536.36
tblProjectCharacteristics	OperationalYear	2018	2020
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripNumber	32,567.00	32,568.00
tblTripsAndVMT	WorkerTripNumber	15.00	16.00
tblTripsAndVMT	WorkerTripNumber	483.00	484.00
tblTripsAndVMT	WorkerTripNumber	97.00	98.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	7.50	4.82
tblVehicleTrips	HO_TL	7.50	4.82
tblVehicleTrips	HO_TL	7.50	4.82
tblVehicleTrips	HS_TL	7.30	4.82
tblVehicleTrips	HS_TL	7.30	4.82
tblVehicleTrips	HS_TL	7.30	4.82

tblVehicleTrips	HW_TL	10.80	4.82
tblVehicleTrips	HW_TL	10.80	4.82
tblVehicleTrips	HW_TL	10.80	4.82
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.98	8.00
tblVehicleTrips	ST_TR	6.39	8.00
tblVehicleTrips	ST_TR	9.91	10.00
tblVehicleTrips	SU_TR	3.65	8.00
tblVehicleTrips	SU_TR	5.86	8.00
tblVehicleTrips	SU_TR	8.62	10.00
tblVehicleTrips	WD_TR	4.20	8.00
tblVehicleTrips	WD_TR	6.65	8.00
tblVehicleTrips	WD_TR	9.52	10.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00

tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	5.85	5.75
tblWoodstoves	NumberCatalytic	3.65	3.75
tblWoodstoves	NumberNoncatalytic	5.85	5.75
tblWoodstoves	NumberNoncatalytic	3.65	3.75
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.6873	8.5623	4.7713	0.0109	0.9129	0.3007	1.2136	0.3541	0.2775	0.6316	0.0000	1,009.172 9	1,009.1729	0.2372	0.0000	1,015.103 1
2019	2.3743	4.4369	4.1242	0.0119	0.5567	0.1625	0.7192	0.1502	0.1533	0.3035	0.0000	1,093.293 8	1,093.2938	0.1091	0.0000	1,096.022 3
Maximum	**2.3743**	**8.5623**	**4.7713**	**0.0119**	**0.9129**	**0.3007**	**1.2136**	**0.3541**	**0.2775**	**0.6316**	**0.0000**	**1,093.293 8**	**1,093.2938**	**0.2372**	**0.0000**	**1,096.022 3**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.6873	8.5623	4.7713	0.0109	0.4854	0.3007	0.7861	0.1795	0.2775	0.4570	0.0000	1,009.172 1	1,009.1721	0.2372	0.0000	1,015.102 4
2019	2.3743	4.4369	4.1242	0.0119	0.5567	0.1625	0.7192	0.1502	0.1533	0.3035	0.0000	1,093.293 5	1,093.2935	0.1091	0.0000	1,096.022 0
Maximum	**2.3743**	**8.5623**	**4.7713**	**0.0119**	**0.5567**	**0.3007**	**0.7861**	**0.1795**	**0.2775**	**0.4570**	**0.0000**	**1,093.293 5**	**1,093.2935**	**0.2372**	**0.0000**	**1,096.022 0**

	ROG	**NOx**	**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**	**29.09**	**0.00**	**22.12**	**34.62**	**0.00**	**18.67**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2018	3-31-2018	2.8592	2.8592
2	4-1-2018	6-30-2018	2.9151	2.9151
3	7-1-2018	9-30-2018	0.9931	0.9931
4	10-1-2018	12-31-2018	1.7203	1.7203
5	1-1-2019	3-31-2019	1.4421	1.4421
6	4-1-2019	6-30-2019	1.4434	1.4434
7	7-1-2019	9-30-2019	2.4365	2.4365
		Highest	2.9151	2.9151

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	1.9060	0.2682	2.7099	1.6600e-003		0.0336	0.0336		0.0336	0.0336	0.0000	279.9249	279.9249	9.4300e-003	5.0500e-003	281.6667
Energy	0.0245	0.2090	0.0890	1.3300e-003		0.0169	0.0169		0.0169	0.0169	0.0000	683.4063	683.4063	0.0285	9.3800e-003	686.9126
Mobile	0.8105	3.3099	8.2343	0.0242	1.9480	0.0249	1.9729	0.5217	0.0233	0.5451	0.0000	2,230.5692	2,230.5692	0.1318	0.0000	2,233.8648
Waste						0.0000	0.0000		0.0000	0.0000	43.2594	0.0000	43.2594	2.5566	0.0000	107.1733
Water						0.0000	0.0000		0.0000	0.0000	8.0681	111.0981	119.1662	0.0338	0.0188	125.6095
Total	**2.7409**	**3.7871**	**11.0332**	**0.0272**	**1.9480**	**0.0754**	**2.0234**	**0.5217**	**0.0738**	**0.5955**	**51.3275**	**3,304.9985**	**3,356.3259**	**2.7601**	**0.0332**	**3,435.2269**

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	1.9060	0.2682	2.7099	1.6600e-003		0.0336	0.0336		0.0336	0.0336	0.0000	279.9249	279.9249	9.4300e-003	5.0500e-003	281.6667
Energy	0.0198	0.1694	0.0721	1.0800e-003		0.0137	0.0137		0.0137	0.0137	0.0000	630.9604	630.9604	0.0273	8.4600e-003	634.1633
Mobile	0.8053	3.2764	8.1239	0.0238	1.9091	0.0245	1.9335	0.5113	0.0229	0.5342	0.0000	2,189.8713	2,189.8713	0.1300	0.0000	2,193.1199
Waste						0.0000	0.0000		0.0000	0.0000	28.5512	0.0000	28.5512	1.6873	0.0000	70.7344
Water						0.0000	0.0000		0.0000	0.0000	8.0681	79.5847	87.6527	0.0321	0.0184	93.9484
Total	**2.7312**	**3.7140**	**10.9059**	**0.0265**	**1.9091**	**0.0717**	**1.9808**	**0.5113**	**0.0702**	**0.5815**	**36.6193**	**3,180.3412**	**3,216.9605**	**1.8861**	**0.0320**	**3,273.6327**

	ROG	NOx	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	0.36	1.93	1.15	2.57	2.00	4.83	2.11	2.00	4.90	2.36	28.66	3.77	4.15	31.67	3.82	4.70

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2018	7/31/2018	5	152	
2	Infrastructure	Grading	8/1/2018	8/31/2018	5	23	
3	Paving	Paving	10/1/2018	12/31/2018	5	66	
4	Building Construction	Building Construction	11/1/2018	10/31/2019	5	261	
5	Architectural Coating	Architectural Coating	8/1/2019	11/28/2019	5	86	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 380

Acres of Paving: 131.3

Residential Indoor: 827,010; Residential Outdoor: 275,670; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Infrastructure	Excavators	2	8.00	158	0.38
Infrastructure	Graders	1	8.00	187	0.41

Infrastructure	Rubber Tired Dozers	1	8.00	247	0.40
Infrastructure	Scrapers	2	8.00	367	0.48
Infrastructure	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	1	7.00	231	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
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
Grading	8	20.00	0.00	32,568.00	10.80	7.30	1.00	LD_Mix	HDT_Mix	HHDT
Infrastructure	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	16.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	484.00	138.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	98.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Grading - 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					
Fugitive Dust					0.6775	0.0000	0.6775	0.2761	0.0000	0.2761	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3869	4.5237	2.6668	4.7100e-003		0.2002	0.2002		0.1842	0.1842	0.0000	430.5286	430.5286	0.1340	0.0000	433.8794
Total	**0.3869**	**4.5237**	**2.6668**	**4.7100e-003**	**0.6775**	**0.2002**	**0.8776**	**0.2761**	**0.1842**	**0.4603**	**0.0000**	**430.5286**	**430.5286**	**0.1340**	**0.0000**	**433.8794**

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	0.0418	1.8341	0.3141	2.2000e-003	0.0143	2.5800e-003	0.0168	3.9500e-003	2.4600e-003	6.4100e-003	0.0000	216.3938	216.3938	0.0391	0.0000	217.3706
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-003	5.1400e-003	0.0493	1.3000e-004	0.0122	9.0000e-005	0.0123	3.2400e-003	8.0000e-005	3.3200e-003	0.0000	11.7310	11.7310	4.0000e-004	0.0000	11.7411
Total	**0.0483**	**1.8392**	**0.3634**	**2.3300e-003**	**0.0265**	**2.6700e-003**	**0.0291**	**7.1900e-003**	**2.5400e-003**	**9.7300e-003**	**0.0000**	**228.1248**	**228.1248**	**0.0395**	**0.0000**	**229.1118**

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					0.3049	0.0000	0.3049	0.1243	0.0000	0.1243	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3869	4.5237	2.6668	4.7100e-003		0.2002	0.2002		0.1842	0.1842	0.0000	430.5281	430.5281	0.1340	0.0000	433.8788
Total	**0.3869**	**4.5237**	**2.6668**	**4.7100e-003**	**0.3049**	**0.2002**	**0.5050**	**0.1243**	**0.1842**	**0.3084**	**0.0000**	**430.5281**	**430.5281**	**0.1340**	**0.0000**	**433.8788**

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	0.0418	1.8341	0.3141	2.2000e-003	0.0143	2.5800e-003	0.0168	3.9500e-003	2.4600e-003	6.4100e-003	0.0000	216.3938	216.3938	0.0391	0.0000	217.3706
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-003	5.1400e-003	0.0493	1.3000e-004	0.0122	9.0000e-005	0.0123	3.2400e-003	8.0000e-005	3.3200e-003	0.0000	11.7310	11.7310	4.0000e-004	0.0000	11.7411
Total	**0.0483**	**1.8392**	**0.3634**	**2.3300e-003**	**0.0265**	**2.6700e-003**	**0.0291**	**7.1900e-003**	**2.5400e-003**	**9.7300e-003**	**0.0000**	**228.1248**	**228.1248**	**0.0395**	**0.0000**	**229.1118**

3.3 Infrastructure - 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					
Fugitive Dust					0.0997	0.0000	0.0997	0.0414	0.0000	0.0414	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0585	0.6845	0.4035	7.1000e-004		0.0303	0.0303		0.0279	0.0279	0.0000	65.1458	65.1458	0.0203	0.0000	65.6528
Total	**0.0585**	**0.6845**	**0.4035**	**7.1000e-004**	**0.0997**	**0.0303**	**0.1300**	**0.0414**	**0.0279**	**0.0692**	**0.0000**	**65.1458**	**65.1458**	**0.0203**	**0.0000**	**65.6528**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.8000e-004	7.8000e-004	7.4700e-003	2.0000e-005	1.8400e-003	1.0000e-005	1.8600e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.7751	1.7751	6.0000e-005	0.0000	1.7766
Total	**9.8000e-004**	**7.8000e-004**	**7.4700e-003**	**2.0000e-005**	**1.8400e-003**	**1.0000e-005**	**1.8600e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.7751**	**1.7751**	**6.0000e-005**	**0.0000**	**1.7766**

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					0.0449	0.0000	0.0449	0.0186	0.0000	0.0186	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0585	0.6845	0.4035	7.1000e-004		0.0303	0.0303		0.0279	0.0279	0.0000	65.1457	65.1457	0.0203	0.0000	65.6527
Total	**0.0585**	**0.6845**	**0.4035**	**7.1000e-004**	**0.0449**	**0.0303**	**0.0752**	**0.0186**	**0.0279**	**0.0465**	**0.0000**	**65.1457**	**65.1457**	**0.0203**	**0.0000**	**65.6527**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.8000e-004	7.8000e-004	7.4700e-003	2.0000e-005	1.8400e-003	1.0000e-005	1.8600e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.7751	1.7751	6.0000e-005	0.0000	1.7766
Total	**9.8000e-004**	**7.8000e-004**	**7.4700e-003**	**2.0000e-005**	**1.8400e-003**	**1.0000e-005**	**1.8600e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.7751**	**1.7751**	**6.0000e-005**	**0.0000**	**1.7766**

