# Appendix B

# Air Quality Study

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# CIELO VISTA
## AIR QUALITY IMPACT ANALYSIS
## COUNTY OF ORANGE, CALIFORNIA

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# CIELO VISTA
## AIR QUALITY IMPACT ANALYSIS
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# 1.0 INTRODUCTION

This report presents the results of the air quality impact analysis (AQIA) prepared by Urban Crossroads, Inc. for the proposed Cielo Vista residential project (referred to as “Project”), which is located north of Via del Agua and east of Aspen Way in unincorporated County of Orange.

The purpose of this AQIA is to evaluate the potential impacts to air quality associated with construction and operation of the proposed Project, and recommend measures to mitigate impacts considered significant in comparison to established regulatory thresholds.

## 1.1 PROJECT OVERVIEW

The Project proposes to develop up to 112 single family detached residential dwelling units on approximately 84 acres as shown on Exhibit 1-1. The single-family dwellings and associated infrastructure would be developed on approximately 47.64 acres (57%) of the site. Residential land use within the two Planning Areas would occur at a gross density of 1.4 dwelling units per acre. The minimum area of the residential lots would be 7,200 square feet and the average lot size would be approximately 14,811 square feet. Residences would be single-family front loaded homes and with a mix of configurations and designs. The project is within the City of Yorba Linda Sphere of Influence (SOI). For purposes of this AQIA, it is assumed that the Project will be constructed and fully occupied by 2015.

## 1.2 STANDARD REGULATORY REQUIREMENTS/BEST AVAILABLE CONTROL MEASURES (BACMS)

SCAQMD Rules that are currently applicable during construction activity for this Project include but are not limited to: Rule 1113 (Architectural Coatings); Rule 431.2 (Low Sulfur Fuel); Rule 403 (Fugitive Dust); and Rule 1186 / 1186.1 (Street Sweepers). In order to facilitate monitoring and compliance, applicable SCAQMD regulatory requirements are summarized below, and are restated as recommended mitigation measures (MM AQ-#).

**MM AQ-1**

The following measures are recommended to be incorporated into Project plans and specifications as implementation of Rule 403:

- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day. As shown in Table XI-A, located in

  Appendix “B”, implementation of this measure is estimated to reduce $PM_{10}$ and $PM_{2.5}$ fugitive dust emissions by approximately 61%.

- The contractor shall ensure that traffic speeds on unpaved roads and Project site areas are reduced to 15 miles per hour or less to reduce PM10 and PM2.5 fugitive dust haul road emissions by approximately 44%.

## 1.3 CONSTRUCTION ACTIVITY RECOMMENDED MITIGATION MEASURES

No significant impacts were identified and no mitigation measures are required beyond the BACM’s identified above.

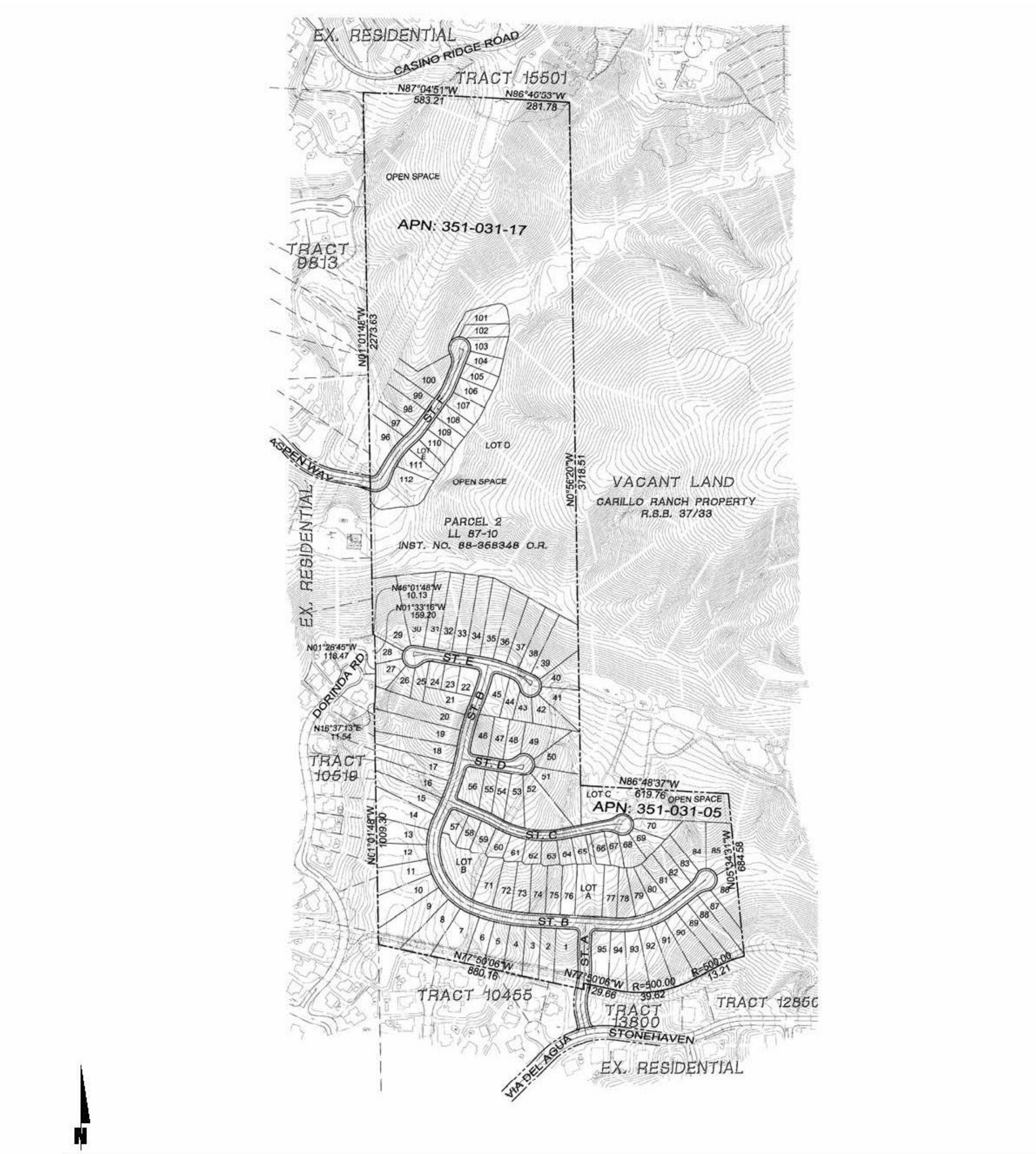
## 1.4 OPERATIONAL ACTIVITY RECOMMENDED MITIGATION MEASURES

No significant impacts were identified and no mitigation measures are required.

## 1.5 SUMMARY OF FINDINGS

- The Project will not conflict with or obstruct implementation of the applicable air quality plan.
- The Project will not violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- The Project will not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors.
- The Project will not expose sensitive receptors to substantial pollutant concentrations.
- The Project will not create objectionable odors affecting a substantial number of people.

EXHIBIT 1-1
# PRELIMINARY SITE PLAN



# 2.0 EXISTING CONDITIONS

This section provides an overview of the existing air quality conditions in the project area and region.

## 2.1 SOUTH COAST AIR BASIN

The project site is located in the SCAB within the jurisdiction of SCAQMD. The SCAQMD was created by the 1977 Lewis-Presley Air Quality Management Act, which merged four county air pollution control bodies into one regional district. Under the Act, the SCAQMD is responsible for bringing air quality in areas under its jurisdiction into conformity with federal and state air quality standards. As discussed above, the Project site is located within the South Coast Air Basin, a 6,745-square mile subregion of the SCAQMD, which includes portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County.

The SCAB is bound by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Los Angeles County portion of the Mojave Desert Air Basin is bound by the San Gabriel Mountains to the south and west, the Los Angeles / Kern County border to the north, and the Los Angeles / San Bernardino County border to the east. The Riverside County portion of the Salton Sea Air Basin is bound by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley.

## 2.2 REGIONAL CLIMATE

The regional climate has a substantial influence on air quality in the SCAB. In addition, the temperature, wind, humidity, precipitation, and amount of sunshine influence the air quality.

The annual average temperatures throughout the SCAB vary from the low to middle 60s (degrees Fahrenheit). Due to a decreased marine influence, the eastern portion of the SCAB shows greater variability in average annual minimum and maximum temperatures. January is the coldest month throughout the SCAB, with average minimum temperatures of 47°F in downtown Los Angeles and 39.7°F in Corona. All portions of the SCAB have recorded maximum temperatures above 100°F.

Although the climate of the SCAB can be characterized as semi-arid, the air near the land surface is quite moist on most days because of the presence of a marine layer. This shallow layer of sea air is an important modifier of SCAB climate. Humidity restricts visibility in the SCAB, and the conversion of sulfur dioxide to sulfates is heightened in air with high relative humidity. The marine layer provides an environment for that conversion process, especially during the spring and summer months. The annual average relative humidity within the SCAB is 71 percent along the coast and 59 percent inland. Since the ocean effect is dominant, periods of heavy early morning fog are frequent and low stratus clouds are a characteristic feature. These effects decrease with distance from the coast.

More than 90 percent of the SCAB's rainfall occurs from November through April. The annual average rainfall varies from approximately nine inches in Riverside to fourteen inches in downtown Los Angeles. Monthly and yearly rainfall totals are extremely variable. Summer rainfall usually consists of widely scattered thunderstorms near the coast and slightly heavier shower activity in the eastern portion of the SCAB with frequency being higher near the coast.

Due to its generally clear weather, about three-quarters of available sunshine is received in the SCAB. The remaining one-quarter is absorbed by clouds. The ultraviolet portion of this abundant radiation is a key factor in photochemical reactions. On the shortest day of the year there are approximately 10 hours of possible sunshine, and on the longest day of the year there are approximately 14-1/2 hours of possible sunshine.

The importance of wind to air pollution is considerable. The direction and speed of the wind determines the horizontal dispersion and transport of the air pollutants. During the late autumn to early spring rainy season, the SCAB is subjected to wind flows associated with the traveling storms moving through the region from the northwest. This period also brings five to ten periods of strong, dry offshore winds, locally termed "Santa Anas" each year. During the dry season, which coincides with the months of maximum photochemical smog concentrations, the wind flow is bimodal, typified by a daytime onshore sea breeze and a nighttime offshore drainage wind. Summer wind flows are created by the pressure differences between the relatively cold ocean and the unevenly heated and cooled land surfaces that modify the general northwesterly wind circulation over southern California. Nighttime drainage begins with the radiational cooling of the mountain slopes. Heavy, cool air descends the slopes and flows through the mountain passes and canyons as it follows the lowering terrain toward the ocean. Another characteristic wind regime in the SCAB is the "Catalina Eddy," a low level cyclonic (counterclockwise) flow centered over Santa Catalina Island which results in an offshore flow to the southwest. On most spring and summer days, some indication of an eddy is apparent in coastal sections.

In the SCAB, there are two distinct temperature inversion structures that control vertical mixing of air pollution. During the summer, warm high-pressure descending (subsiding) air is undercut by a shallow layer of cool marine air. The boundary between these two layers of air is a persistent marine subsidence/inversion. This boundary prevents vertical mixing which effectively acts as an impervious lid to pollutants over the entire SCAB. The mixing height for the inversion structure is normally situated 1,000 to 1,500 feet above mean sea level.

A second inversion-type forms in conjunction with the drainage of cool air off the surrounding mountains at night followed by the seaward drift of this pool of cool air. The top of this layer forms a sharp boundary with the warmer air aloft and creates nocturnal radiation inversions. These inversions occur primarily in the winter, when nights are longer and onshore flow is weakest. They are typically only a few hundred feet above mean sea level. These inversions effectively trap pollutants, such as $NO_X$ and CO from vehicles, as the pool of cool air drifts seaward. Winter is therefore a period of high levels of primary pollutants along the coastline.

## 2.3 WIND PATTERNS AND PROJECT LOCATION

The distinctive climate of the Project area and the SCAB is determined by its terrain and geographical location. The Basin is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter.

Wind patterns across the south coastal region are characterized by westerly and southwesterly on-shore winds during the day and easterly or northeasterly breezes at night. Winds are characteristically light although the speed is somewhat greater during the dry summer months than during the rainy winter season.

## 2.4 EXISTING AIR QUALITY

Existing air quality is measured based upon ambient air quality standards. These standards are the levels of air quality that are considered safe, with an adequate margin of safety, to protect the public health and welfare. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) currently in effect, as well health effects of each pollutant regulated under these standards are shown in Table 2-1.

The determination of whether a region's air quality is healthful or unhealthful is determined by comparing contaminant levels in ambient air samples to the state and federal standards presented in Table 2-1. The air quality in a region is considered to be in attainment by the state if the measured ambient air pollutant levels for $O_3$, CO, $SO_2$, $NO_2$, $PM_{10}$, and $PM_{2.5}$ are not equaled or exceeded at any time in any consecutive three-year period; and the federal standards (other than $O_3$, $PM_{10}$, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not exceeded more than once per year. The $O_3$ standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For $PM_{10}$, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

## TABLE 2-1 (PAGE 1 OF 2)

# Ambient Air Quality Standards

| Pollutant | Averaging Time | California Standards [1] | | National Standards [2] | | |
|---|---|---|---|---|---|---|
| | | Concentration [3] | Method [4] | Primary [3,5] | Secondary [3,6] | Method [7] |
| Ozone ($O_3$) | 1 Hour | 0.09 ppm (180 $\mu g/m^3$) | Ultraviolet Photometry | — | Same as Primary Standard | Ultraviolet Photometry |
| | 8 Hour | 0.070 ppm (137 $\mu g/m^3$) | | 0.075 ppm (147 $\mu g/m^3$) | | |
| Respirable Particulate Matter (PM10) | 24 Hour | 50 $\mu g/m^3$ | Gravimetric or Beta Attenuation | 150 $\mu g/m^3$ | Same as Primary Standard | Inertial Separation and Gravimetric Analysis |
| | Annual Arithmetic Mean | 20 $\mu g/m^3$ | | — | | |
| Fine Particulate Matter (PM2.5) | 24 Hour | — | — | 35 $\mu g/m^3$ | Same as Primary Standard | Inertial Separation and Gravimetric Analysis |
| | Annual Arithmetic Mean | 12 $\mu g/m^3$ | Gravimetric or Beta Attenuation | 15 $\mu g/m^3$ | | |
| Carbon Monoxide (CO) | 1 Hour | 20 ppm (23 $mg/m^3$) | Non-Dispersive Infrared Photometry (NDIR) | 35 ppm (40 $mg/m^3$) | — | Non-Dispersive Infrared Photometry (NDIR) |
| | 8 Hour | 9.0 ppm (10 $mg/m^3$) | | 9 ppm (10 $mg/m^3$) | — | |
| | 8 Hour (Lake Tahoe) | 6 ppm (7 $mg/m^3$) | | — | — | |
| Nitrogen Dioxide ($NO_2$)[8] | 1 Hour | 0.18 ppm (339 $\mu g/m^3$) | Gas Phase Chemiluminescence | 100 ppb (188 $\mu g/m^3$) | — | Gas Phase Chemiluminescence |
| | Annual Arithmetic Mean | 0.030 ppm (57 μg/m3) | | 0.053 ppm (100 $\mu g/m^3$) | Same as Primary Standard | |
| Sulfur Dioxide ($SO_2$)[9] | 1 Hour | 0.25 ppm (655 $\mu g/m^3$) | Ultraviolet Fluorescence | 75 ppb (196 $\mu g/m^3$) | — | Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method) |
| | 3 Hour | — | | — | 0.5 ppm (1300 $\mu g/m^3$) | |
| | 24 Hour | 0.04 ppm (105 $\mu g/m^3$) | | 0.14 ppm (for certain areas)[9] | — | |
| | Annual Arithmetic Mean | — | | 0.030 ppm (for certain areas)[9] | — | |
| Lead[10,11] | 30 Day Average | 1.5 $\mu g/m^3$ | Atomic Absorption | — | — | High Volume Sampler and Atomic Absorption |
| | Calendar Quarter | — | | 1.5 $\mu g/m^3$ (for certain areas)[11] | Same as Primary Standard | |
| | Rolling 3-Month Average | — | | 0.15 $\mu g/m^3$ | | |
| Visibility Reducing Particles[12] | 8 Hour | See footnote 12 | Beta Attenuation and Transmittance through Filter Tape | No National Standards | | |
| Sulfates | 24 Hour | 25 $\mu g/m^3$ | Ion Chromatography | | | |
| Hydrogen Sulfide | 1 Hour | 0.03 ppm (42 $\mu g/m^3$) | Ultraviolet Fluorescence | | | |
| Vinyl Chloride[10] | 24 Hour | 0.01 ppm (26 $\mu g/m^3$) | Gas Chromatography | | | |

See footnotes on next page …

For more information please call ARB-PIO at (916) 322-2990

California Air Resources Board (6/7/12)

## TABLE 2-1 FOOTNOTES (PAGE 2 OF 2)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°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.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

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

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

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. 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 ppb. Note that the national 1-hour standard is in units of parts per billion (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.

9. 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 one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

   Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' 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.

11. 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.

12. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

**For more information please call ARB-PIO at (916) 322-2990** **California Air Resources Board (6/7/12)**

## 2.5 REGIONAL AIR QUALITY

The SCAQMD monitors levels of various criteria pollutants at 30 monitoring stations throughout the air district. In 2011, the federal and state standards were exceeded on one or more days for ozone, $PM_{10}$, and $PM_{2.5}$ at most monitoring locations. No areas of the SCAB exceeded federal or state standards for $NO_2$, $SO_2$, CO, sulfates or lead. See Table 2-2 for attainment designations for the SCAB.