3.4 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0542	0.5782	0.4883	7.5000e-004		0.0316	0.0316		0.0290	0.0290	0.0000	68.6784	68.6784	0.0214	0.0000	69.2129
Paving	0.0184					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0727**	**0.5782**	**0.4883**	**7.5000e-004**		**0.0316**	**0.0316**		**0.0290**	**0.0290**	**0.0000**	**68.6784**	**68.6784**	**0.0214**	**0.0000**	**69.2129**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2600e-003	1.7900e-003	0.0171	5.0000e-005	4.2300e-003	3.0000e-005	4.2700e-003	1.1300e-003	3.0000e-005	1.1500e-003	0.0000	4.0750	4.0750	1.4000e-004	0.0000	4.0785
Total	**2.2600e-003**	**1.7900e-003**	**0.0171**	**5.0000e-005**	**4.2300e-003**	**3.0000e-005**	**4.2700e-003**	**1.1300e-003**	**3.0000e-005**	**1.1500e-003**	**0.0000**	**4.0750**	**4.0750**	**1.4000e-004**	**0.0000**	**4.0785**

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	0.0542	0.5782	0.4883	7.5000e-004		0.0316	0.0316		0.0290	0.0290	0.0000	68.6783	68.6783	0.0214	0.0000	69.2128
Paving	0.0184					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0727**	**0.5782**	**0.4883**	**7.5000e-004**		**0.0316**	**0.0316**		**0.0290**	**0.0290**	**0.0000**	**68.6783**	**68.6783**	**0.0214**	**0.0000**	**69.2128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2600e-003	1.7900e-003	0.0171	5.0000e-005	4.2300e-003	3.0000e-005	4.2700e-003	1.1300e-003	3.0000e-005	1.1500e-003	0.0000	4.0750	4.0750	1.4000e-004	0.0000	4.0785
Total	**2.2600e-003**	**1.7900e-003**	**0.0171**	**5.0000e-005**	**4.2300e-003**	**3.0000e-005**	**4.2700e-003**	**1.1300e-003**	**3.0000e-005**	**1.1500e-003**	**0.0000**	**4.0750**	**4.0750**	**1.4000e-004**	**0.0000**	**4.0785**

3.5 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	0.0576	0.5029	0.3780	5.8000e-004		0.0323	0.0323		0.0303	0.0303	0.0000	51.1200	51.1200	0.0125	0.0000	51.4331
Total	**0.0576**	**0.5029**	**0.3780**	**5.8000e-004**		**0.0323**	**0.0323**		**0.0303**	**0.0303**	**0.0000**	**51.1200**	**51.1200**	**0.0125**	**0.0000**	**51.4331**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0156	0.3961	0.1089	8.2000e-004	0.0197	3.0800e-003	0.0228	5.6900e-003	2.9500e-003	8.6300e-003	0.0000	79.4144	79.4144	6.5400e-003	0.0000	79.5780
Worker	0.0445	0.0352	0.3378	8.9000e-004	0.0835	6.2000e-004	0.0841	0.0222	5.7000e-004	0.0227	0.0000	80.3109	80.3109	2.7700e-003	0.0000	80.3802
Total	**0.0601**	**0.4313**	**0.4467**	**1.7100e-003**	**0.1031**	**3.7000e-003**	**0.1068**	**0.0279**	**3.5200e-003**	**0.0314**	**0.0000**	**159.7253**	**159.7253**	**9.3100e-003**	**0.0000**	**159.9582**

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	0.0576	0.5029	0.3780	5.8000e-004		0.0323	0.0323		0.0303	0.0303	0.0000	51.1199	51.1199	0.0125	0.0000	51.4330
Total	**0.0576**	**0.5029**	**0.3780**	**5.8000e-004**		**0.0323**	**0.0323**		**0.0303**	**0.0303**	**0.0000**	**51.1199**	**51.1199**	**0.0125**	**0.0000**	**51.4330**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0156	0.3961	0.1089	8.2000e-004	0.0197	3.0800e-003	0.0228	5.6900e-003	2.9500e-003	8.6300e-003	0.0000	79.4144	79.4144	6.5400e-003	0.0000	79.5780
Worker	0.0445	0.0352	0.3378	8.9000e-004	0.0835	6.2000e-004	0.0841	0.0222	5.7000e-004	0.0227	0.0000	80.3109	80.3109	2.7700e-003	0.0000	80.3802
Total	**0.0601**	**0.4313**	**0.4467**	**1.7100e-003**	**0.1031**	**3.7000e-003**	**0.1068**	**0.0279**	**3.5200e-003**	**0.0314**	**0.0000**	**159.7253**	**159.7253**	**9.3100e-003**	**0.0000**	**159.9582**

3.5 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	0.2574	2.2976	1.8709	2.9300e-003		0.1406	0.1406		0.1322	0.1322	0.0000	256.2636	256.2636	0.0624	0.0000	257.8243
Total	**0.2574**	**2.2976**	**1.8709**	**2.9300e-003**		**0.1406**	**0.1406**		**0.1322**	**0.1322**	**0.0000**	**256.2636**	**256.2636**	**0.0624**	**0.0000**	**257.8243**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0705	1.8880	0.5072	4.1100e-003	0.0998	0.0131	0.1129	0.0288	0.0125	0.0413	0.0000	399.6328	399.6328	0.0321	0.0000	400.4346
Worker	0.2080	0.1596	1.5436	4.3700e-003	0.4231	3.0900e-003	0.4262	0.1124	2.8500e-003	0.1153	0.0000	394.8768	394.8768	0.0127	0.0000	395.1943
Total	**0.2785**	**2.0476**	**2.0508**	**8.4800e-003**	**0.5229**	**0.0162**	**0.5391**	**0.1413**	**0.0154**	**0.1566**	**0.0000**	**794.5096**	**794.5096**	**0.0448**	**0.0000**	**795.6288**

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	0.2574	2.2976	1.8709	2.9300e-003		0.1406	0.1406		0.1322	0.1322	0.0000	256.2633	256.2633	0.0624	0.0000	257.8240
Total	**0.2574**	**2.2976**	**1.8709**	**2.9300e-003**		**0.1406**	**0.1406**		**0.1322**	**0.1322**	**0.0000**	**256.2633**	**256.2633**	**0.0624**	**0.0000**	**257.8240**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0705	1.8880	0.5072	4.1100e-003	0.0998	0.0131	0.1129	0.0288	0.0125	0.0413	0.0000	399.6328	399.6328	0.0321	0.0000	400.4346
Worker	0.2080	0.1596	1.5436	4.3700e-003	0.4231	3.0900e-003	0.4262	0.1124	2.8500e-003	0.1153	0.0000	394.8768	394.8768	0.0127	0.0000	395.1943
Total	**0.2785**	**2.0476**	**2.0508**	**8.4800e-003**	**0.5229**	**0.0162**	**0.5391**	**0.1413**	**0.0154**	**0.1566**	**0.0000**	**794.5096**	**794.5096**	**0.0448**	**0.0000**	**795.6288**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Archit. Coating	1.8104					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0115	0.0789	0.0792	1.3000e-004		5.5400e-003	5.5400e-003		5.5400e-003	5.5400e-003	0.0000	10.9790	10.9790	9.3000e-004	0.0000	11.0022
Total	**1.8218**	**0.0789**	**0.0792**	**1.3000e-004**		**5.5400e-003**	**5.5400e-003**		**5.5400e-003**	**5.5400e-003**	**0.0000**	**10.9790**	**10.9790**	**9.3000e-004**	**0.0000**	**11.0022**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0166	0.0128	0.1233	3.5000e-004	0.0338	2.5000e-004	0.0340	8.9800e-003	2.3000e-004	9.2100e-003	0.0000	31.5416	31.5416	1.0100e-003	0.0000	31.5670
Total	**0.0166**	**0.0128**	**0.1233**	**3.5000e-004**	**0.0338**	**2.5000e-004**	**0.0340**	**8.9800e-003**	**2.3000e-004**	**9.2100e-003**	**0.0000**	**31.5416**	**31.5416**	**1.0100e-003**	**0.0000**	**31.5670**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.8104					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0115	0.0789	0.0792	1.3000e-004		5.5400e-003	5.5400e-003		5.5400e-003	5.5400e-003	0.0000	10.9790	10.9790	9.3000e-004	0.0000	11.0022
Total	**1.8218**	**0.0789**	**0.0792**	**1.3000e-004**		**5.5400e-003**	**5.5400e-003**		**5.5400e-003**	**5.5400e-003**	**0.0000**	**10.9790**	**10.9790**	**9.3000e-004**	**0.0000**	**11.0022**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0166	0.0128	0.1233	3.5000e-004	0.0338	2.5000e-004	0.0340	8.9800e-003	2.3000e-004	9.2100e-003	0.0000	31.5416	31.5416	1.0100e-003	0.0000	31.5670
Total	**0.0166**	**0.0128**	**0.1233**	**3.5000e-004**	**0.0338**	**2.5000e-004**	**0.0340**	**8.9800e-003**	**2.3000e-004**	**9.2100e-003**	**0.0000**	**31.5416**	**31.5416**	**1.0100e-003**	**0.0000**	**31.5670**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

Provide Traffic Calming Measures

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 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	0.8053	3.2764	8.1239	0.0238	1.9091	0.0245	1.9335	0.5113	0.0229	0.5342	0.0000	2,189.8713	2,189.8713	0.1300	0.0000	2,193.1199
Unmitigated	0.8105	3.3099	8.2343	0.0242	1.9480	0.0249	1.9729	0.5217	0.0233	0.5451	0.0000	2,230.5692	2,230.5692	0.1318	0.0000	2,233.8648

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	936.00	936.00	936.00	1,642,193	1,609,349
Apartments Mid Rise	1,280.00	1,280.00	1280.00	2,245,734	2,200,820
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Single Family Housing	730.00	730.00	730.00	1,280,770	1,255,155
Total	2,946.00	2,946.00	2,946.00	5,168,698	5,065,324

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-...	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	4.82	4.82	4.82	41.60	18.80	39.60	100	0	0
Apartments Mid Rise	4.82	4.82	4.82	41.60	18.80	39.60	100	0	0
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Single Family Housing	4.82	4.82	4.82	41.60	18.80	39.60	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Apartments Mid Rise	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Other Asphalt Surfaces	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Other Non-Asphalt Surfaces	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Single Family Housing	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 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	434.8042	434.8042	0.0235	4.8600e-003	436.8414
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	441.3281	441.3281	0.0239	4.9400e-003	443.3959
NaturalGas Mitigated	0.0198	0.1694	0.0721	1.0800e-003		0.0137	0.0137		0.0137	0.0137	0.0000	196.1562	196.1562	3.7600e-003	3.6000e-003	197.3219
NaturalGas Unmitigated	0.0245	0.2090	0.0890	1.3300e-003		0.0169	0.0169		0.0169	0.0169	0.0000	242.0781	242.0781	4.6400e-003	4.4400e-003	243.5167

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 High Rise	1.03755e+006	5.5900e-003	0.0478	0.0203	3.1000e-004		3.8700e-003	3.8700e-003		3.8700e-003	3.8700e-003	0.0000	55.3675	55.3675	1.0600e-003	1.0200e-003	55.6965
Apartments Mid Rise	1.41887e+006	7.6500e-003	0.0654	0.0278	4.2000e-004		5.2900e-003	5.2900e-003		5.2900e-003	5.2900e-003	0.0000	75.7162	75.7162	1.4500e-003	1.3900e-003	76.1662
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Single Family Housing	2.07996e+006	0.0112	0.0958	0.0408	6.1000e-004		7.7500e-003	7.7500e-003		7.7500e-003	7.7500e-003	0.0000	110.9944	110.9944	2.1300e-003	2.0300e-003	111.6540
Total		**0.0245**	**0.2090**	**0.0889**	**1.3400e-003**		**0.0169**	**0.0169**		**0.0169**	**0.0169**	**0.0000**	**242.0781**	**242.0781**	**4.6400e-003**	**4.4400e-003**	**243.5167**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	883971	4.7700e-003	0.0407	0.0173	2.6000e-004		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003	0.0000	47.1721	47.1721	9.0000e-004	8.6000e-004	47.4524
Apartments Mid Rise	1.20885e+006	6.5200e-003	0.0557	0.0237	3.6000e-004		4.5000e-003	4.5000e-003		4.5000e-003	4.5000e-003	0.0000	64.5088	64.5088	1.2400e-003	1.1800e-003	64.8922
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Single Family Housing	1.58301e+006	8.5400e-003	0.0729	0.0310	4.7000e-004		5.9000e-003	5.9000e-003		5.9000e-003	5.9000e-003	0.0000	84.4753	84.4753	1.6200e-003	1.5500e-003	84.9773
Total		**0.0198**	**0.1694**	**0.0721**	**1.0900e-003**		**0.0137**	**0.0137**		**0.0137**	**0.0137**	**0.0000**	**196.1562**	**196.1562**	**3.7600e-003**	**3.5900e-003**	**197.3219**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	499055	121.4146	6.5600e-003	1.3600e-003	121.9834
Apartments Mid Rise	682469	166.0370	8.9800e-003	1.8600e-003	166.8150
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	632485	153.8766	8.3200e-003	1.7200e-003	154.5975
Total		**441.3281**	**0.0239**	**4.9400e-003**	**443.3959**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	490966	119.4465	6.4600e-003	1.3400e-003	120.0061
Apartments Mid Rise	671406	163.3456	8.8300e-003	1.8300e-003	164.1110
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	624822	152.0121	8.2200e-003	1.7000e-003	152.7243
Total		**434.8042**	**0.0235**	**4.8700e-003**	**436.8414**

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	1.9060	0.2682	2.7099	1.6600e-003		0.0336	0.0336		0.0336	0.0336	0.0000	279.9249	279.9249	9.4300e-003	5.0500e-003	281.6667
Unmitigated	1.9060	0.2682	2.7099	1.6600e-003		0.0336	0.0336		0.0336	0.0336	0.0000	279.9249	279.9249	9.4300e-003	5.0500e-003	281.6667

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	0.1640					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.6347					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0279	0.2380	0.1013	1.5200e-003		0.0193	0.0193		0.0193	0.0193	0.0000	275.6774	275.6774	5.2800e-003	5.0500e-003	277.3157
Landscaping	0.0795	0.0302	2.6086	1.4000e-004		0.0143	0.0143		0.0143	0.0143	0.0000	4.2474	4.2474	4.1500e-003	0.0000	4.3511
Total	**1.9060**	**0.2682**	**2.7099**	**1.6600e-003**		**0.0336**	**0.0336**		**0.0336**	**0.0336**	**0.0000**	**279.9249**	**279.9249**	**9.4300e-003**	**5.0500e-003**	**281.6667**

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	0.1640					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.6347					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0279	0.2380	0.1013	1.5200e-003		0.0193	0.0193		0.0193	0.0193	0.0000	275.6774	275.6774	5.2800e-003	5.0500e-003	277.3157
Landscaping	0.0795	0.0302	2.6086	1.4000e-004		0.0143	0.0143		0.0143	0.0143	0.0000	4.2474	4.2474	4.1500e-003	0.0000	4.3511
Total	**1.9060**	**0.2682**	**2.7099**	**1.6600e-003**		**0.0336**	**0.0336**		**0.0336**	**0.0336**	**0.0000**	**279.9249**	**279.9249**	**9.4300e-003**	**5.0500e-003**	**281.6667**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Reclaimed Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	87.6527	0.0321	0.0184	93.9484
Unmitigated	119.1662	0.0338	0.0188	125.6095

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	7.62302 / 4.80582	39.8356	0.0113	6.2800e-003	41.9895
Apartments Mid Rise	10.4246 / 6.57206	54.4760	0.0154	8.5900e-003	57.4215
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	4.75624 / 2.9985	24.8547	7.0400e-003	3.9200e-003	26.1986
Total		**119.1662**	**0.0338**	**0.0188**	**125.6095**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	7.62302 / 0.90839	29.3011	0.0107	6.1600e-003	31.4056
Apartments Mid Rise	10.4246 / 1.24224	40.0698	0.0147	8.4300e-003	42.9478
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	4.75624 / 0.566773	18.2819	6.6900e-003	3.8500e-003	19.5949
Total		**87.6527**	**0.0321**	**0.0184**	**93.9484**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	28.5512	1.6873	0.0000	70.7344
Unmitigated	43.2594	2.5566	0.0000	107.1733

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	53.82	10.9250	0.6457	0.0000	27.0662
Apartments Mid Rise	73.6	14.9401	0.8829	0.0000	37.0136
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	85.69	17.3943	1.0280	0.0000	43.0936
Total		**43.2594**	**2.5566**	**0.0000**	**107.1733**

Mitigated

Land Use	Waste Disposed	Total CO2	CH4	N2O	CO2e
	tons	MT/yr			
Apartments High Rise	35.5212	7.2105	0.4261	0.0000	17.8637
Apartments Mid Rise	48.576	9.8605	0.5827	0.0000	24.4289
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	56.5554	11.4802	0.6785	0.0000	28.4418
Total		**28.5512**	**1.6873**	**0.0000**	**70.7344**

CalEEMod Version: CalEEMod.2016.3.1

Date: 3/6/2017 10:12 AM

Otay Ranch Village 4 - San Diego County, Summer

Otay Ranch Village 4

San Diego County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	14.08	Acre	14.08	613,324.80	0
Other Non-Asphalt Surfaces	117.22	Acre	117.22	0.00	0
Apartments High Rise	117.00	Dwelling Unit	6.66	117,000.00	335
Apartments Mid Rise	160.00	Dwelling Unit	12.53	160,000.00	458
Single Family Housing	73.00	Dwelling Unit	15.54	131,400.00	209

1.2 Other Project Characteristics

Urbanization Urban | **Wind Speed (m/s)** 2.6 | **Precipitation Freq (Days)** 40

Climate Zone 13 | **Operational Year** 2020

Utility Company San Diego Gas & Electric

CO2 Intensity (lb/MWhr) 536.36 | **CH4 Intensity (lb/MWhr)** 0.029 | **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Otay Ranch Village 4 Project. San Diego County (San Diego Air Basin). CO2 intensity factor update for effect of 33% RPS.

Land Use - Project includes 73 single family residences and 277 multi-family residences on approximately 34.73 acres. Remainder of the 166.02-acre site would be for CPF (1.60 acres), roadways (12.48 acres), open space (19.73 acres), and MSCP (97.49 acres).

Construction Phase - Construction would begin January 2018 and would be completed by November 2019.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Trips and VMT - Rounded trips. Update haul trip length to reflect distance to quarry.

Grading - Export of 260,534 cubic yards of soil.

Architectural Coating - Comply with SDAPCD Rule 67.0.1.

Vehicle Trips - 8 trips/du for apartments and 10 trips/du for single-family. Updated trip lengths to 4.82 miles. Adjusted all trips to primary to match VMT of TIA.

Woodstoves - All gas fireplaces.

Area Coating - Comply with SDAPCD Rule 67.0.1.

Water And Wastewater - 100% aerobic.

Construction Off-road Equipment Mitigation - Water twice daily.

Mobile Land Use Mitigation - Neighborhood enhancements.

Energy Mitigation - Exceed 2013 Title 24 by 28% to reflect compliance with 2016 Title 24 standards.

Water Mitigation - per Dexter Wilson, March 2015 - 100% recycled water for irrigation

Waste Mitigation - 34% waste diversion per Pacific Waste Services (Goals for 21st Century Collection Program).

Operational Off-Road Equipment - Default

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Parking	250	50
tblAreaCoating	Area_EF_Residential_Exterior	250	100
tblAreaCoating	Area_EF_Residential_Interior	250	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	20
tblConstructionPhase	NumDays	220.00	86.00
tblConstructionPhase	NumDays	3,100.00	261.00
tblConstructionPhase	NumDays	310.00	152.00
tblConstructionPhase	NumDays	310.00	23.00
tblConstructionPhase	NumDays	220.00	66.00
tblConstructionPhase	PhaseEndDate	4/2/2020	11/28/2019
tblConstructionPhase	PhaseEndDate	9/2/2019	10/31/2019
tblConstructionPhase	PhaseEndDate	12/3/2019	12/31/2018
tblConstructionPhase	PhaseStartDate	12/4/2019	8/1/2019
tblConstructionPhase	PhaseStartDate	9/1/2018	11/1/2018
tblConstructionPhase	PhaseStartDate	9/3/2019	10/1/2018
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	64.35	115.00
tblFireplaces	NumberGas	88.00	160.00
tblFireplaces	NumberGas	40.15	75.00
tblFireplaces	NumberNoFireplace	11.70	0.00
tblFireplaces	NumberNoFireplace	16.00	0.00
tblFireplaces	NumberNoFireplace	7.30	0.00
tblFireplaces	NumberWood	40.95	0.00

tblFireplaces	NumberWood	56.00	0.00
tblFireplaces	NumberWood	25.55	0.00
tblFleetMix	FleetMixLandUseSubType	Other Asphalt Surfaces	Apartments High Rise
tblFleetMix	FleetMixLandUseSubType	Other Non-Asphalt Surfaces	Apartments Mid Rise
tblFleetMix	FleetMixLandUseSubType	Apartments High Rise	Other Asphalt Surfaces
tblFleetMix	FleetMixLandUseSubType	Apartments Mid Rise	Other Non-Asphalt Surfaces
tblGrading	MaterialExported	0.00	260,534.00
tblLandUse	BuildingSpaceSquareFeet	5,106,103.20	0.00
tblLandUse	LandUseSquareFeet	5,106,103.20	0.00
tblLandUse	LotAcreage	1.89	6.66
tblLandUse	LotAcreage	4.21	12.53
tblLandUse	LotAcreage	23.70	15.54
tblProjectCharacteristics	CO2IntensityFactor	720.49	536.36
tblProjectCharacteristics	OperationalYear	2018	2020
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripNumber	32,567.00	32,568.00
tblTripsAndVMT	WorkerTripNumber	15.00	16.00
tblTripsAndVMT	WorkerTripNumber	483.00	484.00
tblTripsAndVMT	WorkerTripNumber	97.00	98.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	7.50	4.82
tblVehicleTrips	HO_TL	7.50	4.82
tblVehicleTrips	HO_TL	7.50	4.82
tblVehicleTrips	HS_TL	7.30	4.82
tblVehicleTrips	HS_TL	7.30	4.82
tblVehicleTrips	HS_TL	7.30	4.82

tblVehicleTrips	HW_TL	10.80	4.82
tblVehicleTrips	HW_TL	10.80	4.82
tblVehicleTrips	HW_TL	10.80	4.82
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.98	8.00
tblVehicleTrips	ST_TR	6.39	8.00
tblVehicleTrips	ST_TR	9.91	10.00
tblVehicleTrips	SU_TR	3.65	8.00
tblVehicleTrips	SU_TR	5.86	8.00
tblVehicleTrips	SU_TR	8.62	10.00
tblVehicleTrips	WD_TR	4.20	8.00
tblVehicleTrips	WD_TR	6.65	8.00
tblVehicleTrips	WD_TR	9.52	10.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00

tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	5.85	5.75
tblWoodstoves	NumberCatalytic	3.65	3.75
tblWoodstoves	NumberNoncatalytic	5.85	5.75
tblWoodstoves	NumberNoncatalytic	3.65	3.75
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