## 2.6 LOCAL AIR QUALITY

The Project site is located in the Source Receptor Area (SRA) 16 (North Orange County); the monitoring station for this area is located at 621 West Lambert Road in the City of La Habra (Station No. 3177). This station monitors ambient concentrations of Ozone ($O_3$), Carbon Monoxide (CO) and Nitrogen Dioxide ($NO_2$). Ambient concentrations of Particulate Matter < 10 microns ($PM_{10}$) and Particulate Matter < 2.5 microns ($PM_{2.5}$) are monitored at the Anaheim monitoring station located in the Central Orange County (SRA 17), which is located at 1630 Pampas Lane in the City of Anaheim.

The most recent three (3) years of data available[1] is shown on Table 2-3 and identifies the number of days standards were exceeded for the study area, which was chosen to be representative of the local air quality at the Project site. Additionally, data for $SO_2$ has been omitted as attainment is regularly met in the South Coast Air Basin and few monitoring stations measure $SO_2$ concentrations.

Criteria pollutants are pollutants that are regulated through the development of human health based and/or environmentally based criteria for setting permissible levels. Examples of sources and effects of the criteria pollutants are identified below:

- Carbon Monoxide (CO): Is a colorless, odorless gas produced by the incomplete combustion of carbon-containing fuels, such as gasoline or wood. CO concentrations tend to be the highest during the winter morning, when little to no wind and surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines, unlike ozone, motor vehicles operating at slow speeds are the primary source of CO in the Basin. The highest ambient CO concentrations are generally found near congested transportation corridors and intersections.

- Sulfur Dioxide ($SO_2$): Is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high sulfur-content fuel oils and coal and from chemical processes occurring at chemical plants and refineries. When SO2 oxidizes in the atmosphere, it forms sulfates (SO4). Collectively, these pollutants are referred to as sulfur oxides (SOX).

[1] Year 2012 air quality monitoring station data was not available at the time of preparation of this report from the SCAQMD.

## TABLE 2-2

### ATTAINMENT STATUS OF CRITERIA POLLUTANTS IN THE SOUTH COAST AIR BASIN (SCAB)

| Criteria Pollutant | State Designation | Federal Designation |
|---|---|---|
| Ozone - 1hour standard | Nonattainment | No Standard |
| Ozone - 8 hour standard | Nonattainment | Extreme Nonattainment[1] |
| $PM_{10}$ | Nonattainment | Serious Nonattainment |
| $PM_{2.5}$ | Nonattainment | Nonattainment |
| Carbon Monoxide | Attainment | Attainment/Maintenance |
| Nitrogen Dioxide | Nonattainment[2] | Attainment/Maintenance |
| Sulfur Dioxide | Attainment | Attainment |
| Lead | Attainment/Nonattainment[3] | Attainment/Nonattainment[4] |
| All others | Attainment/Unclassified | Attainment/Unclassified |

Source: California Air Resources Board 2010 (http://www.arb.ca.gov/regact/2010/area10/area10.htm, http://www.arb.ca.gov/desig/feddesig.htm)

[1] The USEPA approved redesignation from Severe 17 to Extreme Nonattainment on May 5, 2010 to be effective June 4, 2010.

[2] The SCAB was reclassified from attainment to nonattainment for nitrogen dioxide on March 25, 2010.

[3] Los Angeles County was reclassified from attainment to nonattainment for lead on March 25, 2010; the remainder of the SCAB is in attainment of the State Standard.

[4] The Los Angeles County portion of the SCAB is classified as nonattainment; the remainder of the SCAB is in attainment of the State Standard.

## TABLE 2-3

### PROJECT AREA AIR QUALITY MONITORING SUMMARY 2008-2010 AIR MONITORING DATA [a]

| POLLUTANT | STANDARD | YEAR | | |
|---|---|---|---|---|
| | | 2009 | 2010 | 2011 |
| Ozone ($O_3$) | | | | |
| Maximum 1-Hour Concentration (ppm) | | 0.115 | 0.118 | 0.095 |
| Maximum 8-Hour Concentration (ppm) | | 0.082 | 0.096 | 0.074 |
| Number of Days Exceeding State 1-Hour Standard | > 0.09 ppm | 4 | 2 | 1 |
| Number of Days Exceeding State 8-Hour Standard | > 0.07 ppm | 9 | 4 | 3 |
| Number of Days Exceeding Federal 1-Hour Standard | > 0.12 ppm | 0 | 0 | 0 |
| Number of Days Exceeding Federal 8-Hour Standard | > 0.075 ppm | 3 | 1 | 0 |
| Number of Days Exceeding Health Advisory | ≥ 0.15 ppm | 0 | 0 | 0 |
| Carbon Monoxide (CO) | | | | |
| Maximum 1-Hour Concentration (ppm) | | 4 | 3 | -- |
| Maximum 8-Hour Concentration (ppm) | | 2.3 | 1.8 | 2.1 |
| Number of Days Exceeding State 1-Hour Standard | > 20 ppm | 0 | 0 | 0 |
| Number of Days Exceeding Federal / State 8-Hour Standard | > 9.0 ppm | 0 | 0 | 0 |
| Number of Days Exceeding Federal 1-Hour Standard | > 35 ppm | 0 | 0 | 0 |
| Nitrogen Dioxide ($NO_2$) | | | | |
| Maximum 1-Hour Concentration (ppm) | | 0.10 | 0.0825 | 0.0698 |
| Annual Arithmetic Mean Concentration (ppm) | | 0.0206 | 0.0201 | 0.0177 |
| Number of Days Exceeding State 1-Hour Standard | > 0.18 ppm | 0 | 0 | 0 |
| Inhalable Particulates ($PM_{10}$)[b] | | | | |
| Maximum 24-Hour Concentration (μg/$m^3$) | | 63 | 43 | 53 |
| Annual Arithmetic Mean (μg/$m^3$) | | 30.9 | 22.4 | 24.8 |
| Number of Samples Exceeding State Standard | > 50 μg/$m^3$ | 1 | 0 | 2 |
| Number of Samples Exceeding Federal Standard | > 150 μg/$m^3$ | 0 | 0 | 0 |
| Fine Particulates ($PM_{2.5}$)[b] | | | | |
| Maximum 24-Hour Concentration (μg/$m^3$) | | 64.6 | 31.7 | 39.2 |
| Annual Arithmetic Mean (μg/$m^3$) | | 11.8 | 10.2 | 11 |
| Number of Samples Exceeding Federal 24-Hour Standard | > 35 μg/$m^3$ | 4 | 0 | 2 |

[a] North Orange County (SRA 16) monitoring station data used unless otherwise noted.
[b] Central Orange County (SRA 17) monitoring station data.

Source: South Coast AQMD (www.aqmd.gov)

- Nitrogen Oxides (Oxides of Nitrogen, or $NO_x$): Nitrogen oxides ($NO_x$) consist of nitric oxide (NO), nitrogen dioxide ($NO_2$) and nitrous oxide ($N_2O$) and are formed when nitrogen ($N_2$) combines with oxygen ($O_2$). Their lifespan in the atmosphere ranges from one to seven days for nitric oxide and nitrogen dioxide, to 170 years for nitrous oxide. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. $NO_2$ is a criteria air pollutant, and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility. Of the seven types of nitrogen oxide compounds, NO2 is the most abundant in the atmosphere. As ambient concentrations of NO2 are related to traffic density, commuters in heavy traffic may be exposed to higher concentrations of NO2 than those indicated by regional monitors.

- Ozone ($O_3$): Is a highly reactive and unstable gas that is formed when volatile organic compounds (VOCs) and nitrogen oxides (NOX), both byproducts of internal combustion engine exhaust, undergo slow photochemical reactions in the presence of sunlight. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable to the formation of this pollutant.

- $PM_{10}$ (Particulate Matter less than 10 microns): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the lungs where they may be deposited, resulting in adverse health effects. $PM_{10}$ also causes visibility reduction and is a criteria air pollutant.

- $PM_{2.5}$ (Particulate Matter less than 2.5 microns): A similar air pollutant consisting of tiny solid or liquid particles which are 2.5 microns or smaller (which is often referred to as fine particles). These particles are formed in the atmosphere from primary gaseous emissions that include sulfates formed from $SO_2$ release from power plants and industrial facilities and nitrates that are formed from $NO_X$ release from power plants, automobiles and other types of combustion sources. The chemical composition of fine particles highly depends on location, time of year, and weather conditions. $PM_{2.5}$ is a criteria air pollutant.

- Volatile Organic Compounds (VOC): Volatile organic compounds are hydrocarbon compounds (any compound containing various combinations of hydrogen and carbon atoms) that exist in the ambient air. VOCs contribute to the formation of smog through atmospheric photochemical reactions and/or may be toxic. Compounds of carbon (also known as organic compounds) have different levels of reactivity; that is, they do not react at the same speed or do not form ozone to the same extent when exposed to photochemical processes. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints. Exceptions to the VOC designation include: carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. VOCs are a criteria pollutant since they are a precursor to $O_3$, which is a criteria pollutant.

- Reactive Organic Gasses (ROG): Similar to VOC, Reactive Organic Gasses (ROG) are also precursors in forming ozone and consist of compounds containing methane, ethane, propane, butane, and longer chain hydrocarbons, which are typically the result of some type of combustion/decomposition process. Smog is formed when ROG and nitrogen oxides react in the presence of sunlight. ROGs are a criteria pollutant since they are a precursor to $O_3$, which is a criteria pollutant.

- Lead (Pb): Lead is a heavy metal that is highly persistent in the environment. In the past, the primary source of lead in the air was emissions from vehicles burning leaded gasoline. As a result of the removal of lead from gasoline, there have been no violations at any of the SCAQMD's regular air monitoring stations since 1982. Currently, emissions of lead are largely limited to stationary sources such as lead smelters. It should be noted that the proposed Project is not anticipated to generate a quantifiable amount of lead emissions. Lead is a criteria air pollutant.

**Health Effects of Air Pollutants**

*Ozone*

Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible sub-groups for ozone effects. Short-term exposure (lasting for a few hours) to ozone 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. Elevated ozone levels are associated with increased school absences. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in multiple sports and live in communities with high ozone levels.

Ozone exposure under exercising conditions is known to increase the severity of the responses described above. Animal studies suggest that exposure to a combination of pollutants that includes ozone may be more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.

*Carbon Monoxide*

Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of decreased oxygen supply to the heart. Inhaled CO has no direct toxic effect on the lungs, but exerts its effect on tissues by interfering with oxygen transport and competing with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include fetuses, patients with diseases involving heart and blood vessels, and patients with chronic hypoxemia (oxygen deficiency) as seen at high altitudes.

Reduction in birth weight and impaired neurobehavioral development have been observed in animals chronically exposed to CO, resulting in COHb levels similar to those observed in smokers. Recent studies have found increased risks for adverse birth outcomes with exposure to elevated CO levels; these include pre-term births and heart abnormalities.

*Particulate Matter*

A consistent correlation between elevated ambient fine particulate matter (PM10 and PM2.5) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. In recent years, some studies have reported an association between long-term exposure to air pollution dominated by fine particles and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

Daily fluctuations in PM2.5 concentration levels have also been related to hospital admissions for acute respiratory conditions in children, to school and kindergarten absences, to a decrease in respiratory lung volumes in normal children, and to increased medication use in children and adults with asthma. Recent studies show lung function growth in children is reduced with long-term exposure to particulate matter.

The elderly, people with pre-existing respiratory or cardiovascular disease, and children appear to be more susceptible to the effects of high levels of PM10 and PM2.5.

*Nitrogen Dioxide*

Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposure to NO2 at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to NO2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups.

In animals, exposure to levels of NO2 considerably higher than ambient concentrations results in increased susceptibility to infections, possibly due to the observed changes in cells involved in maintaining immune functions. The severity of lung tissue damage associated with high levels of ozone exposure increases when animals are exposed to a combination of ozone and NO2.

*Sulfur Dioxide*

A few minutes of exposure to low levels of SO2 can result in airway constriction in some asthmatics, all of whom are sensitive to its effects. In asthmatics, increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, are observed after acute exposure to SO2. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO2.

Animal studies suggest that despite SO2 being a respiratory irritant, it does not cause substantial lung injury at ambient concentrations. However, very high levels of exposure can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract.

Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO2 levels. In these studies, efforts to separate the effects of SO2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.

*Lead*

Fetuses, infants, and children are more sensitive than others to the adverse effects of Pb exposure. Exposure to low levels of Pb can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased Pb levels are associated with increased blood pressure.

Pb poisoning can cause anemia, lethargy, seizures, and death; although it appears that there are no direct effects of Pb on the respiratory system. Pb can be stored in the bone from early age environmental exposure, and elevated blood Pb levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland) and osteoporosis (breakdown of bony tissue). Fetuses and breast-fed babies can be exposed to higher levels of Pb because of previous environmental Pb exposure of their mothers.

*Odors*

The science of odor as a health concern is still new. Merely identifying the hundreds of VOCs that cause odors poses a big challenge. Offensive odors can potentially affect human health in several ways. First, odorant compounds can irritate the eye, nose, and throat, which can reduce respiratory volume. Second, studies have shown that the VOCs that cause odors can stimulate sensory nerves to cause neurochemical changes that might influence health, for instance, by compromising the immune system. Finally, unpleasant odors can trigger memories or attitudes linked to unpleasant odors, causing cognitive and emotional effects such as stress.

## 2.7 REGULATORY BACKGROUND

### 2.7.1 FEDERAL REGULATIONS

The U.S. EPA is responsible for setting and enforcing the NAAQS for $O_3$, CO, $NO_x$, $SO_2$, $PM_{10}$, and lead. The U.S. EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emissions sources outside state waters (Outer Continental Shelf). The U.S. EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of the CARB.

The Federal Clean Air Act (CAA) was first enacted in 1955, and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and 1990). The CAA establishes the federal air quality standards, the NAAQS, and specifies future dates for achieving compliance. The CAA also mandates that states submit and implement State Implementation Plans (SIPs) for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA that identify specific emission reduction goals for areas not meeting the NAAQS require a demonstration of reasonable further progress toward attainment and incorporate additional sanctions for failure to attain or to meet interim milestones. The sections of the CAA most directly applicable to the development of the Project site include Title I (Non-Attainment Provisions) and Title II (Mobile Source Provisions).

Title I provisions were established with the goal of attaining the NAAQS for the following criteria pollutants $O_3$, $NO_2$, $SO_2$, $PM_{10}$, CO, $PM_{2.5}$, and lead. The NAAQS were amended in July 1997 to include an additional standard for $O_3$ and to adopt a NAAQS for $PM_{2.5}$. Table 3-1 (previously presented) provides the NAAQS within the basin.

Mobile source emissions are regulated in accordance with Title II provisions. These provisions require the use of cleaner burning gasoline and other cleaner burning fuels such as methanol and natural gas. Automobile manufacturers are also required to reduce tailpipe emissions of hydrocarbons and nitrogen oxides ($NO_x$). $NO_x$ is a collective term that includes all forms of nitrogen oxides (NO, $NO_2$, $NO_3$) which are emitted as byproducts of the combustion process.

### 2.7.2 CALIFORNIA REGULATIONS

The CARB, which became part of the California EPA in 1991, is responsible for ensuring implementation of the California Clean Air Act (AB 2595, December 1998[2]), responding to the federal CAA, and for regulating emissions from consumer products and motor vehicles. The California CAA mandates achievement of the maximum degree of emissions reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date. The CARB established the CAAQS for all pollutants for which the federal government has NAAQS and, in addition, establishes standards for sulfates, visibility, hydrogen sulfide, and vinyl chloride. However at this time, hydrogen sulfide and vinyl chloride are not measured at any monitoring stations in the SCAB because they are not considered to be a regional air quality problem. Generally, the CAAQS are more stringent than the NAAQS.

Local air quality management districts, such as the SCAQMD, regulate air emissions from commercial and light industrial facilities. All air pollution control districts have been formally designated as attainment or non-attainment for each CAAQS.

Serious non-attainment areas are required to prepare air quality management plans that include specified emission reduction strategies in an effort to meet clean air goals. These plans are required to include:

- Application of Best Available Retrofit Control Technology to existing sources;
- Developing control programs for area sources (e.g., architectural coatings and solvents) and indirect sources (e.g. motor vehicle use generated by residential and commercial development);
- A District permitting system designed to allow no net increase in emissions from any new or modified permitted sources of emissions;
- Implementing reasonably available transportation control measures and assuring a substantial reduction in growth rate of vehicle trips and miles traveled;
- Significant use of low emissions vehicles by fleet operators;
- Sufficient control strategies to achieve a five percent or more annual reduction in emissions or 15 percent or more in a period of three years for ROGs, $NO_x$, CO and $PM_{10}$. However, air basins may use alternative emission reduction strategy that achieves a reduction of less than five percent per year under certain circumstances.

[2] California Clean Air Act 1998, AB 2595, SHER (Chapter 1568, Statutes of 1998)

### 2.7.3 AIR QUALITY MANAGEMENT PLANNING

Currently, the NAAQS and CAAQS are exceeded in most parts of the SCAB. In response, the SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the state and federal ambient air quality standards. AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy. A detailed discussion on the AQMP and Project consistency with the AQMP is provided in Section 3.8.

## 2.8 EXISTING PROJECT SITE AIR QUALITY CONDITIONS

The Project site is currently vacant, and therefore does not generate quantifiable emissions. Existing air quality conditions at the Project site would generally reflect ambient monitored conditions as presented previously at Table 2-3.