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					
2018	7.7221	83.9962	54.3079	0.1332	9.2700	2.6662	11.9362	3.7294	2.4540	6.1834	0.0000	13,516.1668	13,516.1668	2.4891	0.0000	13,562.0657
2019	47.6496	41.6193	41.4302	0.1188	5.7152	1.5717	7.2869	1.5371	1.4868	3.0238	0.0000	12,022.6196	12,022.6196	1.1322	0.0000	12,050.9250
Maximum	**47.6496**	**83.9962**	**54.3079**	**0.1332**	**9.2700**	**2.6662**	**11.9362**	**3.7294**	**2.4540**	**6.1834**	**0.0000**	**13,516.1668**	**13,516.1668**	**2.4891**	**0.0000**	**13,562.0657**

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					
2018	7.7221	83.9962	54.3079	0.1332	5.0416	2.6662	7.6694	1.7313	2.4540	4.1853	0.0000	13,516.1668	13,516.1668	2.4891	0.0000	13,562.0657
2019	47.6496	41.6193	41.4302	0.1188	5.7152	1.5717	7.2869	1.5371	1.4868	3.0238	0.0000	12,022.6196	12,022.6196	1.1322	0.0000	12,050.9250
Maximum	**47.6496**	**83.9962**	**54.3079**	**0.1332**	**5.7152**	**2.6662**	**7.6694**	**1.7313**	**2.4540**	**4.1853**	**0.0000**	**13,516.1668**	**13,516.1668**	**2.4891**	**0.0000**	**13,562.0657**

	ROG	**NOx**	**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**	**28.22**	**0.00**	**22.20**	**37.94**	**0.00**	**21.70**	**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	11.4184	6.1411	31.4555	0.0386		0.6288	0.6288		0.6288	0.6288	0.0000	7,463.7868	7,463.7868	0.1928	0.1359	7,509.1006
Energy	0.1340	1.1454	0.4874	7.3100e-003		0.0926	0.0926		0.0926	0.0926		1,462.1669	1,462.1669	0.0280	0.0268	1,470.8558
Mobile	4.7229	17.7194	45.4294	0.1391	10.9606	0.1363	11.0969	2.9297	0.1278	3.0575		14,113.3425	14,113.3425	0.7969		14,133.2655
Total	**16.2753**	**25.0059**	**77.3723**	**0.1849**	**10.9606**	**0.8576**	**11.8183**	**2.9297**	**0.8492**	**3.7788**	**0.0000**	**23,039.2961**	**23,039.2961**	**1.0178**	**0.1627**	**23,113.2218**

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	11.4184	6.1411	31.4555	0.0386		0.6288	0.6288		0.6288	0.6288	0.0000	7,463.7868	7,463.7868	0.1928	0.1359	7,509.1006
Energy	0.1086	0.9281	0.3949	5.9200e-003		0.0750	0.0750		0.0750	0.0750		1,184.7956	1,184.7956	0.0227	0.0217	1,191.8363
Mobile	4.6941	17.5454	44.7721	0.1365	10.7414	0.1339	10.8754	2.8711	0.1256	2.9967		13,855.6685	13,855.6685	0.7852		13,875.2989
Total	**16.2212**	**24.6146**	**76.6225**	**0.1810**	**10.7414**	**0.8377**	**11.5792**	**2.8711**	**0.8294**	**3.7005**	**0.0000**	**22,504.2509**	**22,504.2509**	**1.0008**	**0.1576**	**22,576.2358**

	ROG	**NOx**	**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	**0.33**	**1.56**	**0.97**	**2.13**	**2.00**	**2.32**	**2.02**	**2.00**	**2.33**	**2.07**	**0.00**	**2.32**	**2.32**	**1.67**	**3.13**	**2.32**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2018	7/31/2018	5	152	
2	Infrastructure	Grading	8/1/2018	8/31/2018	5	23	
3	Paving	Paving	10/1/2018	12/31/2018	5	66	
4	Building Construction	Building Construction	11/1/2018	10/31/2019	5	261	
5	Architectural Coating	Architectural Coating	8/1/2019	11/28/2019	5	86	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 380

Acres of Paving: 131.3

Residential Indoor: 827,010; Residential Outdoor: 275,670; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Infrastructure	Excavators	2	8.00	158	0.38
Infrastructure	Graders	1	8.00	187	0.41
Infrastructure	Rubber Tired Dozers	1	8.00	247	0.40
Infrastructure	Scrapers	2	8.00	367	0.48
Infrastructure	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42

Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	1	7.00	231	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
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
Grading	8	20.00	0.00	32,568.00	10.80	7.30	1.00	LD_Mix	HDT_Mix	HHDT
Infrastructure	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	16.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	484.00	138.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	98.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Grading - 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					
Fugitive Dust					8.9142	0.0000	8.9142	3.6330	0.0000	3.6330			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**8.9142**	**2.6337**	**11.5479**	**3.6330**	**2.4230**	**6.0560**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

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	0.5251	24.4131	3.6109	0.0302	0.1915	0.0312	0.2227	0.0529	0.0299	0.0828		3,269.2251	3,269.2251	0.5389		3,282.6983
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	0.0851	0.0613	0.6847	1.8000e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		179.4449	179.4449	6.1400e-003		179.5984
Total	**0.6102**	**24.4744**	**4.2955**	**0.0320**	**0.3558**	**0.0324**	**0.3882**	**0.0965**	**0.0310**	**0.1274**		**3,448.6700**	**3,448.6700**	**0.5451**		**3,462.2967**

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					4.0114	0.0000	4.0114	1.6348	0.0000	1.6348			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**4.0114**	**2.6337**	**6.6451**	**1.6348**	**2.4230**	**4.0579**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

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	0.5251	24.4131	3.6109	0.0302	0.1915	0.0312	0.2227	0.0529	0.0299	0.0828		3,269.2251	3,269.2251	0.5389		3,282.6983
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	0.0851	0.0613	0.6847	1.8000e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		179.4449	179.4449	6.1400e-003		179.5984
Total	**0.6102**	**24.4744**	**4.2955**	**0.0320**	**0.3558**	**0.0324**	**0.3882**	**0.0965**	**0.0310**	**0.1274**		**3,448.6700**	**3,448.6700**	**0.5451**		**3,462.2967**

3.3 Infrastructure - 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					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**8.6733**	**2.6337**	**11.3071**	**3.5965**	**2.4230**	**6.0195**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

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	0.0851	0.0613	0.6847	1.8000e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		179.4449	179.4449	6.1400e-003		179.5984
Total	**0.0851**	**0.0613**	**0.6847**	**1.8000e-003**	**0.1643**	**1.1800e-003**	**0.1655**	**0.0436**	**1.0900e-003**	**0.0447**		**179.4449**	**179.4449**	**6.1400e-003**		**179.5984**

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					3.9030	0.0000	3.9030	1.6184	0.0000	1.6184			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**3.9030**	**2.6337**	**6.5367**	**1.6184**	**2.4230**	**4.0415**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

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	0.0851	0.0613	0.6847	1.8000e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		179.4449	179.4449	6.1400e-003		179.5984
Total	**0.0851**	**0.0613**	**0.6847**	**1.8000e-003**	**0.1643**	**1.1800e-003**	**0.1655**	**0.0436**	**1.0900e-003**	**0.0447**		**179.4449**	**179.4449**	**6.1400e-003**		**179.5984**

3.4 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6437	17.5209	14.7964	0.0228		0.9561	0.9561		0.8797	0.8797		2,294.0887	2,294.0887	0.7142		2,311.9432
Paving	0.5589					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2026**	**17.5209**	**14.7964**	**0.0228**		**0.9561**	**0.9561**		**0.8797**	**0.8797**		**2,294.0887**	**2,294.0887**	**0.7142**		**2,311.9432**

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	0.0681	0.0491	0.5477	1.4400e-003	0.1314	9.5000e-004	0.1324	0.0349	8.7000e-004	0.0357		143.5559	143.5559	4.9100e-003		143.6787
Total	**0.0681**	**0.0491**	**0.5477**	**1.4400e-003**	**0.1314**	**9.5000e-004**	**0.1324**	**0.0349**	**8.7000e-004**	**0.0357**		**143.5559**	**143.5559**	**4.9100e-003**		**143.6787**

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	1.6437	17.5209	14.7964	0.0228		0.9561	0.9561		0.8797	0.8797	0.0000	2,294.0887	2,294.0887	0.7142		2,311.9432
Paving	0.5589					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2026**	**17.5209**	**14.7964**	**0.0228**		**0.9561**	**0.9561**		**0.8797**	**0.8797**	**0.0000**	**2,294.0887**	**2,294.0887**	**0.7142**		**2,311.9432**

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	0.0681	0.0491	0.5477	1.4400e-003	0.1314	9.5000e-004	0.1324	0.0349	8.7000e-004	0.0357		143.5559	143.5559	4.9100e-003		143.6787
Total	**0.0681**	**0.0491**	**0.5477**	**1.4400e-003**	**0.1314**	**9.5000e-004**	**0.1324**	**0.0349**	**8.7000e-004**	**0.0357**		**143.5559**	**143.5559**	**4.9100e-003**		**143.6787**

3.5 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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

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	0.7117	18.1820	4.8147	0.0385	0.9342	0.1422	1.0764	0.2689	0.1360	0.4050		4,115.0201	4,115.0201	0.3261		4,123.1737
Worker	2.0602	1.4837	16.5686	0.0436	3.9760	0.0286	4.0046	1.0546	0.0264	1.0810		4,342.5669	4,342.5669	0.1486		4,346.2817
Total	**2.7719**	**19.6657**	**21.3833**	**0.0821**	**4.9102**	**0.1708**	**5.0810**	**1.3235**	**0.1624**	**1.4860**		**8,457.5870**	**8,457.5870**	**0.4747**		**8,469.4555**

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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

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	0.7117	18.1820	4.8147	0.0385	0.9342	0.1422	1.0764	0.2689	0.1360	0.4050		4,115.0201	4,115.0201	0.3261		4,123.1737
Worker	2.0602	1.4837	16.5686	0.0436	3.9760	0.0286	4.0046	1.0546	0.0264	1.0810		4,342.5669	4,342.5669	0.1486		4,346.2817
Total	**2.7719**	**19.6657**	**21.3833**	**0.0821**	**4.9102**	**0.1708**	**5.0810**	**1.3235**	**0.1624**	**1.4860**		**8,457.5870**	**8,457.5870**	**0.4747**		**8,469.4555**

3.5 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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

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	0.6352	17.1103	4.4173	0.0381	0.9342	0.1190	1.0533	0.2689	0.1139	0.3828		4,085.0295	4,085.0295	0.3154		4,092.9142
Worker	1.9004	1.3263	14.9755	0.0423	3.9760	0.0283	4.0043	1.0546	0.0261	1.0807		4,211.7662	4,211.7662	0.1345		4,215.1285
Total	**2.5356**	**18.4366**	**19.3929**	**0.0804**	**4.9102**	**0.1474**	**5.0575**	**1.3235**	**0.1400**	**1.4635**		**8,296.7958**	**8,296.7958**	**0.4499**		**8,308.0428**

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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