# 3.0 PROJECT AIR QUALITY IMPACT

## 3.1 INTRODUCTION

The Project has been evaluated to determine if it will violate an air quality standard or contribute to an existing or projected air quality violation. Additionally, the proposed Project has been evaluated to determine if it will result in a cumulatively considerable net increase of a criteria pollutant for which the SCAB is non-attainment under an applicable federal or state ambient air quality standard. The significance of these potential impacts is described in the following section. The County of Orange does not have its own thresholds of significance.

## 3.2 STANDARDS OF SIGNIFICANCE

The criteria used to determine the significance of potential Project-related air quality impacts are taken from the Initial Study Checklist in Appendix G of the State CEQA Guidelines (14 California Code of Regulations §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to air quality if it would:

*(1) Conflict with or obstruct implementation of the applicable air quality plan.*

*(2) Violate any air quality standard or contribute 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 in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors).*

*(4) Expose sensitive receptors to substantial pollutant concentrations.*

*(5) Create objectionable odors affecting a substantial number of people.*

The SCAQMD has also developed regional and localized significance thresholds for other regulated pollutants, as summarized at Table 3-1. The SCAQMD's CEQA Air Quality Significance Thresholds (March 2009) indicate that any projects in the SCAB with daily emissions that exceed any of the indicated thresholds should be considered as having an individually and cumulatively significant air quality impact.

**TABLE 3-1**

| MAXIMUM DAILY EMISSIONS THRESHOLDS (REGIONAL THRESHOLDS) | | |
|---|---|---|
| **Pollutant** | **Construction** | **Operational** |
| $NO_x$ | 100 lbs/day | 55 lbs/day |
| VOC | 75 lbs/day | 55 lbs/day |
| $PM_{10}$ | 150 lbs/day | 150 lbs/day |
| $PM_{2.5}$ | 55 lbs/day | 55 lbs/day |
| $SO_x$ | 150 lbs/day | 150 lbs/day |
| CO | 550 lbs/day | 550 lbs/day |
| Lead | 3 lbs/day | 3 lbs/day |

## 3.3 PROJECT-RELATED SOURCES OF POTENTIAL IMPACT

Land uses such as the proposed Project impact air quality through emissions associated with short-term construction, and long-term operational activity.

On February 3, 2011, the SCAQMD released the California Emissions Estimator Model™ (CalEEMod™). The purpose of this model is to accurately calculate criteria pollutant (NOx, VOC, $PM_{10}$, $PM_{2.5}$, SOx, and CO) and greenhouse gas (GHG) emissions from direct and indirect sources and quantify applicable air quality and GHG reductions achieved from mitigation measures. As such, the latest version of CalEEMod™ has been used for this Project to determine construction and operational air quality impacts. Output from the model runs for both construction and operational activity are provided in Appendix "A".

## 3.4 CONSTRUCTION EMISSIONS

Construction activities associated with the proposed project will result in emissions of CO, VOCs, $NO_x$, $SO_x$, $PM_{10}$, and $PM_{2.5}$. Construction related emissions are expected from the following construction activities:

- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coatings (Painting)
- Construction Workers Commuting

The duration of activities was estimated based on the Project's expected opening year, specific construction activity and CalEEMod™ model defaults for the number and type of equipment that would be used were utilized. Please refer to specific detailed modeling inputs/outputs contained in Appendix "A" of this Analysis. A detailed summary of construction equipment assumptions by phase is provided on Table 3-2. The California Air Resources Board (CARB) recently released the OFFROAD2011 emissions inventory model, which provides emissions estimates for various pieces of construction equipment. The OFFROAD2011 model is an update to the OFFROAD2007 model (which is embedded in CalEEMod™). In order to provide a more accurate depiction of construction-related emissions, construction equipment emissions from Site Preparation and Grading Activity were obtained from the OFFROAD2011 model. The CalEEMod™ outputs were adjusted accordingly to reflect the OFFROAD2011 emissions estimate outputs. Additional details on the OFFROAD2011 emissions calculations are available at Appendix "C".

Dust is typically a major concern during rough grading activities. Because such emissions are not amenable to collection and discharge through a controlled source, they are called "fugitive emissions". Emissions rates vary as a function of many parameters (soil silt, soil moisture, wind speed, area disturbed, number of vehicles, depth of disturbance or excavation, etc.). The CalEEMod™ model was utilized to calculate fugitive dust emissions resulting from this phase of activity Site Preparation is expected to occur from January 2014 through March 2014, Grading activities are expected to occur from March 2014 through June 2014, Building Construction is expected to occur from June 2014 through June 2015, Paving is expected to occur from June 2015 through August 2015, Architecture Coating is expected to occur from August 2015 through November 2015.

Construction emissions for construction worker vehicles traveling to and from the project site, as well as vendor trips (construction materials delivered to the project site) were estimated using the CalEEMod™ model.

### 3.4.1 CONSTRUCTION EMISSIONS SUMMARY

Assuming the scenario for construction activity outlined in Section 3.4, the estimated maximum daily construction emissions are summarized on Table 3-3. Detailed construction model outputs are presented in Appendix "A". Under the assumed scenarios, emissions resulting from the Project construction will not exceed criteria pollutant thresholds established by the SCAQMD.

## TABLE 3-2 CONSTRUCTION EQUIPMENT ASSUMPTIONS

| Activity | Concrete/Industrial Saws | Scraper | Grader | Rubber Tired Dozer | Excavator | Tractor / Loader / Backhoe | Pavers | Paving Equipment | Rollers | Forklift | Cranes | Air Compressor | Generator Set | Welder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site Preparation** | | 1 | 1 | | | 1 | | | | | | | | |
| **Grading** | | 2 | 1 | 1 | 2 | 2 | | | | | | | | |
| **Building Construction** | | | | | | 3 | | | | 3 | 1 | | 1 | 1 |
| **Paving** | | | | | | | 2 | 2 | 2 | | | | | |
| **Architecture Coating** | | | | | | | | | | | | 1 | | |

## TABLE 3-3 EMISSIONS SUMMARY OF OVERALL CONSTRUCTION (MAXIMUM DAILY EMISSIONS) (WITHOUT MITIGATION)

| Year | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| 2014 | 13.83 | 56.32 | 52.07 | 0.10 | 9.28 | 5.59 |
| 2015 | 29.09 | 30.88 | 26.29 | 0.05 | 3.27 | 2.57 |
| **Maximum Daily Emissions** | **29.09** | **56.32** | **52.07** | **0.10** | **9.28** | **5.59** |
| SCAQMD Regional Threshold | 75 | 100 | 550 | 150 | 150 | 55 |
| **Significant?** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** |

Note: Please refer to Appendix A for the CalEEMod™ output files and additional hand calculations for the estimated emissions.

## 3.5 OPERATIONAL EMISSIONS

Operational activities associated with the proposed Project will result in emissions of ROG, $NO_X$, CO, $SO_X$, $PM_{10}$, and $PM_{2.5}$. Operational emissions would be expected from the following primary sources:

- Vehicles
- Combustion Emissions Associated with Natural Gas and Electricity
- Fugitive dust related to vehicular travel
- Landscape maintenance equipment
- Emissions from consumer products
- Architectural coatings

### 3.5.1 VEHICLES

Project operational (vehicular) impacts are dependent on both overall daily vehicle trip generation and the effect of the project on peak hour traffic volumes and traffic operations in the vicinity of the project. The project related operational air quality impact centers primarily on the vehicle trips generated by the project. Trip characteristics available from the report, Cielo Vista Traffic Impact Analysis (Urban Crossroads, Inc., February 22, 2013) were utilized in this analysis. The estimated emissions resulting from vehicle operations are summarized in Table 3-4.

### 3.5.2 COMBUSTION EMISSIONS ASSOCIATED WITH NATURAL GAS AND ELECTRICITY

Electricity and natural gas are used by almost every project. Criteria pollutant emissions are emitted through the generation of electricity and consumption of natural gas. However, because electrical generating facilities for the Project area are located either outside the region (state) or offset through the use of pollution credits (RECLAIM) for generation within the SCAB, criteria pollutant emissions from offsite generation of electricity is generally excluded from the evaluation of significance and only natural gas use is considered. The emissions associated with natural gas use were calculated using the CalEEMod™ model. The estimated combustion emissions are provided in Table 3-4 (presented later in this report.) Detailed emission calculations are provided in Appendix “A”.

### 3.5.3 FUGITIVE DUST RELATED TO VEHICULAR TRAVEL

Vehicles traveling on paved roads would be a source of fugitive emissions due to the generation of road dust. The emissions estimates for travel on paved roads were calculated using the CalEEMod™ model. The estimated $PM_{10}$ and $PM_{2.5}$ emissions from vehicles for fugitive dust are summarized in Table 3-4 (presented later in this report.) Detailed emission calculations are provided in Appendix “A”.

### 3.5.4 LANDSCAPE MAINTENANCE EQUIPMENT

Landscape maintenance equipment would generate emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category would include lawnmowers, shedders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping of the Project. The emissions associated with landscape maintenance equipment were calculated based on assumptions provided in the CalEEMod™ model. The estimated landscape maintenance emissions are provided in Table 3-4 (presented later in this report.) Detailed emission calculations are provided in Appendix "A".

### 3.5.5 CONSUMER PRODUCTS

Consumer projects include, but are not limited to detergents, cleaning compounds, polishes, personal care products, and lawn and garden products. Many of these products contain organic compounds which when released in the atmosphere can react to form ozone and other photochemically reactive pollutants. The estimated emissions from consumer products are provided in Table 3-4 (presented later in this report.) Detailed emission calculations are provided in Appendix "A".

### 3.5.6 ARCHITECTURAL COATINGS

Over a period of time the buildings that are part of this Project will be subject to emissions resulting from the evaporation of solvents contained in paints, varnishes, primers, and other surface coatings as part of Project maintenance. The emissions associated with architectural coatings were calculated using the CalEEMod™ model. The estimated architectural coating emissions are provided in Table 3-4 (presented later in this report.) Detailed emission calculations are provided in Appendix "A".

### 3.5.7 OPERATIONAL EMISSIONS SUMMARY

The Project-related operations emissions burdens, along with a comparison of SCAQMD recommended significance thresholds, are shown on Table 3-4.

Detailed construction model outputs are presented in Appendix "A". Results of the analysis indicate that operation of the Project will not exceed criteria pollutant thresholds established by the SCAQMD.

## TABLE 3-4

### SUMMARY OF PEAK OPERATIONAL EMISSIONS (SUMMER)
### (POUNDS PER DAY) (WITHOUT MITIGATION)

| Operational Activities | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Area Source Emissions [a] | 16.65 | 0.66 | 46.60 | 0.09 | 5.97 | 5.97 |
| Energy Source Emissions [b] | 0.14 | 1.20 | 0.51 | 0.01 | 0.10 | 0.10 |
| Mobile Emissions [c] | 5.58 | 10.44 | 56.30 | 0.11 | 12.94 | 0.92 |
| **Maximum Daily Emissions** | **22.37** | **12.30** | **103.41** | **0.21** | **19.01** | **6.99** |
| SCAQMD Regional Threshold | 55 | 55 | 550 | 150 | 150 | 55 |
| **Significant?** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** |

### SUMMARY OF PEAK OPERATIONAL EMISSIONS (WINTER)
### (POUNDS PER DAY) (WITHOUT MITIGATION)

| Operational Activities | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Area Source Emissions [a] | 16.65 | 0.66 | 46.60 | 0.09 | 5.97 | 5.97 |
| Energy Source Emissions [b] | 0.14 | 1.20 | 0.51 | 0.01 | 0.10 | 0.10 |
| Mobile Emissions [c] | 5.98 | 11.49 | 54.96 | 0.10 | 12.94 | 0.93 |
| **Maximum Daily Emissions** | **22.77** | **13.35** | **102.07** | **0.20** | **19.01** | **7.00** |
| SCAQMD Regional Threshold | 55 | 55 | 550 | 150 | 150 | 55 |
| **Significant?** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** |

Note: Please refer to Appendix A for the CalEEMod™ output files and additional supporting information for the estimated emissions.

[a] Includes emissions of landscape maintenance equipment and architectural coatings emissions

[b] Includes emissions of natural gas consumption

[c] Includes emissions of vehicle emissions and fugitive dust related to vehicular travel

## 3.6 LOCALIZED SIGNIFICANCE – CONSTRUCTION ACTIVITY

The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (Methodology) (SCAQMD, June 2003). As previously discussed, the SCAQMD has established that impacts to air quality are significant if there is a potential to contribute or cause localized exceedances of the federal and/or state ambient air quality standards (NAAQS/CAAQS). Collectively, these are referred to as Localized Significance Thresholds (LSTs).

The significance of localized emissions impacts depends on whether ambient levels in the vicinity of the project are above or below State standards. In the case of CO and $NO_2$, if ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a state or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. This would apply to $PM_{10}$ and $PM_{2.5}$; both of which are non-attainment pollutants.

The SCAQMD established LSTs in response to the SCAQMD Governing Board's Environmental Justice Initiative I-4. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest residence or sensitive receptor. The SCAQMD states that lead agencies can use the LSTs as another indicator of significance in its air quality impact analyses.

LSTs were developed in response to environmental justice and health concerns raised by the public regarding exposure of individuals to criteria pollutants in local communities. To address the issue of localized significance, the SCAQMD adopted LSTs that show whether a project would cause or contribute to localized air quality impacts and thereby cause or contribute to potential localized adverse health effects. The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (Methodology) (SCAQMD, June 2003).

The SCAQMD issued guidance on applying CalEEMod™ to LSTs. Since CalEEMod™ calculates construction emissions based on the number of equipment hours and the maximum daily soil disturbance activity possible for each piece of equipment, the following table should be used to determine the maximum daily disturbed-acreage for comparison to LSTs.

| Construction Phase | Equipment Type | Equipment Quantity | Acres grader per 8 hour day | Operating Hours per Day | Acres graded per day |
|---|---|---|---|---|---|
| Grading | Crawler Tractor | 2 | 0.5 | 8 | 1.0 |
| | Graders | 1 | 0.5 | 8 | 0.5 |
| | Rubber Tired Dozers | 1 | 0.5 | 8 | 0.5 |
| | Scrapers | 2 | 1 | 8 | 2.0 |
| Total acres graded per day | | | | | 4.0 |
| Applicable LST Mass Rate Look-up Table | | | | | 4.0 acres |

For this Project, the appropriate Source Receptor Area (SRA) for the LST is the North Orange County area (SRA 16). LSTs apply to carbon monoxide (CO), nitrogen dioxide ($NO_2$), particulate matter ≤ 10 microns ($PM_{10}$), and particulate matter ≤ 2.5 microns ($PM_{2.5}$). The SCAQMD produced look-up tables for projects that disturb less than or equal to 5 acres in size. Larger Projects are advised to rely on dispersion modeling to determine localized pollutant concentrations. Since the Project will not disturb more than 5 acres in size, the SCAQMD's look-up tables were utilized to determine project impacts.

**EMISSIONS CONSIDERED**

SCAQMD's Methodology clearly states that "off-site mobile emissions from the Project should NOT be included in the emissions compared to LSTs." Therefore, for purposes of the construction LST analysis only emissions included in the CalEEMod "on-site" emissions outputs were considered (off-site haul truck emissions from soil import are exluded).

***RECEPTORS***

The nearest existing sensitive receptor to the development boundaries may be located adjacent to the proposed development. As such, the LSTs for receptors at 25 meters are utilized in this analysis.

***IMPACTS WITHOUT MITIGATION***

Without mitigation, emissions during construction activity will exceed the SCAQMD's localized significance thresholds for emissions of PM2.5. Table 3-5 identifies the unmitigated localized impacts at the nearest receptor location in the vicinity of the Project. It should be noted that the impacts without mitigation do not take credit for reductions achieved through best management practices (BMPs) and standard regulatory requirements (SCAQMD's Rule 403). As discussed in Section's 1.0 and 4.0, although there must be compliance with SCAQMD's Rule 403, in order to enhance monitoring and compliance, Rule 403 requirements are restated as recommended mitigation measures (MM AQ1).

***IMPACTS WITH MITIGATION***

After the implementation of applicable mitigation measures (MM AQ1), emissions during construction activity will not exceed the SCAQMD's localized significance threshold for any of the applicable emissions. Section 4.0 of this report provides mitigation measures to reduce these emissions to the maximum extent possible. Table 3-6 identifies the mitigated localized impacts at the nearest receptor location in the vicinity of the Project.

## TABLE 3-5

## LOCALIZED SIGNIFICANCE SUMMARY CONSTRUCTION (WITHOUT MITIGATION)

| Activity | $NO_x$ | CO | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| 2014 | 56.21 | 50.83 | 8.97 | 5.58 |
| 2015 | 30.10 | 22.98 | 2.54 | 2.54 |
| **Maximum Daily Emissions** | **56.21** | **50.83** | **8.97** | **5.58** |
| SCAQMD Localized Threshold | 196.33 | 1,128.00 | 11.00 | 5.33 |
| **Significant?** | **NO** | **NO** | **NO** | **YES** |

NOTE: PLEASE REFER TO ATTACHMENT "A" FOR CALEEMOD™ OUTPUT FILES FOR THE ESTIMATED EMISSIONS.

## TABLE 3-6

## LOCALIZED SIGNIFICANCE SUMMARY CONSTRUCTION (WITH MITIGATION)

| Activity | $NO_x$ | CO | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| 2014 | 56.21 | 50.83 | 4.88 | 3.56 |
| 2015 | 30.10 | 22.98 | 2.54 | 2.54 |
| **Maximum Daily Emissions** | **56.21** | **50.83** | **4.88** | **3.56** |
| SCAQMD Localized Threshold | 196.33 | 1,128.00 | 11.00 | 5.33 |
| **Significant?** | **NO** | **NO** | **NO** | **NO** |

NOTE: PLEASE REFER TO ATTACHMENT "A" FOR CALEEMOD™ OUTPUT FILES FOR THE ESTIMATED EMISSIONS.

## 3.7 LOCALIZED SIGNIFICANCE – LONG-TERM OPERATIONAL ACTIVITY

The proposed project involves the construction and operation of 112 single family residential DU's. According to SCAQMD LST methodology, LSTs would apply to the operational phase of a proposed project, if the project includes stationary sources, or attracts mobile sources that may spend long periods queuing and idling at the site (e.g., warehouse or truck transfer facilities). The proposed project does not include such uses, and thus, due to the lack of stationary source emissions, no long-term localized significance threshold analysis is needed.

## 3.8 CO "HOT SPOT" ANALYSIS

A carbon monoxide (CO) "hot spots" analysis is needed to determine whether the change in the level of service (LOS) of an intersection due to the Project would have the potential to result in exceedances of the California or National Ambient Air Quality Standards (CAAQS or NAAQS).

It has long been recognized that CO exceedances are caused by vehicular emissions, primarily when idling at intersections. Vehicle emissions standards have become increasingly more stringent in the last twenty years. Currently, the CO standard in California is a maximum of 3.4 grams/mile for passenger cars (there are requirements for certain vehicles that are more stringent). With the turnover of older vehicles, introduction of cleaner fuels and implementation of control technology on industrial facilities, CO concentrations in the Project vicinity have steadily declined, as shown based on historical data presented on Table 2-3.

Accordingly, with the steadily decreasing CO emissions from vehicles, even very busy intersections do not result in exceedances of the CO standard.

The analysis prepared for CO attainment in the SCAB by the SCAQMD can be used to assist in evaluating the potential for CO exceedances in the South Coast Air Basin. CO attainment was thoroughly analyzed as part of the SCAQMD's 2003 Air Quality Management Plan (2003 AQMP) and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan). As discussed in the 1992 CO Plan, peak carbon monoxide concentrations in the South Coast Air Basin are due to unusual meteorological and topographical conditions, and not due to the impact of particular intersections. Considering the region's unique meteorological conditions and the increasingly stringent CO emissions standards, CO modeling was performed as part of 1992 CO Plan and subsequent plan updates and air quality management plans.

In the 1992 CO Plan, a CO hot spot analysis was conducted for four busy intersections in Los Angeles County at the peak morning and afternoon time periods. The intersections evaluated included: Long Beach Blvd. and Imperial Highway (Lynwood); Wilshire Blvd. and Veteran Ave. (Westwood); Sunset Blvd. and Highland Ave. (Hollywood); and La Cienega Blvd. and Century Blvd. (Inglewood). The analysis in the 1992

CO Plan did not result in a violation of CO standards. The busiest intersection evaluated was that at Wilshire Blvd. and Veteran Ave., which has a daily traffic volume of approximately 100,000 vehicles per day. The Los Angeles County Metropolitan Transportation Authority evaluated the LOS in the vicinity of the Wilshire Blvd. /Veteran Ave. intersection and found it to be Level E at peak morning traffic and Level F at peak afternoon traffic. Table 3-7 below provides a summary of the modeled CO concentrations at the four intersections modeled in the 2003 AQMP.

### TABLE 3-7

### CO MODELING RESULTS FROM THE 2003 AQMP (PPM)

| Intersection Location | Morning 1-hour | Afternoon 1-hour | Peak 1-hour | 8-hour |
|---|---|---|---|---|
| **Wilshire-Veteran** | 4.6 | 3.5 | -- | 4.2 |
| **Sunset-Highland** | 4.0 | 4.5 | -- | 3.9 |
| **La Cienega-Century** | 3.7 | 3.1 | -- | 5.8 |
| **Long Beach-Imperial** | 3.0 | 3.1 | 1.2 | 9.3 |

Notes: ppm = parts per million. Federal 1-hour standard is 35 ppm and the federal 8- hour standard is 9.0 ppm.

A comparison of the traffic volumes (for the four highest volume intersections) is included in Tables 3-8 and 3-9 below. Table 3-9 clearly shows that the proposed project's traffic volumes would be less than those included in the AQMP modeling analysis (Table 3-8). Consequently at buildout of the Project, according to the Traffic Impact Analysis, none of the intersections in the vicinity of the Proposed Project Site would have peak hourly traffic volumes exceeding those at the intersections modeled in the 2003 AQMP, nor would there be any reason unique to project area meteorology to conclude that this intersection would yield higher CO concentrations if modeled in detail. As a result, the South Coast Air Basin has been designated as attainment for CO since 2007 (SCAQMD 2007) and even very busy intersections do not result in exceedances of the CO standard. The Project will not result in or contribute to any CO violations, and a less than significant impact will occur.

### TABLE 3-8

### TRAFFIC VOLUMES USED IN THE 2003 AQMP

| Intersection Location | Eastbound (AM/PM) | Westbound (AM/PM) | Southbound (AM/PM) | Northbound (AM/PM) |
|---|---|---|---|---|
| **Wilshire-Veteran** | 4,951/2,069 | 1,830/3,317 | 721/1,400 | 560/933 |
| **Sunset-Highland** | 1,417/1,764 | 1,342/1,540 | 2,304/1,832 | 1,551/2,238 |
| **La Cienega-Century** | 2,540/2,243 | 1,890/2,728 | 1,384/2,029 | 821/1,674 |
| **Long Beach-Imperial** | 1,217/2,020 | 1,760/1,400 | 479/944 | 756/1,150 |

Source: SCAQMD AQMP 2003.

## TABLE 3-9

## PROJECT PEAK HOUR TRAFFIC VOLUMES

| Intersection Location | Eastbound (AM/PM) | Westbound (AM/PM) | Southbound (AM/PM) | Northbound (AM/PM) |
|---|---|---|---|---|
| **Opening Year (2015) with Project** | | | | |
| **Imperial Hwy-Yorba Linda Blvd** | 636/1010 | 1487/1280 | 1396/1846 | 1561/1434 |
| **Lakeview Av-Yorba Linda Blvd** | 1017/1556 | 1469/1187 | 492/444 | 489/765 |
| **Fairmont Blvd-Yorba Linda Blvd** | 900/1545 | 1188/765 | 779/517 | 611/408 |
| **Village Ctr Dr-Yorba Linda Blvd** | 632/1065 | 1267/877 | 649/770 | 261/360 |
| **Horizon Year (2035) with Project** | | | | |
| **Imperial Hwy-Yorba Linda Blvd** | 700/1149 | 1643/1421 | 1738/2333 | 1951/1603 |
| **Lakeview Av-Yorba Linda Blvd** | 1119/1712 | 1906/1313 | 870/572 | 579/1185 |
| **Fairmont Blvd-Yorba Linda Blvd** | 1034/1975 | 1326/842 | 884/599 | 748/450 |
| **Village Ctr Dr-Yorba Linda Blvd** | 696/1221 | 1797/964 | 716/848 | 333/409 |

Source: *Cielo Vista Traffic Impact Analysis* (Urban Crossroads, Inc., February 22, 2013).

## 3.9 AIR QUALITY MANAGEMENT PLANNING

The Project site is located within the SCAB, which is characterized by relatively poor air quality. The SCAQMD has jurisdiction over an approximately 12,000 square-mile area consisting of the four-county Basin and the Los Angeles County and Riverside County portions of what used to be referred to as the Southeast Desert Air Basin. In these areas, the SCAQMD is principally responsible for air pollution control, and works directly with the Southern California Association of Governments (SCAG), county transportation commissions, local governments, as well as state and federal agencies to reduce emissions from stationary, mobile, and indirect sources to meet state and federal ambient air quality standards.

Currently, these state and federal air quality standards are exceeded in most parts of the Basin. In response, the SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the state and federal ambient air quality standards. AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy.

The Final 2012 AQMP was adopted by the AQMD Governing Board on Decemeber 7, 2012. The 2012 AQMP incorporates the latest scientific and technological information and planning assumptions, including the 2012 Regional Transportation Plan/Sustainable Communities Strategy and updated emission inventory methodologies for various source categories.

Similar to the 2007 AQMP, the 2012 AQMP was based on assumptions provided by both CARB and SCAG in the latest available EMFAC model for the most recent motor vehicle and demographics information, respectively. The air quality levels projected in the 2012 AQMP are based on several assumptions. For example, the 2012 AQMP has assumed that development associated with general plans, specific plans, residential projects, and wastewater facilities will be constructed in accordance with population growth projections identified by SCAG in its 2012 RTP. The 2012 AQMP also has assumed that such development projects will implement strategies to reduce emissions generated during the construction and operational phases of development. The Project's consistency with the 2012 AQMP is discussed as follows:

Criteria for determining consistency with the AQMP are defined in Chapter 12, Section 12.2 and Section 12.3 of the SCAQMD's <u>CEQA Air Quality Handbook</u> (1993). These indicators are discussed below:

- Consistency Criterion No. 1: The proposed Project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.

**Project's Contribution to Air Quality Violations**

According to the SCAQMD, the proposed project would be consistent with the AQMP if the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

As discussed in Section 3.0, the proposed project could potentially violate an air quality standard or contribute substantially to an existing or projected air quality violation. However, implementation of Mitigation Measures AQ-1 through AQ-2 would reduce associated impacts to less than significant.

If project emissions exceed the SCAQMD regional thresholds for NOX, VOC, PM10, or PM2.5, it follows that the emissions could contribute to a cumulative exceedance of a pollutant for which the Air Basin is in nonattainment (ozone, nitrogen dioxide, PM10, PM2.5) at a monitoring station in the Basin. An exceedance of a nonattainment pollutant at a monitoring station would not be consistent with the goals of the AQMP, which are to achieve attainment of pollutants. As discussed in Section 4.0, the proposed project would not exceed the regional or localized significance thresholds. Therefore, the proposed project would not contribute towards a cumulatively considerable regional air quality violation impact. On the basis of the preceding discussion, the Project is determined to be consistent with the first criterion.

- Consistency Criterion No. 2: The proposed project will not exceed the assumptions in the AQMP or increments based on the years of project build-out phase.

A project would conflict with the AQMP if it will exceed the assumptions in the AQMP or increments based on the year of project buildout and phase. The Handbook indicates that key assumptions to use in this analysis are population number and location and a regional housing needs assessment. The parcel-based land use and growth assumptions and inputs used in the Regional Transportation Model run by the Southern California Association of Governments that generated the mobile inventory used by the SCAQMD for AQMP are not available. Therefore, this indicator is not applicable.

Thus, since the proposed project would not conflict with or obstruct implementation of the air quality plan established for this region, impacts associated with air quality plans would be less than significant.

## 3.10 POTENTIAL IMPACTS TO SENSITIVE RECEPTORS

The potential impact of Project-generated air pollutant emissions at sensitive receptors has also been considered. Sensitive receptors can include uses such as long term health care facilities, rehabilitation centers, and retirement homes. Residences, schools, playgrounds, child care centers, and athletic facilities can also be considered as sensitive receptors.

Potential sensitive receptors in the Project vicinity include existing residences that may be located in close proximity to the Project site. Based on an aerial review, the nearest sensitive receptors include existing residential units located east of Aspen Way approximately 25 meters from the project boundary.

As discussed in the LST analysis previously presented in this report, for analysis purposes, sensitive receptors were placed at a distance of 25 meters from the project boundary, as a conservative measure. Results of the LST analysis indicate that the proposed project will not exceed the SCAQMD localized significance thresholds (after mitigation) and a less than significant impact is expected during construction activity. Therefore sensitive receptors would not be subject to a significant air quality impact during Project construction.

The proposed Project would not result in a significant CO "hotspot" as a result of Project related traffic during ongoing operations, thus a less than significant impact to sensitive receptors during operational activity is expected.

## 3.11 ODORS

The potential for the Project to generate objectionable odors has also been considered. Land uses generally associated with odor complaints include:

- Agricultural uses (livestock and farming)
- Wastewater treatment plants
- Food processing plants
- Chemical plants
- Composting operations
- Refineries
- Landfills
- Dairies
- Fiberglass molding facilities

The Project does not contain land uses typically associated with emitting objectionable odors. Potential odor sources associated with the proposed Project may result from construction equipment exhaust and the application of asphalt and architectural coatings during construction activities, and the temporary storage of typical solid waste (refuse) associated with the proposed Project's (long-term operational) uses. Standard construction requirements would minimize odor impacts resulting from construction activity. It should be noted that any construction odor emissions generated would be temporary, short-term, and intermittent in nature and would cease upon completion of the respective phase of construction activity and is thus considered less than significant. It is expected that Project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with the City's solid waste regulations. The proposed Project would also be required to comply with SCAQMD Rule 402 to prevent occurrences of public nuisances. Therefore, odors associated with the proposed Project construction and operations would be less than significant and no mitigation is required.

## 3.12 CUMULATIVE IMPACTS

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

Project implementation would result in a less than significant cumulative considerable net increase of any criteria pollutant for which the project region is non-attainment. A more detailed evaluation is as follows.

The Project area is designated as an extreme non-attainment area for ozone, and a non-attainment area for PM10 and PM2.5. Therefore a significant impact would occur if the proposed Project would add a cumulatively considerable contribution of a federal or state non-attainment pollutant. Germane to this non-attainment status, the Project-specific evaluation of emissions presented in the preceding analysis for both construction and operational activity demonstrates that the Project will not result in exceedances of any applicable thresholds which are designed to assist the region in attaining the applicable state and national ambient air quality standards. Since regional emissions address pollutants generated throughout the air basin, impacts in this regard are considered cumulative impacts. Furthermore, the Project would comply with SCAQMD's Rule 403 (fugitive dust control) during construction, as well as all other adopted AQMP emissions control measures. Per SCAQMD rule and mandates, as well as the CEQA requirement that significant impacts be mitigated to the extent feasible, these same requirements would also be imposed on all projects Basin-wide, which would include all related projects. As such, cumulative impacts with respect to criteria pollutant emissions would be less than significant.

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# 4.0 REGULATORY REQUIREMENTS AND MITIGATION MEASURES

## 4.1 STANDARD REGULATORY REQUIREMENTS/BEST AVAILABLE CONTROL MEASURES (BACMS)

SCAQMD Rules that are currently applicable during construction activity for this Project include but are not limited to: Rule 1113 (Architectural Coatings); Rule 431.2 (Low Sulfur Fuel); Rule 403 (Fugitive Dust); and Rule 1186 / 1186.1 (Street Sweepers). In order to facilitate monitoring and compliance, applicable SCAQMD regulatory requirements are summarized below, and are restated as recommended mitigation measures (MM AQ-#).

**MM AQ-1**

The following measures are recommended to be incorporated into Project plans and specifications as implementation of Rule 403:

- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day. As shown in Table XI-A, located in Appendix "B", implementation of this measure is estimated to reduce $PM_{10}$ and $PM_{2.5}$ fugitive dust emissions by approximately 61%.

- The contractor shall ensure that traffic speeds on unpaved roads and Project site areas are reduced to 15 miles per hour or less to reduce PM10 and PM2.5 fugitive dust haul road emissions by approximately 44%.

## 4.2 CONSTRUCTION ACTIVITY RECOMMENDED MITIGATION MEASURES

No significant impacts were identified and no mitigation measures are required.

## 4.3 OPERATIONAL ACTIVITY RECOMMENDED MITIGATION MEASURES

No significant impacts were identified and no mitigation measures are required.

## TABLE 4-1 EMISSIONS SUMMARY OF OVERALL CONSTRUCTION (MAXIMUM DAILY EMISSIONS) (WITH MITIGATION)

| Year | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| 2014 | 13.83 | 56.32 | 52.07 | 0.10 | 5.19 | 3.57 |
| 2015 | 29.09 | 30.88 | 26.29 | 0.05 | 3.27 | 2.58 |
| **Maximum Daily Emissions** | **29.09** | **56.32** | **52.07** | **0.10** | **5.19** | **3.57** |
| SCAQMD Regional Threshold | 75 | 100 | 550 | 150 | 150 | 55 |
| **Significant?** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** |

Note: Please refer to Appendix A for the CalEEMod™ output files and additional hand calculations for the estimated emissions.