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	0.6352	17.1103	4.4173	0.0381	0.9342	0.1190	1.0533	0.2689	0.1139	0.3828		4,085.0295	4,085.0295	0.3154		4,092.9142
Worker	1.9004	1.3263	14.9755	0.0423	3.9760	0.0283	4.0043	1.0546	0.0261	1.0807		4,211.7662	4,211.7662	0.1345		4,215.1285
Total	**2.5356**	**18.4366**	**19.3929**	**0.0804**	**4.9102**	**0.1474**	**5.0575**	**1.3235**	**0.1400**	**1.4635**		**8,296.7958**	**8,296.7958**	**0.4499**		**8,308.0428**

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	42.1016					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		282.0423
Total	**42.3680**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

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	0.3848	0.2685	3.0322	8.5600e-003	0.8051	5.7400e-003	0.8108	0.2135	5.2900e-003	0.2188		852.7956	852.7956	0.0272		853.4764
Total	**0.3848**	**0.2685**	**3.0322**	**8.5600e-003**	**0.8051**	**5.7400e-003**	**0.8108**	**0.2135**	**5.2900e-003**	**0.2188**		**852.7956**	**852.7956**	**0.0272**		**853.4764**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Archit. Coating	42.1016					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		282.0423
Total	**42.3680**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	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	0.3848	0.2685	3.0322	8.5600e-003	0.8051	5.7400e-003	0.8108	0.2135	5.2900e-003	0.2188		852.7956	852.7956	0.0272		853.4764
Total	**0.3848**	**0.2685**	**3.0322**	**8.5600e-003**	**0.8051**	**5.7400e-003**	**0.8108**	**0.2135**	**5.2900e-003**	**0.2188**		**852.7956**	**852.7956**	**0.0272**		**853.4764**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

Provide Traffic Calming Measures

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	4.6941	17.5454	44.7721	0.1365	10.7414	0.1339	10.8754	2.8711	0.1256	2.9967		13,855.6685	13,855.6685	0.7852		13,875.2989
Unmitigated	4.7229	17.7194	45.4294	0.1391	10.9606	0.1363	11.0969	2.9297	0.1278	3.0575		14,113.3425	14,113.3425	0.7969		14,133.2655

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	936.00	936.00	936.00	1,642,193	1,609,349
Apartments Mid Rise	1,280.00	1,280.00	1280.00	2,245,734	2,200,820
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Single Family Housing	730.00	730.00	730.00	1,280,770	1,255,155
Total	2,946.00	2,946.00	2,946.00	5,168,698	5,065,324

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	4.82	4.82	4.82	41.60	18.80	39.60	100	0	0
Apartments Mid Rise	4.82	4.82	4.82	41.60	18.80	39.60	100	0	0
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Single Family Housing	4.82	4.82	4.82	41.60	18.80	39.60	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Apartments Mid Rise	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Other Asphalt Surfaces	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Other Non-Asphalt Surfaces	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Single Family Housing	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive 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	0.1086	0.9281	0.3949	5.9200e-003		0.0750	0.0750		0.0750	0.0750		1,184.7956	1,184.7956	0.0227	0.0217	1,191.8363
NaturalGas Unmitigated	0.1340	1.1454	0.4874	7.3100e-003		0.0926	0.0926		0.0926	0.0926		1,462.1669	1,462.1669	0.0280	0.0268	1,470.8558

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 High Rise	2842.6	0.0307	0.2620	0.1115	1.6700e-003		0.0212	0.0212		0.0212	0.0212		334.4232	334.4232	6.4100e-003	6.1300e-003	336.4105
Apartments Mid Rise	3887.31	0.0419	0.3582	0.1524	2.2900e-003		0.0290	0.0290		0.0290	0.0290		457.3308	457.3308	8.7700e-003	8.3800e-003	460.0485
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Single Family Housing	5698.51	0.0615	0.5252	0.2235	3.3500e-003		0.0425	0.0425		0.0425	0.0425		670.4129	670.4129	0.0129	0.0123	674.3969
Total		**0.1340**	**1.1454**	**0.4874**	**7.3100e-003**		**0.0926**	**0.0926**		**0.0926**	**0.0926**		**1,462.1669**	**1,462.1669**	**0.0280**	**0.0268**	**1,470.8558**

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					
Apartments High Rise	2.42184	0.0261	0.2232	0.0950	1.4200e-003		0.0181	0.0181		0.0181	0.0181		284.9222	284.9222	5.4600e-003	5.2200e-003	286.6154
Apartments Mid Rise	3.31192	0.0357	0.3052	0.1299	1.9500e-003		0.0247	0.0247		0.0247	0.0247		389.6372	389.6372	7.4700e-003	7.1400e-003	391.9527
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Single Family Housing	4.33701	0.0468	0.3997	0.1701	2.5500e-003		0.0323	0.0323		0.0323	0.0323		510.2361	510.2361	9.7800e-003	9.3500e-003	513.2682
Total		**0.1086**	**0.9281**	**0.3949**	**5.9200e-003**		**0.0750**	**0.0750**		**0.0750**	**0.0750**		**1,184.7956**	**1,184.7956**	**0.0227**	**0.0217**	**1,191.8363**

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	11.4184	6.1411	31.4555	0.0386		0.6288	0.6288		0.6288	0.6288	0.0000	7,463.7868	7,463.7868	0.1928	0.1359	7,509.1006
Unmitigated	11.4184	6.1411	31.4555	0.0386		0.6288	0.6288		0.6288	0.6288	0.0000	7,463.7868	7,463.7868	0.1928	0.1359	7,509.1006

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	0.8985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	8.9570					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.6794	5.8059	2.4706	0.0371		0.4694	0.4694		0.4694	0.4694	0.0000	7,411.7647	7,411.7647	0.1421	0.1359	7,455.8091
Landscaping	0.8835	0.3352	28.9849	1.5300e-003		0.1594	0.1594		0.1594	0.1594		52.0221	52.0221	0.0508		53.2914
Total	**11.4184**	**6.1411**	**31.4555**	**0.0386**		**0.6288**	**0.6288**		**0.6288**	**0.6288**	**0.0000**	**7,463.7868**	**7,463.7868**	**0.1928**	**0.1359**	**7,509.1006**

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	0.8985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	8.9570					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.6794	5.8059	2.4706	0.0371		0.4694	0.4694		0.4694	0.4694	0.0000	7,411.7647	7,411.7647	0.1421	0.1359	7,455.8091
Landscaping	0.8835	0.3352	28.9849	1.5300e-003		0.1594	0.1594		0.1594	0.1594		52.0221	52.0221	0.0508		53.2914
Total	**11.4184**	**6.1411**	**31.4555**	**0.0386**		**0.6288**	**0.6288**		**0.6288**	**0.6288**	**0.0000**	**7,463.7868**	**7,463.7868**	**0.1928**	**0.1359**	**7,509.1006**

CalEEMod Version: CalEEMod.2016.3.1 Date: 3/6/2017 10:14 AM

Otay Ranch Village 4 - San Diego County, Winter

Otay Ranch Village 4
San Diego County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	14.08	Acre	14.08	613,324.80	0
Other Non-Asphalt Surfaces	117.22	Acre	117.22	0.00	0
Apartments High Rise	117.00	Dwelling Unit	6.66	117,000.00	335
Apartments Mid Rise	160.00	Dwelling Unit	12.53	160,000.00	458
Single Family Housing	73.00	Dwelling Unit	15.54	131,400.00	209

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.6 **Precipitation Freq (Days)** 40

Climate Zone 13 **Operational Year** 2020

Utility Company San Diego Gas & Electric

CO2 Intensity (lb/MWhr) 536.36 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Otay Ranch Village 4 Project. San Diego County (San Diego Air Basin). CO2 intensity factor update for effect of 33% RPS.

Land Use - Project includes 73 single family residences and 277 multi-family residences on approximately 34.73 acres. Remainder of the 166.02-acre site would be for CPF (1.60 acres), roadways (12.48 acres), open space (19.73 acres), and MSCP (97.49 acres).

Construction Phase - Construction would begin January 2018 and would be completed by November 2019.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Off-road Equipment - Default equipment.

Trips and VMT - Rounded trips. Update haul trip length to reflect distance to quarry.

Grading - Export of 260,534 cubic yards of soil.

Architectural Coating - Comply with SDAPCD Rule 67.0.1.

Vehicle Trips - 8 trips/du for apartments and 10 trips/du for single-family. Updated trip lengths to 4.82 miles. Adjusted all trips to primary to match VMT of TIA.

Woodstoves - All gas fireplaces.

Area Coating - Comply with SDAPCD Rule 67.0.1.

Water And Wastewater - 100% aerobic.

Construction Off-road Equipment Mitigation - Water twice daily.

Mobile Land Use Mitigation - Neighborhood enhancements.

Energy Mitigation - Exceed 2013 Title 24 by 28% to reflect compliance with 2016 Title 24 standards.

Water Mitigation - per Dexter Wilson, March 2015 - 100% recycled water for irrigation

Waste Mitigation - 34% waste diversion per Pacific Waste Services (Goals for 21st Century Collection Program).

Operational Off-Road Equipment - Default

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Parking	250	50
tblAreaCoating	Area_EF_Residential_Exterior	250	100
tblAreaCoating	Area_EF_Residential_Interior	250	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	20
tblConstructionPhase	NumDays	220.00	86.00
tblConstructionPhase	NumDays	3,100.00	261.00
tblConstructionPhase	NumDays	310.00	152.00
tblConstructionPhase	NumDays	310.00	23.00
tblConstructionPhase	NumDays	220.00	66.00
tblConstructionPhase	PhaseEndDate	4/2/2020	11/28/2019
tblConstructionPhase	PhaseEndDate	9/2/2019	10/31/2019
tblConstructionPhase	PhaseEndDate	12/3/2019	12/31/2018
tblConstructionPhase	PhaseStartDate	12/4/2019	8/1/2019
tblConstructionPhase	PhaseStartDate	9/1/2018	11/1/2018
tblConstructionPhase	PhaseStartDate	9/3/2019	10/1/2018
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	64.35	115.00
tblFireplaces	NumberGas	88.00	160.00
tblFireplaces	NumberGas	40.15	75.00
tblFireplaces	NumberNoFireplace	11.70	0.00
tblFireplaces	NumberNoFireplace	16.00	0.00
tblFireplaces	NumberNoFireplace	7.30	0.00
tblFireplaces	NumberWood	40.95	0.00

tblFireplaces	NumberWood	56.00	0.00
tblFireplaces	NumberWood	25.55	0.00
tblFleetMix	FleetMixLandUseSubType	Other Asphalt Surfaces	Apartments High Rise
tblFleetMix	FleetMixLandUseSubType	Other Non-Asphalt Surfaces	Apartments Mid Rise
tblFleetMix	FleetMixLandUseSubType	Apartments High Rise	Other Asphalt Surfaces
tblFleetMix	FleetMixLandUseSubType	Apartments Mid Rise	Other Non-Asphalt Surfaces
tblGrading	MaterialExported	0.00	260,534.00
tblLandUse	BuildingSpaceSquareFeet	5,106,103.20	0.00
tblLandUse	LandUseSquareFeet	5,106,103.20	0.00
tblLandUse	LotAcreage	1.89	6.66
tblLandUse	LotAcreage	4.21	12.53
tblLandUse	LotAcreage	23.70	15.54
tblProjectCharacteristics	CO2IntensityFactor	720.49	536.36
tblProjectCharacteristics	OperationalYear	2018	2020
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripNumber	32,567.00	32,568.00
tblTripsAndVMT	WorkerTripNumber	15.00	16.00
tblTripsAndVMT	WorkerTripNumber	483.00	484.00
tblTripsAndVMT	WorkerTripNumber	97.00	98.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	7.50	4.82
tblVehicleTrips	HO_TL	7.50	4.82
tblVehicleTrips	HO_TL	7.50	4.82
tblVehicleTrips	HS_TL	7.30	4.82
tblVehicleTrips	HS_TL	7.30	4.82
tblVehicleTrips	HS_TL	7.30	4.82

tblVehicleTrips	HW_TL	10.80	4.82
tblVehicleTrips	HW_TL	10.80	4.82
tblVehicleTrips	HW_TL	10.80	4.82
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.98	8.00
tblVehicleTrips	ST_TR	6.39	8.00
tblVehicleTrips	ST_TR	9.91	10.00
tblVehicleTrips	SU_TR	3.65	8.00
tblVehicleTrips	SU_TR	5.86	8.00
tblVehicleTrips	SU_TR	8.62	10.00
tblVehicleTrips	WD_TR	4.20	8.00
tblVehicleTrips	WD_TR	6.65	8.00
tblVehicleTrips	WD_TR	9.52	10.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00

tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	5.85	5.75
tblWoodstoves	NumberCatalytic	3.65	3.75
tblWoodstoves	NumberNoncatalytic	5.85	5.75
tblWoodstoves	NumberNoncatalytic	3.65	3.75
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

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					
2018	8.0280	83.1853	53.9401	0.1295	9.2700	2.6725	11.9425	3.7294	2.4601	6.1895	0.0000	13,138.2918	13,138.2918	2.5514	0.0000	13,184.5266
2019	47.9762	41.8294	40.9201	0.1148	5.7152	1.5738	7.2890	1.5371	1.4888	3.0258	0.0000	11,608.7697	11,608.7697	1.1440	0.0000	11,637.3704
Maximum	**47.9762**	**83.1853**	**53.9401**	**0.1295**	**9.2700**	**2.6725**	**11.9425**	**3.7294**	**2.4601**	**6.1895**	**0.0000**	**13,138.2918**	**13,138.2918**	**2.5514**	**0.0000**	**13,184.5266**

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					
2018	8.0280	83.1853	53.9401	0.1295	5.0416	2.6725	7.6718	1.7313	2.4601	4.1914	0.0000	13,138.2918	13,138.2918	2.5514	0.0000	13,184.5266
2019	47.9762	41.8294	40.9201	0.1148	5.7152	1.5738	7.2890	1.5371	1.4888	3.0258	0.0000	11,608.7697	11,608.7697	1.1440	0.0000	11,637.3704
Maximum	**47.9762**	**83.1853**	**53.9401**	**0.1295**	**5.7152**	**2.6725**	**7.6718**	**1.7313**	**2.4601**	**4.1914**	**0.0000**	**13,138.2918**	**13,138.2918**	**2.5514**	**0.0000**	**13,184.5266**

	ROG	**NOx**	**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**	**28.22**	**0.00**	**22.21**	**37.94**	**0.00**	**21.68**	**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	11.4184	6.1411	31.4555	0.0386		0.6288	0.6288		0.6288	0.6288	0.0000	7,463.7868	7,463.7868	0.1928	0.1359	7,509.1006
Energy	0.1340	1.1454	0.4874	7.3100e-003		0.0926	0.0926		0.0926	0.0926		1,462.1669	1,462.1669	0.0280	0.0268	1,470.8558
Mobile	4.5888	18.1053	46.1419	0.1317	10.9606	0.1377	11.0983	2.9297	0.1291	3.0588		13,367.8776	13,367.8776	0.8112		13,388.1570
Total	**16.1413**	**25.3917**	**78.0848**	**0.1776**	**10.9606**	**0.8590**	**11.8197**	**2.9297**	**0.8505**	**3.7802**	**0.0000**	**22,293.8312**	**22,293.8312**	**1.0320**	**0.1627**	**22,368.1134**

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	11.4184	6.1411	31.4555	0.0386		0.6288	0.6288		0.6288	0.6288	0.0000	7,463.7868	7,463.7868	0.1928	0.1359	7,509.1006
Energy	0.1086	0.9281	0.3949	5.9200e-003		0.0750	0.0750		0.0750	0.0750		1,184.7956	1,184.7956	0.0227	0.0217	1,191.8363
Mobile	4.5606	17.9206	45.5406	0.1293	10.7414	0.1353	10.8767	2.8711	0.1269	2.9980		13,123.0601	13,123.0601	0.7998		13,143.0559
Total	**16.0876**	**24.9898**	**77.3910**	**0.1738**	**10.7414**	**0.8391**	**11.5805**	**2.8711**	**0.8307**	**3.7018**	**0.0000**	**21,771.6425**	**21,771.6425**	**1.0154**	**0.1576**	**21,843.9928**

	ROG	**NOx**	**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	**0.33**	**1.58**	**0.89**	**2.15**	**2.00**	**2.32**	**2.02**	**2.00**	**2.32**	**2.07**	**0.00**	**2.34**	**2.34**	**1.61**	**3.13**	**2.34**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2018	7/31/2018	5	152	
2	Infrastructure	Grading	8/1/2018	8/31/2018	5	23	
3	Paving	Paving	10/1/2018	12/31/2018	5	66	
4	Building Construction	Building Construction	11/1/2018	10/31/2019	5	261	
5	Architectural Coating	Architectural Coating	8/1/2019	11/28/2019	5	86	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 380

Acres of Paving: 131.3

Residential Indoor: 827,010; Residential Outdoor: 275,670; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Infrastructure	Excavators	2	8.00	158	0.38
Infrastructure	Graders	1	8.00	187	0.41
Infrastructure	Rubber Tired Dozers	1	8.00	247	0.40
Infrastructure	Scrapers	2	8.00	367	0.48
Infrastructure	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42

Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	1	7.00	231	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
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
Grading	8	20.00	0.00	32,568.00	10.80	7.30	1.00	LD_Mix	HDT_Mix	HHDT
Infrastructure	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	16.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	484.00	138.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	98.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Grading - 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					
Fugitive Dust					8.9142	0.0000	8.9142	3.6330	0.0000	3.6330			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**8.9142**	**2.6337**	**11.5479**	**3.6330**	**2.4230**	**6.0560**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

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	0.5822	23.5947	4.7571	0.0273	0.1915	0.0376	0.2291	0.0529	0.0359	0.0888		2,958.2054	2,958.2054	0.6016		2,973.2458
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	0.0962	0.0689	0.6495	1.6900e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		168.4655	168.4655	5.8400e-003		168.6114
Total	**0.6784**	**23.6635**	**5.4065**	**0.0290**	**0.3558**	**0.0387**	**0.3946**	**0.0965**	**0.0370**	**0.1335**		**3,126.6709**	**3,126.6709**	**0.6075**		**3,141.8572**

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					4.0114	0.0000	4.0114	1.6348	0.0000	1.6348			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**4.0114**	**2.6337**	**6.6451**	**1.6348**	**2.4230**	**4.0579**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

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	0.5822	23.5947	4.7571	0.0273	0.1915	0.0376	0.2291	0.0529	0.0359	0.0888		2,958.2054	2,958.2054	0.6016		2,973.2458
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	0.0962	0.0689	0.6495	1.6900e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		168.4655	168.4655	5.8400e-003		168.6114
Total	**0.6784**	**23.6635**	**5.4065**	**0.0290**	**0.3558**	**0.0387**	**0.3946**	**0.0965**	**0.0370**	**0.1335**		**3,126.6709**	**3,126.6709**	**0.6075**		**3,141.8572**

3.3 Infrastructure - 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					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**8.6733**	**2.6337**	**11.3071**	**3.5965**	**2.4230**	**6.0195**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

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	0.0962	0.0689	0.6495	1.6900e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		168.4655	168.4655	5.8400e-003		168.6114
Total	**0.0962**	**0.0689**	**0.6495**	**1.6900e-003**	**0.1643**	**1.1800e-003**	**0.1655**	**0.0436**	**1.0900e-003**	**0.0447**		**168.4655**	**168.4655**	**5.8400e-003**		**168.6114**

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					3.9030	0.0000	3.9030	1.6184	0.0000	1.6184			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**3.9030**	**2.6337**	**6.5367**	**1.6184**	**2.4230**	**4.0415**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

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	0.0962	0.0689	0.6495	1.6900e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		168.4655	168.4655	5.8400e-003		168.6114
Total	**0.0962**	**0.0689**	**0.6495**	**1.6900e-003**	**0.1643**	**1.1800e-003**	**0.1655**	**0.0436**	**1.0900e-003**	**0.0447**		**168.4655**	**168.4655**	**5.8400e-003**		**168.6114**

3.4 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6437	17.5209	14.7964	0.0228		0.9561	0.9561		0.8797	0.8797		2,294.0887	2,294.0887	0.7142		2,311.9432
Paving	0.5589					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2026**	**17.5209**	**14.7964**	**0.0228**		**0.9561**	**0.9561**		**0.8797**	**0.8797**		**2,294.0887**	**2,294.0887**	**0.7142**		**2,311.9432**

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	0.0769	0.0551	0.5196	1.3500e-003	0.1314	9.5000e-004	0.1324	0.0349	8.7000e-004	0.0357		134.7724	134.7724	4.6700e-003		134.8891
Total	**0.0769**	**0.0551**	**0.5196**	**1.3500e-003**	**0.1314**	**9.5000e-004**	**0.1324**	**0.0349**	**8.7000e-004**	**0.0357**		**134.7724**	**134.7724**	**4.6700e-003**		**134.8891**

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	1.6437	17.5209	14.7964	0.0228		0.9561	0.9561		0.8797	0.8797	0.0000	2,294.0887	2,294.0887	0.7142		2,311.9432
Paving	0.5589					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2026**	**17.5209**	**14.7964**	**0.0228**		**0.9561**	**0.9561**		**0.8797**	**0.8797**	**0.0000**	**2,294.0887**	**2,294.0887**	**0.7142**		**2,311.9432**

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	0.0769	0.0551	0.5196	1.3500e-003	0.1314	9.5000e-004	0.1324	0.0349	8.7000e-004	0.0357		134.7724	134.7724	4.6700e-003		134.8891
Total	**0.0769**	**0.0551**	**0.5196**	**1.3500e-003**	**0.1314**	**9.5000e-004**	**0.1324**	**0.0349**	**8.7000e-004**	**0.0357**		**134.7724**	**134.7724**	**4.6700e-003**		**134.8891**

3.5 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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

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	0.7418	18.2130	5.3269	0.0375	0.9342	0.1446	1.0788	0.2689	0.1383	0.4072		4,011.6316	4,011.6316	0.3471		4,020.3099
Worker	2.3272	1.6663	15.7168	0.0410	3.9760	0.0286	4.0046	1.0546	0.0264	1.0810		4,076.8640	4,076.8640	0.1413		4,080.3961
Total	**3.0690**	**19.8792**	**21.0437**	**0.0785**	**4.9102**	**0.1732**	**5.0834**	**1.3235**	**0.1647**	**1.4882**		**8,088.4956**	**8,088.4956**	**0.4884**		**8,100.7060**

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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

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	0.7418	18.2130	5.3269	0.0375	0.9342	0.1446	1.0788	0.2689	0.1383	0.4072		4,011.6316	4,011.6316	0.3471		4,020.3099
Worker	2.3272	1.6663	15.7168	0.0410	3.9760	0.0286	4.0046	1.0546	0.0264	1.0810		4,076.8640	4,076.8640	0.1413		4,080.3961
Total	**3.0690**	**19.8792**	**21.0437**	**0.0785**	**4.9102**	**0.1732**	**5.0834**	**1.3235**	**0.1647**	**1.4882**		**8,088.4956**	**8,088.4956**	**0.4884**		**8,100.7060**