# 5.0 REFERENCES


1. California Air Resources Board, 2007. *California Air Resources Board Almanac.*

2. California Air Resources Board, 2007. *EMFAC 2007.*

3. South Coast Air Quality Management District (SCAQMD), 1993. *CEQA Air Quality Handbook.*

4. South Coast Air Quality Management District (SCAQMD), 2011. *California Emissions Estimator Model (CalEEMod™).*

5. South Coast Air Quality Management District (SCAQMD), March 2009. *CEQA Air Quality Significance Thresholds.*

6. South Coast Air Quality Management District (SCAQMD), 2003. *Final Localized Significance Threshold Methodology.*

7. Urban Crossroads, Inc., 2013. *Cielo Vista Traffic Impact Analysis.*

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# APPENDIX A

CalEEMod™ Input/Output
Construction and Operational Emissions

# Cielo Vista

**Orange County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric |
|---|---|---|
| Single Family Housing | 112 | Dwelling Unit |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Utility Company** | Southern California Edison |
| **Climate Zone** | 8 | **Precipitation Freq (Days)** | 30 | | |

### 1.3 User Entered Comments

Project Characteristics -

Land Use -

Construction Phase - Building Construction schedule has been adjusted to reflect project opening year.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Grading - 47.88 acres graded per project description

Construction Off-road Equipment Mitigation -

Area Mitigation -

## 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 | | | | | |
| 2014 | 13.83 | 56.32 | 52.07 | 0.10 | 7.01 | *2.27* | *9.28* | 3.32 | *2.27* | *5.59* | 0.00 | 11,095.34 | 0.00 | 1.02 | 0.00 | 11,116.68 |
| 2015 | 29.09 | 30.88 | 26.29 | 0.05 | 0.73 | 2.54 | 3.27 | 0.03 | 2.54 | 2.57 | 0.00 | 4,832.99 | 0.00 | 0.45 | 0.00 | 4,842.40 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 for Site Preparation and Grading from OFFROAD2011**

**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 | | | | | |
| 2014 | *13.83* | *56.32* | 52.07 | 0.10 | 2.92 | *2.27* | *5.19* | 1.30 | *2.27* | *3.57* | 0.00 | 11,095.34 | 0.00 | 1.02 | 0.00 | 11,116.68 |
| 2015 | 29.09 | 30.88 | 26.29 | 0.05 | 0.73 | 2.55 | 3.28 | 0.03 | 2.55 | 2.58 | 0.00 | 4,832.99 | 0.00 | 0.45 | 0.00 | 4,842.40 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 for Site Preparation and Grading from OFFROAD2011**

## 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 | 16.65 | 0.66 | 46.60 | 0.09 | | 0.00 | 5.97 | | 0.00 | 5.97 | 790.35 | 2,032.84 | | 3.15 | 0.05 | 2,904.26 |
| Energy | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| Mobile | 5.58 | 10.44 | 56.30 | 0.11 | 12.44 | 0.50 | 12.94 | 0.42 | 0.50 | 0.92 | | 10,624.63 | | 0.42 | | 10,633.49 |
| **Total** | **22.37** | **12.30** | **103.41** | **0.21** | **12.44** | **0.50** | **19.01** | **0.42** | **0.50** | **6.99** | **790.35** | **14,183.97** | | **3.60** | **0.08** | **15,073.54** |

### 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 | 4.92 | 0.11 | 9.54 | 0.00 | | 0.00 | 0.19 | | 0.00 | 0.18 | 0.00 | 2,151.43 | | 0.06 | 0.04 | 2,164.79 |
| Energy | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| Mobile | 5.58 | 10.44 | 56.30 | 0.11 | 12.44 | 0.50 | 12.94 | 0.42 | 0.50 | 0.92 | | 10,624.63 | | 0.42 | | 10,633.49 |
| **Total** | **10.64** | **11.75** | **66.35** | **0.12** | **12.44** | **0.50** | **13.23** | **0.42** | **0.50** | **1.20** | **0.00** | **14,302.56** | | **0.51** | **0.07** | **14,334.07** |

## 3.0 Construction Detail

### 3.1 Mitigation Measures Construction

Water Exposed Area

### 3.2 Site Preparation - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | 0.00 |
| Off-Road | *2.51* | *33.08* | 17.72 | 0.04 | | *1.10* | *1.10* | | *1.10* | *1.10* | | 3,969.40 | | 0.36 | | 3,976.99 |
| **Total** | ***2.51*** | ***33.08*** | **17.72** | **0.04** | **0.00** | ***1.10*** | ***1.10*** | **0.00** | ***1.10*** | ***1.10*** | | **3,969.40** | | **0.36** | | **3,976.99** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 from OFFROAD2011**

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.04 | 0.04 | 0.49 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 | | 95.48 | | 0.01 | | 95.58 |
| **Total** | **0.04** | **0.04** | **0.49** | **0.00** | **0.12** | **0.00** | **0.13** | **0.00** | **0.00** | **0.01** | | **95.48** | | **0.01** | | **95.58** |

**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 | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | 0.00 |
| Off-Road | 2.51 | 33.08 | 17.72 | 0.04 | | 1.10 | 1.10 | | 1.10 | 1.10 | 0.00 | 3,969.40 | | 0.36 | | 3,976.99 |
| **Total** | **2.51** | **33.08** | **17.72** | **0.04** | **0.00** | **1.10** | **1.10** | **0.00** | **1.10** | **1.10** | **0.00** | **3,969.40** | | **0.36** | | **3,976.99** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 from OFFROAD2011**

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.04 | 0.04 | 0.49 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 | | 95.48 | | 0.01 | | 95.58 |
| **Total** | **0.04** | **0.04** | **0.49** | **0.00** | **0.12** | **0.00** | **0.13** | **0.00** | **0.00** | **0.01** | | **95.48** | | **0.01** | | **95.58** |

## 3.3 Grading - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.70 | 0.00 | 6.70 | 3.31 | 0.00 | 3.31 | | | | | | 0.00 |
| Off-Road | 13.72 | 56.21 | 50.83 | 0.10 | | 2.27 | 2.27 | | 2.27 | 2.27 | | 10,856.65 | | 1.00 | | 10,877.72 |
| **Total** | **13.72** | **56.21** | **50.83** | **0.10** | **6.70** | **2.27** | **8.97** | **3.31** | **2.27** | **5.58** | | **10,856.65** | | **1.00** | | **10,877.72** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 from OFFROAD2011**

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.11 | 0.11 | 1.23 | 0.00 | 0.31 | 0.01 | 0.32 | 0.01 | 0.01 | 0.02 | | 238.69 | | 0.01 | | 238.96 |
| **Total** | **0.11** | **0.11** | **1.23** | **0.00** | **0.31** | **0.01** | **0.32** | **0.01** | **0.01** | **0.02** | | **238.69** | | **0.01** | | **238.96** |

**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 | | | | | 2.61 | 0.00 | 2.61 | 1.29 | 0.00 | 1.29 | | | | | | 0.00 |
| Off-Road | 13.72 | 56.21 | 50.83 | 0.10 | | 2.27 | 2.27 | | 2.27 | 2.27 | 0.00 | 10,856.65 | | 1.00 | | 10,877.72 |
| **Total** | **13.72** | **56.21** | **50.83** | **0.10** | **2.61** | **2.27** | **4.88** | **1.29** | **2.27** | **3.56** | **0.00** | **10,856.65** | | **1.00** | | **10,877.72** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 from OFFROAD2011**

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.11 | 0.11 | 1.23 | 0.00 | 0.31 | 0.01 | 0.32 | 0.01 | 0.01 | 0.02 | | 238.69 | | 0.01 | | 238.96 |
| **Total** | **0.11** | **0.11** | **1.23** | **0.00** | **0.31** | **0.01** | **0.32** | **0.01** | **0.01** | **0.02** | | **238.69** | | **0.01** | | **238.96** |

## 3.4 Building Construction - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.74 | 32.06 | 23.20 | 0.04 | | 2.02 | 2.02 | | 2.02 | 2.02 | | 4,040.61 | | 0.42 | | 4,049.51 |
| **Total** | **4.74** | **32.06** | **23.20** | **0.04** | | **2.02** | **2.02** | | **2.02** | **2.02** | | **4,040.61** | | **0.42** | | **4,049.51** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.16 | 1.68 | 1.12 | 0.00 | 0.11 | 0.06 | 0.17 | 0.01 | 0.06 | 0.06 | | 324.49 | | 0.01 | | 324.65 |
| Worker | 0.22 | 0.21 | 2.46 | 0.00 | 0.61 | 0.02 | 0.63 | 0.02 | 0.02 | 0.04 | | 477.38 | | 0.03 | | 477.91 |
| **Total** | **0.38** | **1.89** | **3.58** | **0.00** | **0.72** | **0.08** | **0.80** | **0.03** | **0.08** | **0.10** | | **801.87** | | **0.04** | | **802.56** |

**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 | 4.74 | 32.06 | 23.20 | 0.04 | | 2.02 | 2.02 | | 2.02 | 2.02 | 0.00 | 4,040.61 | | 0.42 | | 4,049.51 |
| **Total** | **4.74** | **32.06** | **23.20** | **0.04** | | **2.02** | **2.02** | | **2.02** | **2.02** | **0.00** | **4,040.61** | | **0.42** | | **4,049.51** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.16 | 1.68 | 1.12 | 0.00 | 0.11 | 0.06 | 0.17 | 0.01 | 0.06 | 0.06 | | 324.49 | | 0.01 | | 324.65 |
| Worker | 0.22 | 0.21 | 2.46 | 0.00 | 0.61 | 0.02 | 0.63 | 0.02 | 0.02 | 0.04 | | 477.38 | | 0.03 | | 477.91 |
| **Total** | **0.38** | **1.89** | **3.58** | **0.00** | **0.72** | **0.08** | **0.80** | **0.03** | **0.08** | **0.10** | | **801.87** | | **0.04** | | **802.56** |

### 3.4 Building Construction - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.34 | 29.16 | 22.98 | 0.04 | | 1.80 | 1.80 | | 1.80 | 1.80 | | 4,040.61 | | 0.39 | | 4,048.81 |
| **Total** | **4.34** | **29.16** | **22.98** | **0.04** | | **1.80** | **1.80** | | **1.80** | **1.80** | | **4,040.61** | | **0.39** | | **4,048.81** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.14 | 1.53 | 1.03 | 0.00 | 0.11 | 0.05 | 0.16 | 0.01 | 0.05 | 0.06 | | 325.59 | | 0.01 | | 325.74 |
| Worker | 0.20 | 0.20 | 2.27 | 0.00 | 0.61 | 0.02 | 0.63 | 0.02 | 0.02 | 0.04 | | 466.79 | | 0.02 | | 467.28 |
| **Total** | **0.34** | **1.73** | **3.30** | **0.00** | **0.72** | **0.07** | **0.79** | **0.03** | **0.07** | **0.10** | | **792.38** | | **0.03** | | **793.02** |

**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 | 4.34 | 29.16 | 22.98 | 0.04 | | 1.80 | 1.80 | | 1.80 | 1.80 | 0.00 | 4,040.61 | | 0.39 | | 4,048.81 |
| **Total** | **4.34** | **29.16** | **22.98** | **0.04** | | **1.80** | **1.80** | | **1.80** | **1.80** | **0.00** | **4,040.61** | | **0.39** | | **4,048.81** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.14 | 1.53 | 1.03 | 0.00 | 0.11 | 0.05 | 0.16 | 0.01 | 0.05 | 0.06 | | 325.59 | | 0.01 | | 325.74 |
| Worker | 0.20 | 0.20 | 2.27 | 0.00 | 0.61 | 0.02 | 0.63 | 0.02 | 0.02 | 0.04 | | 466.79 | | 0.02 | | 467.28 |
| **Total** | **0.34** | **1.73** | **3.30** | **0.00** | **0.72** | **0.07** | **0.79** | **0.03** | **0.07** | **0.10** | | **792.38** | | **0.03** | | **793.02** |

### 3.5 Paving - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.89 | 30.10 | 20.54 | 0.03 | | 2.54 | 2.54 | | 2.54 | 2.54 | | 2,917.65 | | 0.44 | | 2,926.87 |
| Paving | 0.00 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| **Total** | **4.89** | **30.10** | **20.54** | **0.03** | | **2.54** | **2.54** | | **2.54** | **2.54** | | **2,917.65** | | **0.44** | | **2,926.87** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.08 | 0.07 | 0.85 | 0.00 | 0.23 | 0.01 | 0.24 | 0.01 | 0.01 | 0.02 | | 175.05 | | 0.01 | | 175.23 |
| **Total** | **0.08** | **0.07** | **0.85** | **0.00** | **0.23** | **0.01** | **0.24** | **0.01** | **0.01** | **0.02** | | **175.05** | | **0.01** | | **175.23** |

**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 | 4.89 | 30.10 | 20.54 | 0.03 | | 2.54 | 2.54 | | 2.54 | 2.54 | 0.00 | 2,917.65 | | 0.44 | | 2,926.87 |
| Paving | 0.00 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| **Total** | **4.89** | **30.10** | **20.54** | **0.03** | | **2.54** | **2.54** | | **2.54** | **2.54** | **0.00** | **2,917.65** | | **0.44** | | **2,926.87** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.08 | 0.07 | 0.85 | 0.00 | 0.23 | 0.01 | 0.24 | 0.01 | 0.01 | 0.02 | | 175.05 | | 0.01 | | 175.23 |
| **Total** | **0.08** | **0.07** | **0.85** | **0.00** | **0.23** | **0.01** | **0.24** | **0.01** | **0.01** | **0.02** | | **175.05** | | **0.01** | | **175.23** |

## 3.6 Architectural Coating - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 28.64 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Off-Road | 0.41 | 2.57 | 1.90 | 0.00 | | 0.22 | 0.22 | | 0.22 | 0.22 | | 281.19 | | 0.04 | | 281.96 |
| **Total** | **29.05** | **2.57** | **1.90** | **0.00** | | **0.22** | **0.22** | | **0.22** | **0.22** | | **281.19** | | **0.04** | | **281.96** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.04 | 0.04 | 0.45 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 | | 93.36 | | 0.00 | | 93.46 |
| **Total** | **0.04** | **0.04** | **0.45** | **0.00** | **0.12** | **0.00** | **0.13** | **0.00** | **0.00** | **0.01** | | **93.36** | | **0.00** | | **93.46** |

## 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 | 28.64 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Off-Road | 0.41 | 2.57 | 1.90 | 0.00 | | 0.22 | 0.22 | | 0.22 | 0.22 | 0.00 | 281.19 | | 0.04 | | 281.96 |
| **Total** | **29.05** | **2.57** | **1.90** | **0.00** | | **0.22** | **0.22** | | **0.22** | **0.22** | **0.00** | **281.19** | | **0.04** | | **281.96** |

## 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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.04 | 0.04 | 0.45 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 | | 93.36 | | 0.00 | | 93.46 |
| **Total** | **0.04** | **0.04** | **0.45** | **0.00** | **0.12** | **0.00** | **0.13** | **0.00** | **0.00** | **0.01** | | **93.36** | | **0.00** | | **93.46** |

## 4.0 Mobile Detail

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 5.58 | 10.44 | 56.30 | 0.11 | 12.44 | 0.50 | 12.94 | 0.42 | 0.50 | 0.92 | | 10,624.63 | | 0.42 | | 10,633.49 |
| Unmitigated | 5.58 | 10.44 | 56.30 | 0.11 | 12.44 | 0.50 | 12.94 | 0.42 | 0.50 | 0.92 | | 10,624.63 | | 0.42 | | 10,633.49 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 1,071.84 | 1,128.96 | 982.24 | 3,554,389 | 3,554,389 |
| Total | 1,071.84 | 1,128.96 | 982.24 | 3,554,389 | 3,554,389 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | |
|---|---|---|---|---|---|---|
| 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 |
| Single Family Housing | 12.70 | 7.00 | 9.50 | 40.20 | 19.20 | 40.60 |

## 5.0 Energy Detail

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| NaturalGas Unmitigated | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

### 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 | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 12975.2 | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| **Total** | | **0.14** | **1.20** | **0.51** | **0.01** | | **0.00** | **0.10** | | **0.00** | **0.10** | | **1,526.50** | | **0.03** | **0.03** | **1,535.79** |

**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 | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 12.9752 | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| **Total** | | **0.14** | **1.20** | **0.51** | **0.01** | | **0.00** | **0.10** | | **0.00** | **0.10** | | **1,526.50** | | **0.03** | **0.03** | **1,535.79** |

### 6.1 Mitigation Measures Area

Use only Natural Gas Hearths

| | ROG | NOx | CO | SO2 | Fugitive 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 | 4.92 | 0.11 | 9.54 | 0.00 | | 0.00 | 0.19 | | 0.00 | 0.18 | 0.00 | 2,151.43 | | 0.06 | 0.04 | 2,164.79 |
| Unmitigated | 16.65 | 0.66 | 46.60 | 0.09 | | 0.00 | 5.97 | | 0.00 | 5.97 | 790.35 | 2,032.84 | | 3.15 | 0.05 | 2,904.26 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

### 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 | 0.43 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Consumer Products | 3.99 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Hearth | 11.92 | 0.55 | 37.07 | 0.09 | | 0.00 | 5.92 | | 0.00 | 5.92 | 790.35 | 2,016.00 | | 3.13 | 0.05 | 2,887.05 |
| Landscaping | 0.30 | 0.11 | 9.53 | 0.00 | | 0.00 | 0.05 | | 0.00 | 0.05 | | 16.84 | | 0.02 | | 17.21 |
| **Total** | **16.64** | **0.66** | **46.60** | **0.09** | | **0.00** | **5.97** | | **0.00** | **5.97** | **790.35** | **2,032.84** | | **3.15** | **0.05** | **2,904.26** |

**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 | 0.43 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Consumer Products | 3.99 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Hearth | 0.20 | 0.00 | 0.01 | 0.00 | | 0.00 | 0.14 | | 0.00 | 0.13 | 0.00 | 2,134.59 | | 0.04 | 0.04 | 2,147.58 |
| Landscaping | 0.30 | 0.11 | 9.53 | 0.00 | | 0.00 | 0.05 | | 0.00 | 0.05 | | 16.84 | | 0.02 | | 17.21 |
| **Total** | **4.92** | **0.11** | **9.54** | **0.00** | | **0.00** | **0.19** | | **0.00** | **0.18** | **0.00** | **2,151.43** | | **0.06** | **0.04** | **2,164.79** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

### 8.1 Mitigation Measures Waste

## 9.0 Vegetation

**Cielo Vista**
**Orange County, Winter**

# 1.0 Project Characteristics

## 1.1 Land Usage

| Land Uses | Size | Metric |
|---|---|---|
| Single Family Housing | 112 | Dwelling Unit |

## 1.2 Other Project Characteristics

**Urbanization** Urban

**Wind Speed (m/s)** 2.2

**Utility Company** Southern California Edison

**Climate Zone** 8

**Precipitation Freq (Days)** 30

## 1.3 User Entered Comments

Project Characteristics -

Land Use -

Construction Phase - Building Construction schedule has been adjusted to reflect project opening year.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Off-road Equipment - Default Load Factors.

Grading - 47.88 acres graded per project description

Construction Off-road Equipment Mitigation -

Area Mitigation -

## 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 | | | | | |
| 2014 | 13.83 | 56.32 | 52.00 | 0.10 | 7.01 | 2.27 | 9.28 | 3.32 | 2.27 | 5.59 | 0.00 | 11,079.79 | 0.00 | 1.02 | 0.00 | 11,101.12 |
| 2015 | 29.10 | 30.97 | 26.29 | 0.05 | 0.73 | 2.55 | 3.28 | 0.03 | 2.55 | 2.58 | 0.00 | 4,800.53 | 0.00 | 0.45 | 0.00 | 4,809.93 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 for Site Preparation and Grading from OFFROAD2011**

**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 | | | | | |
| 2014 | 13.83 | 56.32 | 52.00 | 0.10 | 2.92 | 2.27 | 5.19 | 1.30 | 2.27 | 3.57 | 0.00 | 11,079.79 | 0.00 | 1.02 | 0.00 | 11,101.12 |
| 2015 | 29.10 | 30.97 | 26.29 | 0.05 | 0.73 | 2.55 | 3.28 | 0.03 | 2.55 | 2.58 | 0.00 | 4,800.53 | 0.00 | 0.45 | 0.00 | 4,809.93 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 for Site Preparation and Grading from OFFROAD2011**

### 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 | 16.65 | 0.66 | 46.60 | 0.09 | | 0.00 | 5.97 | | 0.00 | 5.97 | 790.35 | 2,032.84 | | 3.15 | 0.05 | 2,904.26 |
| Energy | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| Mobile | 5.98 | 11.49 | 54.96 | 0.10 | 12.44 | 0.51 | 12.94 | 0.42 | 0.51 | 0.93 | | 10,027.58 | | 0.41 | | 10,036.16 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **22.77** | **13.35** | **102.07** | **0.20** | **12.44** | **0.51** | **19.01** | **0.42** | **0.51** | **7.00** | **790.35** | **13,586.92** | | **3.59** | **0.08** | **14,476.21** |

**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 | 4.92 | 0.11 | 9.54 | 0.00 | | 0.00 | 0.19 | | 0.00 | 0.18 | 0.00 | 2,151.43 | | 0.06 | 0.04 | 2,164.79 |
| Energy | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| Mobile | 5.98 | 11.49 | 54.96 | 0.10 | 12.44 | 0.51 | 12.94 | 0.42 | 0.51 | 0.93 | | 10,027.58 | | 0.41 | | 10,036.16 |
| **Total** | **11.04** | **12.80** | **65.01** | **0.11** | **12.44** | **0.51** | **13.23** | **0.42** | **0.51** | **1.21** | **0.00** | **13,705.51** | | **0.50** | **0.07** | **13,736.74** |

# 3.0 Construction Detail

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Site Preparation - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | 0.00 |
| Off-Road | *2.51* | *33.08* | 17.72 | 0.04 | | *1.10* | *1.10* | | *1.10* | *1.10* | | 3,969.40 | | 0.36 | | 3,976.99 |
| **Total** | ***2.51*** | ***33.08*** | **17.72** | **0.04** | **0.00** | ***1.10*** | ***1.10*** | **0.00** | ***1.10*** | ***1.10*** | | **3,969.40** | | **0.36** | | **3,976.99** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 from OFFROAD2011**

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.05 | 0.05 | 0.47 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 | | 89.26 | | 0.00 | | 89.36 |
| **Total** | **0.05** | **0.05** | **0.47** | **0.00** | **0.12** | **0.00** | **0.13** | **0.00** | **0.00** | **0.01** | | **89.26** | | **0.00** | | **89.36** |

**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 | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | 0.00 |
| Off-Road | *2.51* | *33.08* | 17.72 | 0.04 | | *1.10* | *1.10* | | *1.10* | *1.10* | 0.00 | 3,969.40 | | 0.36 | | 3,976.99 |
| **Total** | ***2.51*** | ***33.08*** | **17.72** | **0.04** | **0.00** | ***1.10*** | ***1.10*** | **0.00** | ***1.10*** | ***1.10*** | **0.00** | **3,969.40** | | **0.36** | | **3,976.99** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 from OFFROAD2011**

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.05 | 0.05 | 0.47 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 | | 89.26 | | 0.00 | | 89.36 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 0.05 | 0.05 | 0.47 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 | | 89.26 | | 0.00 | | 89.36 |

## 3.3 Grading - 2014

**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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.70 | 0.00 | 6.70 | 3.31 | 0.00 | 3.31 | | | | | | 0.00 |
| Off-Road | 13.72 | 56.21 | 50.83 | 0.10 | | 2.27 | 2.27 | | 2.27 | 2.27 | | 10,856.65 | | 1.00 | | 10,877.72 |
| **Total** | **13.72** | **56.21** | **50.83** | **0.10** | **6.70** | **2.27** | **8.97** | **3.31** | **2.27** | **5.58** | | **10,856.65** | | **1.00** | | **10,877.72** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 from OFFROAD2011**

**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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.12 | 0.12 | 1.17 | 0.00 | 0.31 | 0.01 | 0.32 | 0.01 | 0.01 | 0.02 | | 223.14 | | 0.01 | | 223.40 |
| **Total** | **0.12** | **0.12** | **1.17** | **0.00** | **0.31** | **0.01** | **0.32** | **0.01** | **0.01** | **0.02** | | **223.14** | | **0.01** | | **223.40** |

**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 | | | | | |
| Fugitive Dust | | | | | 2.61 | 0.00 | 2.61 | 1.29 | 0.00 | 1.29 | | | | | | 0.00 |
| Off-Road | 13.72 | 56.21 | 50.83 | 0.10 | | 2.27 | 2.27 | | 2.27 | 2.27 | 0.00 | 10,856.65 | | 1.00 | | 10,877.72 |
| **Total** | **13.72** | **56.21** | **50.83** | **0.10** | **2.61** | **2.27** | **4.88** | **1.29** | **2.27** | **3.56** | **0.00** | **10,856.65** | | **1.00** | | **10,877.72** |

**Note: Exhaust ROG, NOx, PM10, PM2.5 from OFFROAD2011**

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.12 | 0.12 | 1.17 | 0.00 | 0.31 | 0.01 | 0.32 | 0.01 | 0.01 | 0.02 | | 223.14 | | 0.01 | | 223.40 |
| **Total** | **0.12** | **0.12** | **1.17** | **0.00** | **0.31** | **0.01** | **0.32** | **0.01** | **0.01** | **0.02** | | **223.14** | | **0.01** | | **223.40** |

## 3.4 Building Construction - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.74 | 32.06 | 23.20 | 0.04 | | 2.02 | 2.02 | | 2.02 | 2.02 | | 4,040.61 | | 0.42 | | 4,049.51 |
| **Total** | **4.74** | **32.06** | **23.20** | **0.04** | | **2.02** | **2.02** | | **2.02** | **2.02** | | **4,040.61** | | **0.42** | | **4,049.51** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.16 | 1.77 | 1.25 | 0.00 | 0.11 | 0.06 | 0.17 | 0.01 | 0.06 | 0.06 | | 322.55 | | 0.01 | | 322.72 |
| Worker | 0.24 | 0.25 | 2.33 | 0.00 | 0.61 | 0.02 | 0.63 | 0.02 | 0.02 | 0.04 | | 446.29 | | 0.02 | | 446.79 |
| **Total** | **0.40** | **2.02** | **3.58** | **0.00** | **0.72** | **0.08** | **0.80** | **0.03** | **0.08** | **0.10** | | **768.84** | | **0.03** | | **769.51** |

### 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 | 4.74 | 32.06 | 23.20 | 0.04 | | 2.02 | 2.02 | | 2.02 | 2.02 | 0.00 | 4,040.61 | | 0.42 | | 4,049.51 |
| **Total** | **4.74** | **32.06** | **23.20** | **0.04** | | **2.02** | **2.02** | | **2.02** | **2.02** | **0.00** | **4,040.61** | | **0.42** | | **4,049.51** |

### 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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.16 | 1.77 | 1.25 | 0.00 | 0.11 | 0.06 | 0.17 | 0.01 | 0.06 | 0.06 | | 322.55 | | 0.01 | | 322.72 |
| Worker | 0.24 | 0.25 | 2.33 | 0.00 | 0.61 | 0.02 | 0.63 | 0.02 | 0.02 | 0.04 | | 446.29 | | 0.02 | | 446.79 |
| **Total** | **0.40** | **2.02** | **3.58** | **0.00** | **0.72** | **0.08** | **0.80** | **0.03** | **0.08** | **0.10** | | **768.84** | | **0.03** | | **769.51** |

## 3.4 Building Construction - 2015

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.34 | 29.16 | 22.98 | 0.04 | | 1.80 | 1.80 | | 1.80 | 1.80 | | 4,040.61 | | 0.39 | | 4,048.81 |
| **Total** | **4.34** | **29.16** | **22.98** | **0.04** | | **1.80** | **1.80** | | **1.80** | **1.80** | | **4,040.61** | | **0.39** | | **4,048.81** |

### 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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.15 | 1.59 | 1.16 | 0.00 | 0.11 | 0.05 | 0.16 | 0.01 | 0.05 | 0.06 | | 323.57 | | 0.01 | | 323.73 |
| Worker | 0.22 | 0.22 | 2.15 | 0.00 | 0.61 | 0.02 | 0.63 | 0.02 | 0.02 | 0.04 | | 436.35 | | 0.02 | | 436.82 |
| **Total** | **0.37** | **1.81** | **3.31** | **0.00** | **0.72** | **0.07** | **0.79** | **0.03** | **0.07** | **0.10** | | **759.92** | | **0.03** | | **760.55** |

### 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 | 4.34 | 29.16 | 22.98 | 0.04 | | 1.80 | 1.80 | | 1.80 | 1.80 | 0.00 | 4,040.61 | | 0.39 | | 4,048.81 |
| **Total** | **4.34** | **29.16** | **22.98** | **0.04** | | **1.80** | **1.80** | | **1.80** | **1.80** | **0.00** | **4,040.61** | | **0.39** | | **4,048.81** |

### 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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.15 | 1.59 | 1.16 | 0.00 | 0.11 | 0.05 | 0.16 | 0.01 | 0.05 | 0.06 | | 323.57 | | 0.01 | | 323.73 |
| Worker | 0.22 | 0.22 | 2.15 | 0.00 | 0.61 | 0.02 | 0.63 | 0.02 | 0.02 | 0.04 | | 436.35 | | 0.02 | | 436.82 |
| **Total** | **0.37** | **1.81** | **3.31** | **0.00** | **0.72** | **0.07** | **0.79** | **0.03** | **0.07** | **0.10** | | **759.92** | | **0.03** | | **760.55** |

## 3.5 Paving - 2015

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.89 | 30.10 | 20.54 | 0.03 | | 2.54 | 2.54 | | 2.54 | 2.54 | | 2,917.65 | | 0.44 | | 2,926.87 |
| Paving | 0.00 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| **Total** | **4.89** | **30.10** | **20.54** | **0.03** | | **2.54** | **2.54** | | **2.54** | **2.54** | | **2,917.65** | | **0.44** | | **2,926.87** |

### 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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.08 | 0.08 | 0.81 | 0.00 | 0.23 | 0.01 | 0.24 | 0.01 | 0.01 | 0.02 | | 163.63 | | 0.01 | | 163.81 |
| **Total** | **0.08** | **0.08** | **0.81** | **0.00** | **0.23** | **0.01** | **0.24** | **0.01** | **0.01** | **0.02** | | **163.63** | | **0.01** | | **163.81** |

### 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 | 4.89 | 30.10 | 20.54 | 0.03 | | 2.54 | 2.54 | | 2.54 | 2.54 | 0.00 | 2,917.65 | | 0.44 | | 2,926.87 |
| Paving | 0.00 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| **Total** | **4.89** | **30.10** | **20.54** | **0.03** | | **2.54** | **2.54** | | **2.54** | **2.54** | **0.00** | **2,917.65** | | **0.44** | | **2,926.87** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.08 | 0.08 | 0.81 | 0.00 | 0.23 | 0.01 | 0.24 | 0.01 | 0.01 | 0.02 | | 163.63 | | 0.01 | | 163.81 |
| **Total** | **0.08** | **0.08** | **0.81** | **0.00** | **0.23** | **0.01** | **0.24** | **0.01** | **0.01** | **0.02** | | **163.63** | | **0.01** | | **163.81** |

## 3.6 Architectural Coating - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 28.64 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Off-Road | 0.41 | 2.57 | 1.90 | 0.00 | | 0.22 | 0.22 | | 0.22 | 0.22 | | 281.19 | | 0.04 | | 281.96 |
| **Total** | **29.05** | **2.57** | **1.90** | **0.00** | | **0.22** | **0.22** | | **0.22** | **0.22** | | **281.19** | | **0.04** | | **281.96** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.04 | 0.04 | 0.43 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 | | 87.27 | | 0.00 | | 87.36 |
| **Total** | **0.04** | **0.04** | **0.43** | **0.00** | **0.12** | **0.00** | **0.13** | **0.00** | **0.00** | **0.01** | | **87.27** | | **0.00** | | **87.36** |

**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 | 28.64 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Off-Road | 0.41 | 2.57 | 1.90 | 0.00 | | 0.22 | 0.22 | | 0.22 | 0.22 | 0.00 | 281.19 | | 0.04 | | 281.96 |
| **Total** | **29.05** | **2.57** | **1.90** | **0.00** | | **0.22** | **0.22** | | **0.22** | **0.22** | **0.00** | **281.19** | | **0.04** | | **281.96** |

**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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Worker | 0.04 | 0.04 | 0.43 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.00 | 0.01 | | 87.27 | | 0.00 | | 87.36 |
| **Total** | **0.04** | **0.04** | **0.43** | **0.00** | **0.12** | **0.00** | **0.13** | **0.00** | **0.00** | **0.01** | | **87.27** | | **0.00** | | **87.36** |

# 4.0 Mobile Detail

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 5.98 | 11.49 | 54.96 | 0.10 | 12.44 | 0.51 | 12.94 | 0.42 | 0.51 | 0.93 | | 10,027.58 | | 0.41 | | 10,036.16 |
| Unmitigated | 5.98 | 11.49 | 54.96 | 0.10 | 12.44 | 0.51 | 12.94 | 0.42 | 0.51 | 0.93 | | 10,027.58 | | 0.41 | | 10,036.16 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 1,071.84 | 1,128.96 | 982.24 | 3,554,389 | 3,554,389 |
| Total | 1,071.84 | 1,128.96 | 982.24 | 3,554,389 | 3,554,389 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | |
|---|---|---|---|---|---|---|
| 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 |
| Single Family Housing | 12.70 | 7.00 | 9.50 | 40.20 | 19.20 | 40.60 |

## 5.0 Energy Detail

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| NaturalGas Unmitigated | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

### 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 | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 12975.2 | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| **Total** | | **0.14** | **1.20** | **0.51** | **0.01** | | **0.00** | **0.10** | | **0.00** | **0.10** | | **1,526.50** | | **0.03** | **0.03** | **1,535.79** |

**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 | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 12.9752 | 0.14 | 1.20 | 0.51 | 0.01 | | 0.00 | 0.10 | | 0.00 | 0.10 | | 1,526.50 | | 0.03 | 0.03 | 1,535.79 |
| **Total** | | **0.14** | **1.20** | **0.51** | **0.01** | | **0.00** | **0.10** | | **0.00** | **0.10** | | **1,526.50** | | **0.03** | **0.03** | **1,535.79** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

Use only Natural Gas Hearths

| | ROG | NOx | CO | SO2 | Fugitive 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 | 4.92 | 0.11 | 9.54 | 0.00 | | 0.00 | 0.19 | | 0.00 | 0.18 | 0.00 | 2,151.43 | | 0.06 | 0.04 | 2,164.79 |
| Unmitigated | 16.65 | 0.66 | 46.60 | 0.09 | | 0.00 | 5.97 | | 0.00 | 5.97 | 790.35 | 2,032.84 | | 3.15 | 0.05 | 2,904.26 |
| **Total** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

## 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 | 0.43 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Consumer Products | 3.99 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Hearth | 11.92 | 0.55 | 37.07 | 0.09 | | 0.00 | 5.92 | | 0.00 | 5.92 | 790.35 | 2,016.00 | | 3.13 | 0.05 | 2,887.05 |
| Landscaping | 0.30 | 0.11 | 9.53 | 0.00 | | 0.00 | 0.05 | | 0.00 | 0.05 | | 16.84 | | 0.02 | | 17.21 |
| **Total** | **16.64** | **0.66** | **46.60** | **0.09** | | **0.00** | **5.97** | | **0.00** | **5.97** | **790.35** | **2,032.84** | | **3.15** | **0.05** | **2,904.26** |

**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 | 0.43 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Consumer Products | 3.99 | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | | | | | | 0.00 |
| Hearth | 0.20 | 0.00 | 0.01 | 0.00 | | 0.00 | 0.14 | | 0.00 | 0.13 | 0.00 | 2,134.59 | | 0.04 | 0.04 | 2,147.58 |
| Landscaping | 0.30 | 0.11 | 9.53 | 0.00 | | 0.00 | 0.05 | | 0.00 | 0.05 | | 16.84 | | 0.02 | | 17.21 |
| **Total** | **4.92** | **0.11** | **9.54** | **0.00** | | **0.00** | **0.19** | | **0.00** | **0.18** | **0.00** | **2,151.43** | | **0.06** | **0.04** | **2,164.79** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Vegetation