3.5 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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

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	0.6625	17.1241	4.8976	0.0372	0.9342	0.1211	1.0554	0.2689	0.1159	0.3848		3,981.3035	3,981.3035	0.3355		3,989.6913
Worker	2.1493	1.4895	14.1519	0.0397	3.9760	0.0283	4.0043	1.0546	0.0261	1.0807		3,953.8626	3,953.8626	0.1276		3,957.0520
Total	**2.8118**	**18.6136**	**19.0495**	**0.0769**	**4.9102**	**0.1495**	**5.0596**	**1.3235**	**0.1420**	**1.4655**		**7,935.1660**	**7,935.1660**	**0.4631**		**7,946.7433**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	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	0.6625	17.1241	4.8976	0.0372	0.9342	0.1211	1.0554	0.2689	0.1159	0.3848		3,981.3035	3,981.3035	0.3355		3,989.6913
Worker	2.1493	1.4895	14.1519	0.0397	3.9760	0.0283	4.0043	1.0546	0.0261	1.0807		3,953.8626	3,953.8626	0.1276		3,957.0520
Total	**2.8118**	**18.6136**	**19.0495**	**0.0769**	**4.9102**	**0.1495**	**5.0596**	**1.3235**	**0.1420**	**1.4655**		**7,935.1660**	**7,935.1660**	**0.4631**		**7,946.7433**

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	42.1016					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		282.0423
Total	**42.3680**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

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	0.4352	0.3016	2.8655	8.0400e-003	0.8051	5.7400e-003	0.8108	0.2135	5.2900e-003	0.2188		800.5755	800.5755	0.0258		801.2213
Total	**0.4352**	**0.3016**	**2.8655**	**8.0400e-003**	**0.8051**	**5.7400e-003**	**0.8108**	**0.2135**	**5.2900e-003**	**0.2188**		**800.5755**	**800.5755**	**0.0258**		**801.2213**

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	42.1016					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		282.0423
Total	**42.3680**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

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	0.4352	0.3016	2.8655	8.0400e-003	0.8051	5.7400e-003	0.8108	0.2135	5.2900e-003	0.2188		800.5755	800.5755	0.0258		801.2213
Total	**0.4352**	**0.3016**	**2.8655**	**8.0400e-003**	**0.8051**	**5.7400e-003**	**0.8108**	**0.2135**	**5.2900e-003**	**0.2188**		**800.5755**	**800.5755**	**0.0258**		**801.2213**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

Provide Traffic Calming Measures

	ROG	NOx	CO	SO2	Fugitive 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	4.5606	17.9206	45.5406	0.1293	10.7414	0.1353	10.8767	2.8711	0.1269	2.9980		13,123.0601	13,123.0601	0.7998		13,143.0559
Unmitigated	4.5888	18.1053	46.1419	0.1317	10.9606	0.1377	11.0983	2.9297	0.1291	3.0588		13,367.8776	13,367.8776	0.8112		13,388.1570

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	936.00	936.00	936.00	1,642,193	1,609,349
Apartments Mid Rise	1,280.00	1,280.00	1280.00	2,245,734	2,200,820
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Single Family Housing	730.00	730.00	730.00	1,280,770	1,255,155
Total	2,946.00	2,946.00	2,946.00	5,168,698	5,065,324

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 High Rise	4.82	4.82	4.82	41.60	18.80	39.60	100	0	0
Apartments Mid Rise	4.82	4.82	4.82	41.60	18.80	39.60	100	0	0
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Single Family Housing	4.82	4.82	4.82	41.60	18.80	39.60	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Apartments Mid Rise	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Other Asphalt Surfaces	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Other Non-Asphalt Surfaces	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Single Family Housing	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive 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	0.1086	0.9281	0.3949	5.9200e-003		0.0750	0.0750		0.0750	0.0750		1,184.7956	1,184.7956	0.0227	0.0217	1,191.8363
NaturalGas Unmitigated	0.1340	1.1454	0.4874	7.3100e-003		0.0926	0.0926		0.0926	0.0926		1,462.1669	1,462.1669	0.0280	0.0268	1,470.8558

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 High Rise	2842.6	0.0307	0.2620	0.1115	1.6700e-003		0.0212	0.0212		0.0212	0.0212		334.4232	334.4232	6.4100e-003	6.1300e-003	336.4105
Apartments Mid Rise	3887.31	0.0419	0.3582	0.1524	2.2900e-003		0.0290	0.0290		0.0290	0.0290		457.3308	457.3308	8.7700e-003	8.3800e-003	460.0485
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Single Family Housing	5698.51	0.0615	0.5252	0.2235	3.3500e-003		0.0425	0.0425		0.0425	0.0425		670.4129	670.4129	0.0129	0.0123	674.3969
Total		**0.1340**	**1.1454**	**0.4874**	**7.3100e-003**		**0.0926**	**0.0926**		**0.0926**	**0.0926**		**1,462.1669**	**1,462.1669**	**0.0280**	**0.0268**	**1,470.8558**

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					
Apartments High Rise	2.42184	0.0261	0.2232	0.0950	1.4200e-003		0.0181	0.0181		0.0181	0.0181		284.9222	284.9222	5.4600e-003	5.2200e-003	286.6154
Apartments Mid Rise	3.31192	0.0357	0.3052	0.1299	1.9500e-003		0.0247	0.0247		0.0247	0.0247		389.6372	389.6372	7.4700e-003	7.1400e-003	391.9527
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Single Family Housing	4.33701	0.0468	0.3997	0.1701	2.5500e-003		0.0323	0.0323		0.0323	0.0323		510.2361	510.2361	9.7800e-003	9.3500e-003	513.2682
Total		**0.1086**	**0.9281**	**0.3949**	**5.9200e-003**		**0.0750**	**0.0750**		**0.0750**	**0.0750**		**1,184.7956**	**1,184.7956**	**0.0227**	**0.0217**	**1,191.8363**

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	11.4184	6.1411	31.4555	0.0386		0.6288	0.6288		0.6288	0.6288	0.0000	7,463.7868	7,463.7868	0.1928	0.1359	7,509.1006
Unmitigated	11.4184	6.1411	31.4555	0.0386		0.6288	0.6288		0.6288	0.6288	0.0000	7,463.7868	7,463.7868	0.1928	0.1359	7,509.1006

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	0.8985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	8.9570					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.6794	5.8059	2.4706	0.0371		0.4694	0.4694		0.4694	0.4694	0.0000	7,411.7647	7,411.7647	0.1421	0.1359	7,455.8091
Landscaping	0.8835	0.3352	28.9849	1.5300e-003		0.1594	0.1594		0.1594	0.1594		52.0221	52.0221	0.0508		53.2914
Total	**11.4184**	**6.1411**	**31.4555**	**0.0386**		**0.6288**	**0.6288**		**0.6288**	**0.6288**	**0.0000**	**7,463.7868**	**7,463.7868**	**0.1928**	**0.1359**	**7,509.1006**

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	0.8985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	8.9570					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.6794	5.8059	2.4706	0.0371		0.4694	0.4694		0.4694	0.4694	0.0000	7,411.7647	7,411.7647	0.1421	0.1359	7,455.8091
Landscaping	0.8835	0.3352	28.9849	1.5300e-003		0.1594	0.1594		0.1594	0.1594		52.0221	52.0221	0.0508		53.2914
Total	**11.4184**	**6.1411**	**31.4555**	**0.0386**		**0.6288**	**0.6288**		**0.6288**	**0.6288**	**0.0000**	**7,463.7868**	**7,463.7868**	**0.1928**	**0.1359**	**7,509.1006**

APPENDIX B

CALINE4 Modeling Results

EMFAC2014 (v1.0.7) Emission Rates
Region Type: County
Region: San Diego
Calendar Year: 2020
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, g/mile for RUNEX, PMBW and PMTW

Region	CalYr	VehClass	MdlYr	Speed	Fuel	VMT	CO_RUNEX
San Diego	2020	HHDT	Aggregated	10	GAS	321.0158318	51.36011445
San Diego	2020	HHDT	Aggregated	10	DSL	33718.96224	7.940954065
San Diego	2020	LDA	Aggregated	10	GAS	222323.4663	1.229020591
San Diego	2020	LDA	Aggregated	10	DSL	2575.521661	2.622443852
San Diego	2020	LDT1	Aggregated	10	GAS	16873.94103	2.757187771
San Diego	2020	LDT1	Aggregated	10	DSL	17.31701606	2.707720635
San Diego	2020	LDT2	Aggregated	10	GAS	72486.87431	1.382130854
San Diego	2020	LDT2	Aggregated	10	DSL	140.8393584	1.741254263
San Diego	2020	LHDT1	Aggregated	10	GAS	47837.27414	2.67492448
San Diego	2020	LHDT1	Aggregated	10	DSL	45442.30348	2.307736276
San Diego	2020	LHDT2	Aggregated	10	GAS	10937.96841	0.981886865
San Diego	2020	LHDT2	Aggregated	10	DSL	18108.40706	2.145802404
San Diego	2020	MCY	Aggregated	10	GAS	2433.918531	38.29045473
San Diego	2020	MDV	Aggregated	10	GAS	42820.09194	2.354600225
San Diego	2020	MDV	Aggregated	10	DSL	805.3706613	2.664133982
San Diego	2020	MH	Aggregated	10	GAS	3610.064324	10.24730005
San Diego	2020	MH	Aggregated	10	DSL	864.0127609	2.003864281
San Diego	2020	MHDT	Aggregated	10	GAS	6283.202881	4.110951018
San Diego	2020	MHDT	Aggregated	10	DSL	45403.77742	1.547338932
San Diego	2020	OBUS	Aggregated	10	GAS	3738.476346	2.16399785
San Diego	2020	OBUS	Aggregated	10	DSL	2614.678198	2.19703322
San Diego	2020	SBUS	Aggregated	10	GAS	556.1818492	4.8192967
San Diego	2020	SBUS	Aggregated	10	DSL	1571.793152	1.097077064
San Diego	2020	UBUS	Aggregated	10	GAS	2813.486815	2.855619355
San Diego	2020	UBUS	Aggregated	10	DSL	5281.717501	30.02875419
						Composite	**2.560336345**

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-805 SB Ramps and Olympic Pkwy
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT:

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 79.2 (M)
BRG= WORST CASE	VD= 0.0 CM/S	
CLAS= 7 (G)	VS= 0.0 CM/S	
MIXH= 1000. M	AMB= 0.0 PPM	
SIGTH= 10. DEGREES	TEMP= 12.1 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. OP EBLA	-500	-12	30	-12	AG	0	2.6	0.0	33.0
B. OP EBTA	-500	-36	0	-36	AG	1274	2.6	0.0	33.0
C. OP EBRA	-500	-54	-18	-54	AG	345	2.6	0.0	33.0
D. OP EBD	0	-36	500	-36	AG	2560	2.6	0.0	33.0
E. OP WBRA	500	36	30	36	AG	0	2.6	0.0	33.0
F. OP WBTA	500	18	-30	18	AG	1458	2.6	0.0	33.0
G. OP WBLA	500	-12	-18	-12	AG	1459	2.6	0.0	33.0
H. OP WBD	-30	18	-500	18	AG	2283	2.6	0.0	33.0
I. I-805 SBLA	0	500	0	-36	AG	1286	2.6	0.0	33.0
J. I-805 SBTA	-18	500	-18	-12	AG	5	2.6	0.0	33.0
K. I-805 SBRA	-30	500	-30	18	AG	825	2.6	0.0	33.0
L. I-805 SBD	-18	-12	-18	-500	AG	1809	2.6	0.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. SR1	-60	60	5.9
2. SR2	60	60	5.9
3. SR3	-60	-60	5.9
4. SR4	60	-60	5.9