# APPENDIX B

Rule 403 Regulatory Requirements and Mitigation Measure Example

**Table 1**
**Fugitive Dust Best Available Control Measure**
**(Applicable to All Construction Activity Sources)**

| Source Category | Control Measure | Guidance |
|---|---|---|
| Backfilling | 01-1 Stabilize backfill material when not actively handling; and<br>01-2 Stabilize backfill material during handling; and<br>01-3 Stabilize soil at completion of activity. | • Mix backfill soil with water prior to moving.<br>• Dedicate water truck or high capacity hose to backfilling equipment.<br>• Empty loader bucket slowly so that no dust plumes are generated.<br>• Minimize drop height from loader bucket. |
| Clearing and grubbing | 02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and<br>02-2 Stabilize soil during clearing and grubbing activities; and<br>02-3 Stabilize soil immediately after clearing and grubbing activities. | • Maintain live perennial vegetation where possible.<br>• Apply water in sufficient quantity to prevent generation of dust plumes. |
| Clearing forms | 03-1 Use water spray to clear forms; or<br>03-2 Use sweeping and water spray to clear forms; or<br>03-3 Use vacuum system to clear forms. | • Use of high-pressure air to clear forms may cause exceedance of Rule requirements. |
| Crushing | 04-1 Stabilize surface soils prior to operation of support equipment; and<br>04-2 Stabilize material after crushing. | • Follow permit conditions for crushing equipment.<br>• Prewater material prior to loading into crusher.<br>• Monitor crusher emissions opacity.<br>• Apply water to crushed material to prevent dust plumes |
| Cut and fill | 05-1 Prewater soils prior to cut and fill activities; and<br>05-2 Stabilize soil during and after cut and fill activities. | • For large site, prewater with sprinklers or water trucks and allow time for penetration.<br>• Use water trucks/pull to water soils to depth of cut prior to subsequent cuts. |

| | | |
|---|---|---|
| Demolition—mechanical/ manual | 06-1 Stabilize wind erodible surfaces to reduce dust; and<br>06-2 Stabilize surface soil where support equipment and vehicles will operate; and<br>06-3 Stabilize loose soil and demolition debris; and<br>06-4 Comply with AQMD Rule 1403. | • Apply water in sufficient quantities to prevent the generation of visible dust plumes. |
| Disturbed soil | 07-1 Stabilize disturbed soil throughout the construction site; and<br>07-2 Stabilize disturbed soil between structures. | • Limit vehicular traffic and disturbances on soils where possible.<br>• If interior block walls are planned, install as early as possible.<br>• Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes. |
| Earth-moving activities | 08-1 Preapply water to depth of proposed cuts; and<br>08-2 Reapply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and<br>08-3 Stabilize soils once earth moving activities are complete | • Grade each project phase separately, times to coincide with construction phase.<br>• Upwind fencing can prevent material movement on-site.<br>• Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes. |
| Importing/ exporting of bulk materials | 09-1 Stabilize material while loading to reduce fugitive dust emissions; and<br>09-2 Maintain at least six inches of freeboard on haul vehicles; and<br>09-3 Stabilize material while transporting to reduce fugitive dust emissions; and<br>09-4 Stabilize material while unloading to reduce fugitive dust emissions; and<br>09-5 Comply with Vehicle Code Section 23114. | • Use tarps or other suitable enclosures on haul trucks.<br>• Check belly-dump truck seals regularly and remove and trapped rocks to prevent spillage.<br>• Comply with track-out prevention/ Mitigation requirements.<br>• Provide water while loading and unloading to reduce visible dust plumes. |

| | | |
|---|---|---|
| Landscaping | 10-1 Stabilize soils, materials, slopes. | • Apply water to materials to stabilize.<br>• Maintain materials in a crusted condition.<br>• Maintain effective cover over materials.<br>• Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes.<br>• Hydroseed prior to rain season. |
| Road shoulder maintenance | 11-1 Apply water to unpaved shoulders prior to clearing; and<br>11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance. | • Installation of curbing and/or paving road shoulders can reduce recurring maintenance costs.<br>• Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs. |
| Screening | 12-1 Prewater material prior to screening; and<br>12-2 Limit fugitive dust emissions to opacity and plum length standards; and<br>12-3 Stabilize material immediately after screening. | • Dedicate water truck or high capacity hose to screening operation.<br>• Drop material through the screen slowly and minimize drop height.<br>• Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point. |
| Staging areas | 13-1 Stabilize staging areas during use; and<br>13-2 Stabilize staging area soils at project completion. | • Limit size of staging area.<br>• Limit vehicle speeds of 15 miles per hour<br>• Limit number and size of staging area entrances/exits. |
| Stockpiles/ Bulk Material Handling | 14-1 Stabilize stockpiled materials.<br>14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage. | • Add or remove material from the downwind portion of the storage pile.<br>• Maintain storage piles to avoid steep sides or faces. |

| | | |
|---|---|---|
| Traffic Areas for Contruction | 15-1 Stabilize all off-road traffic and parking areas; and<br>15-2 Stabilize all haul routes; and<br>15-3 Direct construction traffic over established haul routes. | • Apply gravel/paving to all haul routes as soon as possible to all future roadway areas.<br>• Barriers can be used to ensure vehicles are only used on established parking areas/haul routes. |
| Trenching | 16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and<br>16-2 Stabilize soils at the completion of trenching activities. | • Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18-inches soak soils via the pre-trench and resuming trenching.<br>• Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment. |
| Truck loading | 17-1 Prewater material prior to loading; and<br>17-2 Ensure that freeboard exceeds six inches (CVC 23114). | • Empty loader bucket such that no visible dust plumes are created.<br>• Ensure that the loader bucket is closer to the truck to minimize drop height while loading. |
| Turf Overseeding | 18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plum length standards; and<br>18-2 Cover haul vehicles prior to exiting the site. | • Haul waste material immediately off site. |
| Unpaved roads/ parking lots | 19-1 Stabilize soils to meet the applicable performance standards; and<br>19-2 Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots. | • Restricting vehicular access to established unpaved travel path and parking lots can reduce stabilization requirements. |
| Vacant land | 20-1 In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by | |

| | | |
|---|---|---|
| | motor vehicles and/or off-road vehicles, prevent motor vehicles and/or off-road vehicle trespassing, parking and/or access by installing barriers curbs, fences, gates, posts, signs, shrubs, trees, or other effective control measures. | |

Table 2
Dust Control Measures for Large Operations

| Fugitive Dust Source Category | Control Actions |
|---|---|
| Earth-moving (except construction cutting and filling area, and mining operations) | 1a Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or equivalent method approved by the Executive Officer, CARB, and the USEPA. Two soil moisture evaluations must be conducted during the first three hours or active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; or<br>1a-1 For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction. |
| Earth-moving: Construction fill areas | 1b Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four hour period of active operations |
| Earth-moving: Construction cut areas and mining operations: | 1c Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors. |
| Disturbed surface areas (except completed grading areas) | 2a/b Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind-driven fugitive dust, must have an application of water at least twice per day to at least 80 percent of the unstabilized area. |
| Disturbed surface areas: Completed grading areas | 2c Apply chemical stabilizers within five working days of grading completion;<br>2d Take actions (3a) or (3c) specified for inactive disturbed surface areas. |

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|---|---|
| Inactive disturbed surface areas | 3a Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; or<br>3b Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; or<br>3c Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; or<br>3d Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas. |
| Unpaved Roads | 4a Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; or<br>4b Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; or<br>4c Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface. |
| Open storage piles | 5a Apply chemical stabilizers; or<br>5b Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; or<br>5c Install temporary coverings; or<br>5d Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities. |
| All Categories | 6a Any other control measures approved by the Executive Officer and the USEPA as equivalent to the methods specified in this Table may be used. |

**Table 3**
**Contingency Control Measures for Large Operations**

| Fugitive Dust Source Category | Control Measures |
|---|---|
| Earth-moving | 1A Cease all active operations; or<br>2A Apply water to soil not more than 15 minutes prior to moving such soil. |
| Disturbed surface areas | 0B On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; or<br>1B Apply chemical stabilizers prior to wind event; or<br>2B Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind-driven fugitive dust, watering frequency is increased to a minimum of four times per day; or<br>3B Take the actions specified in this Table, Item (3c); or<br>4B Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas. |
| Unpaved roads | 1C Apply chemical stabilizers prior to wind event; or<br>2C Apply water twice per hour during active operation; or<br>3C Stop all vehicular traffic. |
| Open storage piles | 1D Apply water twice per hour; or<br>2D Install temporary coverings. |
| Paved road track-out | 1E Cover all haul vehicles; or<br>2E Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads. |
| All Categories | 1F Any other control measures approved by the Executive Officer and the USEPA as equivalent to the methods specified in this Table may be used. |

AQMD

# TABLE XI-A
# MITIGATION MEASURE EXAMPLES:
# FUGITIVE DUST FROM CONSTRUCTION & DEMOLITION

| Source Activity | Mitigation Measure[1] | PM10 Control Efficiency | Comments | Estimated Cost[2] |
|---|---|---|---|---|
| Active demolition and debris removal | Apply water every 4 hours to the area within 100 feet of a structure being demolished, to reduce vehicle trackout. | 36% | | ND |
| Trackout | Use a gravel apron, 25 feet long by road width, to reduce mud/dirt trackout from unpaved truck exit routes. | 46% | | $1,360/year (gravel apron dimensions: 50' x 30' x 3" thick) |
| Post-demolition stabilization | Apply dust suppressants (e.g., polymer emulsion) to disturbed areas upon completion of demolition. | 84% | For actively disturbed areas. | $5,340/acre-year (Useful life of 1 year) |
| Demolition Activities | Apply water to disturbed soils after demolition is completed or at the end of each day of cleanup. | 10% | 14-hour watering interval. | $68-$81/acre-day |
| Demolition Activities | Prohibit demolition activities when wind speeds exceed 25 mph. | 98% | Estimated for high wind days in absence of soil disturbance activities. Demolition of 1,000 $ft^2$ structure on 1.2 acres. | $1.36 per 8 hour day idled |
| Construction Activities | Apply water every 3 hours to disturbed areas within a construction site. | 61% | 3.2-hour watering interval. | ND |
| Scraper loading and unloading | Require minimum soil moisture of 12% for earthmoving by use of a moveable sprinkler system or a water truck. Moisture content can be verified by lab sample or moisture probe. | 69% | AP-42 emission factor equation for materials handling due to increasing soil moisture from 1.4% to 12%. | $138/acre (sprinkler system to maintain minimum soil moisture of 12%) |
| Construction traffic | Limit on-site vehicle speeds (on unpaved roads) to 15 mph by radar enforcement. | 57% | Assume linear relationship between PM10 emissions and uncontrolled vehicle speed of 35 mph. | $22/inspection<br>$180/sign |

[1]Unless otherwise noted, information presented in this table is from the following reference: *WRAP Fugitive Dust Handbook*, September 7, 2006 (http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf). ND = No Data.
[2]2003 dollars.

# TABLE XI-A
# MITIGATION MEASURE EXAMPLES:
# FUGITIVE DUST FROM CONSTRUCTION & DEMOLITION

| Source Component | Mitigation Measure[1] | PM10 Control Efficiency | References & Assumptions | Estimated Cost[2] |
|---|---|---|---|---|
| Grading | Replace ground cover in disturbed areas as quickly as possible. | 5%[3] | EPA, "Control of Fugitive Dust Sources" EPA-450/3-88-008, September 1988 | ND |
| Grading | All trucks hauling dirt, sand, soil, or other loose materials are to be tarped with a fabric cover and maintain a freeboard height of 12 inches. | 91% | Arizona Department of Transportation Construction Analysis Services, "Final Field Study Report - PM10 Control Management Study for ADOT Construction Projects, June 1994 | ND |

[1]Unless otherwise noted, information presented in this table is from the following reference: *WRAP Fugitive Dust Handbook*, September 7, 2006 (http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf). ND = No Data.
[2] 2003 dollars.
[3] Higher than 5% control efficiency may be used. However, please provide the supporting analysis and data in the environmental documentation.

# APPENDIX C

OFFROAD2011 Calculations

| | | | | CalEEMod | OFFROAD | Total Emissions Lbs/Day (OFFROAD 2011) | | |
|---|---|---|---|---|---|---|---|---|
| Phase | Equipment Type | # Equipment | UsageHours | HorsePower | HP Bin | NOx | PM | ROG |
| Site Preparation | Graders | 1 | 8 | 162 | 175 | 9.336485 | 0.524885 | 1.059134 |
| Site Preparation | Scrapers | 1 | 8 | 356 | 500 | 20.72852 | 0.273347 | 0.669078 |
| Site Preparation | Tractors/Loaders/Backh | 1 | 8 | 75 | 120 | 3.013793 | 0.303634 | 0.776976 |
| | | | | | Total | **33.08** | **1.10** | **2.51** |
| | | | | | | NOx | PM | ROG |
| Grading | Excavators | 2 | 8 | 157 | 175 | 9.237552 | 0.455524 | 4.739701 |
| Grading | Graders | 1 | 8 | 162 | 175 | 9.336485 | 0.212438 | 7.311547 |
| Grading | Rubber Tired Dozers | 1 | 8 | 358 | 500 | 10.8786 | 0.24927 | 0.576802 |
| Grading | Scrapers | 2 | 8 | 356 | 500 | 20.72852 | 0.875015 | 0.488021 |
| Grading | Tractors/Loaders/Backh | 2 | 8 | 75 | 120 | 6.027586 | 0.474554 | 0.607881 |
| | | | | | Total | **56.21** | **2.27** | **13.72** |

| CalendarYear | AirBasin | Equipment Class | EquipmentTypeID | Equipment Type |
|---|---|---|---|---|
| 2014 | SC | Construction and Mining | 12 | Cranes |
| 2014 | SC | Construction and Mining | 12 | Cranes |
| 2014 | SC | Construction and Mining | 12 | Cranes |
| 2014 | SC | Construction and Mining | 12 | Cranes |
| 2014 | SC | Construction and Mining | 12 | Cranes |
| 2014 | SC | Construction and Mining | 12 | Cranes |
| 2014 | SC | Construction and Mining | 12 | Cranes |
| 2014 | SC | Construction and Mining | 12 | Cranes |
| 2014 | SC | Construction and Mining | 13 | Crawler Tractors |
| 2014 | SC | Construction and Mining | 13 | Crawler Tractors |
| 2014 | SC | Construction and Mining | 13 | Crawler Tractors |
| 2014 | SC | Construction and Mining | 13 | Crawler Tractors |
| 2014 | SC | Construction and Mining | 13 | Crawler Tractors |
| 2014 | SC | Construction and Mining | 13 | Crawler Tractors |
| 2014 | SC | Construction and Mining | 13 | Crawler Tractors |
| 2014 | SC | Construction and Mining | 13 | Crawler Tractors |
| 2014 | SC | Construction and Mining | 14 | Excavators |
| 2014 | SC | Construction and Mining | 14 | Excavators |
| 2014 | SC | Construction and Mining | 14 | Excavators |
| 2014 | SC | Construction and Mining | 14 | Excavators |
| 2014 | SC | Construction and Mining | 14 | Excavators |
| 2014 | SC | Construction and Mining | 14 | Excavators |
| 2014 | SC | Construction and Mining | 14 | Excavators |
| 2014 | SC | Construction and Mining | 14 | Excavators |
| 2014 | SC | Construction and Mining | 15 | Graders |
| 2014 | SC | Construction and Mining | 15 | Graders |
| 2014 | SC | Construction and Mining | 15 | Graders |
| 2014 | SC | Construction and Mining | 15 | Graders |
| 2014 | SC | Construction and Mining | 15 | Graders |
| 2014 | SC | Construction and Mining | 15 | Graders |
| 2014 | SC | Construction and Mining | 15 | Graders |
| 2014 | SC | Construction and Mining | 16 | Off-Highway |
| 2014 | SC | Construction and Mining | 16 | Off-Highway |
| 2014 | SC | Construction and Mining | 16 | Off-Highway |
| 2014 | SC | Construction and Mining | 16 | Off-Highway |
| 2014 | SC | Construction and Mining | 16 | Off-Highway |
| 2014 | SC | Construction and Mining | 16 | Off-Highway |
| 2014 | SC | Construction and Mining | 16 | Off-Highway |
| 2014 | SC | Construction and Mining | 16 | Off-Highway |
| 2014 | SC | Construction and Mining | 17 | Off-Highway |
| 2014 | SC | Construction and Mining | 17 | Off-Highway |
| 2014 | SC | Construction and Mining | 17 | Off-Highway |
| 2014 | SC | Construction and Mining | 17 | Off-Highway |
| 2014 | SC | Construction and Mining | 17 | Off-Highway |
| 2014 | SC | Construction and Mining | 17 | Off-Highway |
| 2014 | SC | Construction and Mining | 17 | Off-Highway |