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION

JOB: I-805 SB Ramps and Olympic Pkwy
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT:

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SR1	111.	0.6	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.0
2. SR2	214.	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
3. SR3	76.	0.8	0.0	0.1	0.0	0.3	0.0	0.1	0.1	0.0
4. SR4	72.	0.7	0.0	0.0	0.0	0.4	0.0	0.1	0.1	0.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L
1. SR1	0.1	0.0	0.1	0.0
2. SR2	0.1	0.0	0.0	0.1
3. SR3	0.0	0.0	0.0	0.1
4. SR4	0.0	0.0	0.0	0.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION

JOB: I-805 NB Ramps and Olympic Pkwy
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT:

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 82.9 (M)
BRG= WORST CASE	VD= 0.0 CM/S	
CLAS= 7 (G)	VS= 0.0 CM/S	
MIXH= 1000. M	AMB= 0.0 PPM	
SIGTH= 10. DEGREES	TEMP= 12.1 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. OP EBLA	-500	-12	30	-12	AG	455	2.6	0.0	33.0
B. OP EBTA	-500	-36	0	-36	AG	2110	2.6	0.0	33.0
C. OP EBRA	-500	-54	-18	-54	AG	0	2.6	0.0	33.0
D. OP EBD	0	-36	500	-36	AG	3126	2.6	0.0	33.0
E. OP WBRA	500	36	30	36	AG	756	2.6	0.0	33.0
F. OP WBTA	500	18	-30	18	AG	2302	2.6	0.0	33.0
G. OP WBLA	500	-12	-18	-12	AG	0	2.6	0.0	33.0
H. OP WBD	-30	18	-500	18	AG	2927	2.6	0.0	33.0
I. I-805 NBLA	12	-500	12	18	AG	625	2.6	0.0	33.0
J. I-805 NBTA	-30	-500	30	-12	AG	5	2.6	0.0	33.0
K. I-805 NBRA	42	-500	42	-36	AG	1016	2.6	0.0	33.0
L. I-805 NBD	30	-12	30	500	AG	1216	2.6	0.0	33.0

LINK COORDINATES (FT): X1, Y1, X2, Y2

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. SR1	-60	60	5.9
2. SR2	60	60	5.9
3. SR3	-60	-60	5.9
4. SR4	60	-60	5.9

COORDINATES (FT)

JOB: I-805 NB Ramps and Olympic Pkwy
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT:

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SR1	106.	0.5	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.0
2. SR2	213.	0.6	0.0	0.1	0.0	0.1	0.1	0.2	0.0	0.0
3. SR3	76.	0.7	0.0	0.1	0.0	0.3	0.0	0.1	0.0	0.0
4. SR4	289.	0.8	0.1	0.2	0.0	0.3	0.0	0.0	0.0	0.2

RECEPTOR	CONC/LINK (PPM) I	J	K	L
1. SR1	0.0	0.0	0.0	0.1
2. SR2	0.1	0.0	0.0	0.1
3. SR3	0.0	0.0	0.0	0.0
4. SR4	0.0	0.0	0.1	0.0

APPENDIX C

Blasting and Rock Crushing Emissions Estimates

Otay Ranch Village 4
Blasting Emissions
Phase 1

Equation:

Where:

Reference:

Assumptions:

Anticipated blasting activities is assumed to include the following:

406,500	cubic yard/phase
60	days
6,775	cubic yard/day
492	ton explosives/phase
8.2	ton explosives/day
2,027,718	square feet blasted/phase
33,795	square feet blasted/day

Emissions Calculations:

Pollutant	Source	Emission Factor	Units	Maximum Daily (lbs/day)	Annual (lbs/year)	Annual (ton/year)
ROG	1	N/A	lb/ton	—	—	—
NOx	1	17	lb/ton	139.40	8,364.00	4.18
CO	1	67	lb/ton	549.40	32,964.00	16.48
SOx	1	2	lb/ton	16.40	984.00	0.49
PM_{10}	2	—	lb/blast	45.23	21,020.48	10.51
$PM_{2.5}$	2	—	lb/blast	2.61	1,212.72	0.61

Source/Reference:

1. AP-42, Section 13.3, Table 13.3-1 for ANFO.
2. AP-42, Section 11.9, Table 11.9-1.
   $PM_{10} = 0.52 \times 0.000014 \times (A)^{1.5}$, where A is the horizontal area blasted.
   $PM_{2.5} = 0.03 \times 0.000014 \times (A)^{1.5}$, where A is the horizontal area blasted.

Otay Ranch Village 4
Blasting Emissions
Phase 1

Equation:

Where:

Reference:

Assumptions:

Anticipated blasting activities is assumed to include the following:

406,500	cubic yard/phase
60	days
6,775	cubic yard/day
492	ton explosives/phase
8.2	ton explosives/day
2,027,718	square feet blasted/phase
33,795	square feet blasted/day

Emissions Calculations:

Pollutant	Source	Emission Factor	Units	Maximum Daily (lbs/day)	Annual (lbs/year)	Annual (ton/year)
ROG	1	N/A	lb/ton	—	—	—
NOx	1	17	lb/ton	139.40	8,364.00	4.18
CO	1	67	lb/ton	549.40	32,964.00	16.48
SOx	1	2	lb/ton	16.40	984.00	0.49
PM_{10}	2	—	lb/blast	45.23	21,020.48	10.51
$PM_{2.5}$	2	—	lb/blast	2.61	1,212.72	0.61

Source/Reference:

1. AP-42, Section 13.3, Table 13.3-1 for ANFO.
2. AP-42, Section 11.9, Table 11.9-1.
   $PM_{10} = 0.52 \times 0.000014 \times (A)^{1.5}$, where A is the horizontal area blasted.
   $PM_{2.5} = 0.03 \times 0.000014 \times (A)^{1.5}$, where A is the horizontal area blasted.

Otay Ranch Village 4
Rock Crusher Emissions
Per Crushing Facility

Production Rate Information

2,500	cu yd/day
2.26	tons/cu yd
5,650	ton/day

Drop Operations Formula

$EF(PM) = (k*0.0032)*(U/5)^{1.3}/(M/2)^{1.4}$

k (PM_{10}) =	0.35	
k ($PM_{2.5}$) =	0.053	
U =	2.40	mph
M =	3	%

Equipment Type	Throughput	PM_{10}		$PM_{2.5}$	
	Tons/day	Emission Factor (lb/ton)	Daily (lb/day)	Emission Factor (lb/ton)	Daily (lb/day)
Hopper Loading	5,650	0.000245	1.38	0.000037	0.209
Primary Crusher	5,650	0.00054	3.05	0.0001	0.565
Conveyor Transfer	5,650	0.000046	0.26	0.000013	0.073
Screen 1	5,650	0.00074	4.18	0.00005	0.283
Conveyor Transfer	1,695	0.000046	0.08	0.000013	0.022
Conveyor Transfer to Pile	1,695	0.000245	0.42	0.000037	0.063
Conveyor Transfer	3,955	0.000046	0.18	0.000013	0.051
Secondary Crusher	3,955	0.00054	2.14	0.000100	0.396
Conveyor Transfer	3,955	0.000046	0.18	0.000013	0.051
Screen 2	3,955	0.00074	2.93	0.00005	0.198
Conveyor Transfer	3,955	0.000046	0.18	0.000013	0.051
Conveyor Transfer to Pile	3,955	0.000245	0.97	0.000037	0.146
Total Rock Crushing			***15.95***		***2.11***

Notes:
1. Emission Factors from AP-42, Section 11.19.2 (Crushed Stone Processing), Table 11.19.2-2 (controlled factors).
2. Emission Factor for drop operation (conveyor to product pile) from AP-42, Section 13.2.4 (Aggregate Handling and Storage Piles), Equation 1. Wind speed is obtained from mean of Escondido 2010-2012 meteorlogical data. Moisture content is assumed to be 3%.

Phase 1

No. of Rock Crushing Facilities 1

	PM_{10}	$PM_{2.5}$
Total Rock Crushing	15.95	2.11

Otay Ranch Village 4
Rock Crushing Operation
Diesel Engine-Generator Emissions
Phase 1

Engine Rating	750	kW
	1060	HP
No. of Units	2	
Load Factor (1)	0.74	
Operating Schedule	8.0	hr/day
	277	days/yr

	VOC	NOx	CO	SOx	PM10	PM2.5	CO2	CH4
gm/BHP-hr (1)	0.280	4.058	1.128	0.005	0.095	0.095	568.299	0.025
lb/day	7.75	112.28	31.21	0.14	2.63	2.63	15,724	0.69
metric ton/yr							1,976	0.09

Notes:
(1) Emissions calculated using factors derived from CalEEMod for 1060 HP generator operating in 2018.

Otay Ranch Village 4
Rock Crushing Operation
Diesel Engine-Generator Emissions
Phase 1

Engine Rating	750	kW
	1060	HP
No. of Units	2	
Load Factor (1)	0.74	
Operating Schedule	8.0	hr/day
	277	days/yr

	VOC	NOx	CO	SOx	PM10	PM2.5	CO2	CH4
gm/BHP-hr (1)	0.280	4.058	1.128	0.005	0.095	0.095	568.299	0.025
lb/day	7.75	112.28	31.21	0.14	2.63	2.63	15,724	0.69
metric ton/yr							1,976	0.09

Notes:
(1) Emissions calculated using factors derived from CalEEMod for 1060 HP generator operating in 2018.

Otay Ranch Village 4
Rock Crusher Emissions
Per Crushing Facility

Production Rate Information

2,500	cu yd/day
2.26	tons/cu yd
5,650	ton/day

Drop Operations Formula

$EF(PM) = (k*0.0032)*(U/5)^{1.3}/(M/2)^{1.4}$

k (PM_{10}) =	0.35	
k ($PM_{2.5}$) =	0.053	
U =	2.40	mph
M =	3	%

Equipment Type	Throughput Tons/day	PM_{10} Emission Factor (lb/ton)	PM_{10} Daily (lb/day)	$PM_{2.5}$ Emission Factor (lb/ton)	$PM_{2.5}$ Daily (lb/day)
Hopper Loading	5,650	0.000245	1.38	0.000037	0.209
Primary Crusher	5,650	0.00054	3.05	0.0001	0.565
Conveyor Transfer	5,650	0.000046	0.26	0.000013	0.073
Screen 1	5,650	0.00074	4.18	0.00005	0.283
Conveyor Transfer	1,695	0.000046	0.08	0.000013	0.022
Conveyor Transfer to Pile	1,695	0.000245	0.42	0.000037	0.063
Conveyor Transfer	3,955	0.000046	0.18	0.000013	0.051
Secondary Crusher	3,955	0.00054	2.14	0.000100	0.396
Conveyor Transfer	3,955	0.000046	0.18	0.000013	0.051
Screen 2	3,955	0.00074	2.93	0.00005	0.198
Conveyor Transfer	3,955	0.000046	0.18	0.000013	0.051
Conveyor Transfer to Pile	3,955	0.000245	0.97	0.000037	0.146
Total Rock Crushing			***15.95***		***2.11***

Notes:
1. Emission Factors from AP-42, Section 11.19.2 (Crushed Stone Processing), Table 11.19.2-2 (controlled factors).
2. Emission Factor for drop operation (conveyor to product pile) from AP-42, Section 13.2.4 (Aggregate Handling and Storage Piles), Equation 1. Wind speed is obtained from mean of Escondido 2010-2012 meteorlogical data. Moisture content is assumed to be 3%.

Phase 1

No. of Rock Crushing Facilities 1

	PM_{10}	$PM_{2.5}$
Total Rock Crushing	15.95	2.11