| | | | | |
|---|---|---|---|---|
| 2014 | SC | Construction and Mining | 17 | Off-Highway |
| 2014 | SC | Construction and Mining | 18 | Other |
| 2014 | SC | Construction and Mining | 18 | Other |
| 2014 | SC | Construction and Mining | 18 | Other |
| 2014 | SC | Construction and Mining | 18 | Other |
| 2014 | SC | Construction and Mining | 18 | Other |
| 2014 | SC | Construction and Mining | 18 | Other |
| 2014 | SC | Construction and Mining | 18 | Other |
| 2014 | SC | Construction and Mining | 18 | Other |
| 2014 | SC | Construction and Mining | 19 | Pavers |
| 2014 | SC | Construction and Mining | 19 | Pavers |
| 2014 | SC | Construction and Mining | 19 | Pavers |
| 2014 | SC | Construction and Mining | 19 | Pavers |
| 2014 | SC | Construction and Mining | 19 | Pavers |
| 2014 | SC | Construction and Mining | 19 | Pavers |
| 2014 | SC | Construction and Mining | 20 | Paving Equipment |
| 2014 | SC | Construction and Mining | 20 | Paving Equipment |
| 2014 | SC | Construction and Mining | 20 | Paving Equipment |
| 2014 | SC | Construction and Mining | 20 | Paving Equipment |
| 2014 | SC | Construction and Mining | 20 | Paving Equipment |
| 2014 | SC | Construction and Mining | 20 | Paving Equipment |
| 2014 | SC | Construction and Mining | 20 | Paving Equipment |
| 2014 | SC | Construction and Mining | 21 | Rollers |
| 2014 | SC | Construction and Mining | 21 | Rollers |
| 2014 | SC | Construction and Mining | 21 | Rollers |
| 2014 | SC | Construction and Mining | 21 | Rollers |
| 2014 | SC | Construction and Mining | 21 | Rollers |
| 2014 | SC | Construction and Mining | 21 | Rollers |
| 2014 | SC | Construction and Mining | 22 | Rough Terrain |
| 2014 | SC | Construction and Mining | 22 | Rough Terrain |
| 2014 | SC | Construction and Mining | 22 | Rough Terrain |
| 2014 | SC | Construction and Mining | 22 | Rough Terrain |
| 2014 | SC | Construction and Mining | 22 | Rough Terrain |
| 2014 | SC | Construction and Mining | 22 | Rough Terrain |
| 2014 | SC | Construction and Mining | 23 | Rubber Tired |
| 2014 | SC | Construction and Mining | 23 | Rubber Tired |
| 2014 | SC | Construction and Mining | 23 | Rubber Tired |
| 2014 | SC | Construction and Mining | 23 | Rubber Tired |
| 2014 | SC | Construction and Mining | 23 | Rubber Tired |
| 2014 | SC | Construction and Mining | 23 | Rubber Tired |
| 2014 | SC | Construction and Mining | 24 | Rubber Tired |
| 2014 | SC | Construction and Mining | 24 | Rubber Tired |
| 2014 | SC | Construction and Mining | 24 | Rubber Tired |
| 2014 | SC | Construction and Mining | 24 | Rubber Tired |
| 2014 | SC | Construction and Mining | 24 | Rubber Tired |
| 2014 | SC | Construction and Mining | 24 | Rubber Tired |
| 2014 | SC | Construction and Mining | 24 | Rubber Tired |

| | | | | |
|---|---|---|---|---|
| 2014 | SC | Construction and Mining | 24 | Rubber Tired |
| 2014 | SC | Construction and Mining | 25 | Scrapers |
| 2014 | SC | Construction and Mining | 25 | Scrapers |
| 2014 | SC | Construction and Mining | 25 | Scrapers |
| 2014 | SC | Construction and Mining | 25 | Scrapers |
| 2014 | SC | Construction and Mining | 25 | Scrapers |
| 2014 | SC | Construction and Mining | 25 | Scrapers |
| 2014 | SC | Construction and Mining | 25 | Scrapers |
| 2014 | SC | Construction and Mining | 25 | Scrapers |
| 2014 | SC | Construction and Mining | 26 | Skid Steer Loaders |
| 2014 | SC | Construction and Mining | 26 | Skid Steer Loaders |
| 2014 | SC | Construction and Mining | 26 | Skid Steer Loaders |
| 2014 | SC | Construction and Mining | 26 | Skid Steer Loaders |
| 2014 | SC | Construction and Mining | 26 | Skid Steer Loaders |
| 2014 | SC | Construction and Mining | 26 | Skid Steer Loaders |
| 2014 | SC | Construction and Mining | 26 | Skid Steer Loaders |
| 2014 | SC | Construction and Mining | 27 | Surfacing |
| 2014 | SC | Construction and Mining | 27 | Surfacing |
| 2014 | SC | Construction and Mining | 27 | Surfacing |
| 2014 | SC | Construction and Mining | 27 | Surfacing |
| 2014 | SC | Construction and Mining | 27 | Surfacing |
| 2014 | SC | Construction and Mining | 27 | Surfacing |
| 2014 | SC | Construction and Mining | 27 | Surfacing |
| 2014 | SC | Construction and Mining | 27 | Surfacing |
| 2014 | SC | Construction and Mining | 28 | Tractors/Loaders/ |
| 2014 | SC | Construction and Mining | 28 | Tractors/Loaders/ |
| 2014 | SC | Construction and Mining | 28 | Tractors/Loaders/ |
| 2014 | SC | Construction and Mining | 28 | Tractors/Loaders/ |
| 2014 | SC | Construction and Mining | 28 | Tractors/Loaders/ |
| 2014 | SC | Construction and Mining | 28 | Tractors/Loaders/ |
| 2014 | SC | Construction and Mining | 28 | Tractors/Loaders/ |
| 2014 | SC | Construction and Mining | 28 | Tractors/Loaders/ |
| 2014 | SC | Construction and Mining | 29 | Trenchers |
| 2014 | SC | Construction and Mining | 29 | Trenchers |
| 2014 | SC | Construction and Mining | 29 | Trenchers |
| 2014 | SC | Construction and Mining | 29 | Trenchers |
| 2014 | SC | Construction and Mining | 29 | Trenchers |
| 2014 | SC | Construction and Mining | 29 | Trenchers |
| 2014 | SC | Construction and Mining | 29 | Trenchers |
| 2014 | SC | Construction and Mining | 36 | Sweepers/Scrubbe |
| 2014 | SC | Construction and Mining | 36 | Sweepers/Scrubbe |
| 2014 | SC | Construction and Mining | 36 | Sweepers/Scrubbe |
| 2014 | SC | Construction and Mining | 36 | Sweepers/Scrubbe |
| 2014 | SC | Construction and Mining | 36 | Sweepers/Scrubbe |
| 2014 | SC | Construction and Mining | 36 | Sweepers/Scrubbe |

| HorsepowerBin | BaseNOx | BasePM | BaseHC | BaseActivity | NOx lb/hr | PM lb/hr | ROG lb/hr |
|---|---|---|---|---|---|---|---|
| 50 | 0.55462566 | 0.05527715 | 0.1590822 | 7054.608955 | 0.1572378 | 0.0156712 | 0.063536 |
| 120 | 25.0775268 | 1.86324255 | 2.51171 | 84777.88095 | 0.5916054 | 0.0439559 | 0.083475 |
| 175 | 53.2176699 | 2.87676319 | 4.12182655 | 133158.1391 | 0.7993153 | 0.0432082 | 0.087215 |
| 250 | 84.2296062 | 3.87694314 | 5.86409881 | 153828.6619 | 1.0951094 | 0.050406 | 0.107407 |
| 500 | 103.263161 | 4.29136255 | 6.58925004 | 152449.9579 | 1.3547155 | 0.0562986 | 0.12178 |
| 750 | 18.5952702 | 0.64770729 | 0.99399585 | 23856.25167 | 1.5589432 | 0.0543008 | 0.117395 |
| 1000 | 11.731575 | 0.58146341 | 0.86953928 | 3391.302094 | 6.9186258 | 0.3429145 | 0.722423 |
| 9999 | 0.17633744 | 0.00420408 | 0.0076938 | 236.3645899 | 1.4920801 | 0.0355728 | 0.091712 |
| 50 | 1.78613504 | 0.20842149 | 0.5851895 | 13865.04799 | 0.2576457 | 0.0300643 | 0.118917 |
| 120 | 100.920553 | 8.43833356 | 9.80775566 | 325227.3749 | 0.6206154 | 0.0518919 | 0.084967 |
| 175 | 102.075972 | 5.56943129 | 7.7334171 | 207717.6923 | 0.9828337 | 0.053625 | 0.104898 |
| 250 | 93.2553668 | 3.62554586 | 5.63409202 | 154006.7608 | 1.2110555 | 0.0470829 | 0.103075 |
| 500 | 224.809008 | 8.73509356 | 13.6811102 | 244636.4304 | 1.8379029 | 0.0714129 | 0.157568 |
| 750 | 75.6329544 | 2.76358878 | 4.43411309 | 57188.94072 | 2.6450203 | 0.0966477 | 0.218456 |
| 1000 | 15.080427 | 0.44311408 | 0.79769072 | 5187.953588 | 5.8136322 | 0.1708242 | 0.433219 |
| 9999 | 6.77898617 | 0.17811885 | 0.31319619 | 1558.216768 | 8.7009539 | 0.2286188 | 0.566314 |
| 50 | 54.3692701 | 4.16508457 | 7.47135701 | 727548.3927 | 0.1494588 | 0.0114496 | 0.028934 |
| 120 | 82.4503121 | 6.15919639 | 6.82980443 | 464601.9718 | 0.3549288 | 0.0265139 | 0.041419 |
| 175 | 156.470047 | 7.71588888 | 10.8553506 | 542031.2135 | 0.577347 | 0.0284703 | 0.056427 |
| 250 | 189.209308 | 6.11517469 | 10.6199573 | 460571.8913 | 0.8216277 | 0.0265547 | 0.064967 |
| 500 | 242.631204 | 7.94656843 | 14.0101599 | 510068.9817 | 0.9513662 | 0.0311588 | 0.07739 |
| 750 | 22.6021008 | 0.72201981 | 1.25267703 | 26404.82863 | 1.7119672 | 0.0546885 | 0.133667 |
| 1000 | 4.67733599 | 0.14947515 | 0.24781514 | 2019.454831 | 4.6322759 | 0.1480352 | 0.34575 |
| 9999 | 5.05193737 | 0.13038418 | 0.23458681 | 2127.915181 | 4.7482507 | 0.1225464 | 0.310612 |
| 50 | 0.50524673 | 0.06689632 | 0.19723394 | 4372.38471 | 0.2311081 | 0.0305995 | 0.127096 |
| 120 | 22.0845261 | 1.83931146 | 2.323788 | 53148.80807 | 0.831045 | 0.0692136 | 0.123189 |
| 175 | 173.035886 | 9.72785392 | 13.9336493 | 296532.8306 | 1.1670606 | 0.0656106 | 0.132392 |
| 250 | 199.218431 | 6.43607773 | 11.1826732 | 376727.5286 | 1.0576261 | 0.0341683 | 0.083635 |
| 500 | 37.2758145 | 1.43468044 | 2.60599399 | 75600.48665 | 0.9861263 | 0.0379543 | 0.097122 |
| 1000 | 0.89844832 | 0.03126794 | 0.05669442 | 269.6175123 | 6.664614 | 0.231943 | 0.592463 |
| 9999 | 8.94468417 | 0.26976595 | 0.49301473 | 1519.880233 | 11.770249 | 0.3549832 | 0.913943 |
| 50 | 26.1304672 | 2.64310181 | 6.42694523 | 251151.7988 | 0.208085 | 0.0210478 | 0.0721 |
| 120 | 41.6159452 | 3.43114891 | 3.86596794 | 178557.5495 | 0.4661348 | 0.0384319 | 0.061003 |
| 175 | 27.8129793 | 1.43107371 | 1.94649767 | 72176.18131 | 0.7706969 | 0.039655 | 0.075985 |
| 250 | 26.1732306 | 0.94078896 | 1.54650705 | 44970.9137 | 1.1640071 | 0.0418399 | 0.096892 |
| 500 | 52.4986162 | 1.88348435 | 3.09829461 | 80966.16678 | 1.2968038 | 0.0465252 | 0.107817 |
| 750 | 13.2010156 | 0.44367792 | 0.72804067 | 11850.36749 | 2.2279504 | 0.07488 | 0.173098 |
| 1000 | 1.13551546 | 0.05777229 | 0.0793836 | 192.7415621 | 11.782777 | 0.5994793 | 1.160444 |
| 9999 | 7.24484856 | 0.27243411 | 0.47844647 | 894.9268278 | 16.190929 | 0.6088411 | 1.506311 |
| 50 | 2.60187621 | 0.27072991 | 0.61237983 | 36486.62608 | 0.1426208 | 0.01484 | 0.047289 |
| 120 | 3.57676503 | 0.29011071 | 0.35370339 | 16376.21407 | 0.4368244 | 0.0354307 | 0.060855 |
| 175 | 60.2796393 | 3.37879249 | 4.89549011 | 171908.5613 | 0.7012989 | 0.0393092 | 0.080236 |
| 250 | 136.04329 | 6.01051082 | 10.028692 | 266093.5242 | 1.0225224 | 0.0451759 | 0.106189 |
| 500 | 476.869972 | 18.5095592 | 33.1339274 | 631436.8508 | 1.5104281 | 0.0586268 | 0.147847 |
| 750 | 217.393976 | 9.29805135 | 15.6999365 | 128428.4681 | 3.3854484 | 0.1447974 | 0.344433 |
| 1000 | 159.753516 | 4.70923026 | 8.64207483 | 65531.00835 | 4.8756618 | 0.1437252 | 0.371569 |

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|---|---|---|---|---|---|---|---|
| 9999 | 209.298179 | 6.55845317 | 12.3690043 | 47603.76583 | 8.7933455 | 0.2755435 | 0.732086 |
| 50 | 13.5575343 | 1.22357299 | 2.6184883 | 139974.3147 | 0.1937146 | 0.0174828 | 0.052707 |
| 120 | 56.9595817 | 4.4488817 | 5.17568245 | 229033.871 | 0.49739 | 0.0388491 | 0.06367 |
| 175 | 30.3938404 | 1.60821706 | 2.24541538 | 66898.23386 | 0.908659 | 0.0480795 | 0.094569 |
| 250 | 34.689209 | 1.28580485 | 2.01788809 | 59660.71364 | 1.1628828 | 0.0431039 | 0.095297 |
| 500 | 95.840041 | 3.60582148 | 5.78257963 | 123703.1985 | 1.549516 | 0.058298 | 0.131707 |
| 750 | 33.7795199 | 1.14760265 | 1.84984481 | 28963.19451 | 2.3325825 | 0.0792456 | 0.179952 |
| 1000 | 4.1244963 | 0.10838466 | 0.1696617 | 2440.370329 | 3.3802216 | 0.0888264 | 0.195883 |
| 9999 | 3.13095336 | 0.08599711 | 0.14471689 | 1143.493707 | 5.4761182 | 0.1504112 | 0.356578 |
| 50 | 1.7112116 | 0.17797693 | 0.46954456 | 16924.26219 | 0.2022199 | 0.0210322 | 0.078169 |
| 120 | 20.2396228 | 1.57759099 | 1.84605058 | 89184.15786 | 0.4538838 | 0.0353783 | 0.058321 |
| 175 | 25.3121111 | 1.26652549 | 1.83412596 | 60634.99709 | 0.834901 | 0.0417754 | 0.085226 |
| 250 | 12.2418764 | 0.31122855 | 0.50795218 | 30261.41368 | 0.809075 | 0.0205693 | 0.047294 |
| 500 | 3.44096984 | 0.11426675 | 0.16807448 | 7532.429764 | 0.9136414 | 0.0303399 | 0.062869 |
| 750 | 0.31433498 | 0.01346406 | 0.01778781 | 376.2679193 | 1.670804 | 0.0715664 | 0.133197 |
| 50 | 1.96792452 | 0.16847387 | 0.34180046 | 27672.88199 | 0.1422277 | 0.0121761 | 0.034801 |
| 120 | 12.1246644 | 0.92601214 | 1.06888759 | 54311.33903 | 0.4464874 | 0.0341001 | 0.055451 |
| 175 | 9.35690332 | 0.44969946 | 0.6161038 | 30730.2772 | 0.6089697 | 0.0292675 | 0.056488 |
| 250 | 4.97882668 | 0.18057136 | 0.2827076 | 11053.07619 | 0.9008943 | 0.0326735 | 0.072065 |
| 500 | 6.14445867 | 0.22000866 | 0.34474077 | 9992.115393 | 1.2298614 | 0.0440365 | 0.097208 |
| 750 | 2.4592754 | 0.05659497 | 0.11244672 | 2635.177393 | 1.866497 | 0.0429534 | 0.120228 |
| 1000 | 0.55752872 | 0.01348674 | 0.02200961 | 369.9511979 | 3.0140663 | 0.0729109 | 0.167624 |
| 50 | 33.3020338 | 2.9968702 | 6.7116371 | 417160.9243 | 0.1596604 | 0.0143679 | 0.045331 |
| 120 | 68.9621609 | 5.14888438 | 6.21988041 | 297110.9109 | 0.4642183 | 0.0346597 | 0.058984 |
| 175 | 53.2146554 | 2.48588173 | 3.44697031 | 186362.9282 | 0.5710863 | 0.0266779 | 0.052113 |
| 250 | 9.21008557 | 0.326415 | 0.53269485 | 19783.89639 | 0.9310689 | 0.032998 | 0.075864 |
| 500 | 6.4143084 | 0.2641823 | 0.40225445 | 7872.837692 | 1.6294781 | 0.0671123 | 0.143959 |
| 750 | 0.46233257 | 0.01721783 | 0.02732069 | 249.7018827 | 3.7030764 | 0.1379071 | 0.308275 |
| 50 | 1.63987 | 0.13676785 | 0.30651643 | 14974.85542 | 0.2190165 | 0.0182663 | 0.057671 |
| 120 | 126.392587 | 7.41270656 | 8.2479113 | 657544.93 | 0.3844379 | 0.0225466 | 0.035342 |
| 175 | 19.239256 | 0.75956597 | 1.00104229 | 90077.96414 | 0.427169 | 0.0168646 | 0.031311 |
| 250 | 2.59019203 | 0.11461115 | 0.17526431 | 4594.301698 | 1.1275672 | 0.0498927 | 0.107484 |
| 500 | 0.84447024 | 0.02582266 | 0.04287847 | 1097.539671 | 1.5388423 | 0.0470555 | 0.110075 |
| 750 | 0.4249213 | 0.02259128 | 0.03402851 | 101.7464701 | 8.3525512 | 0.44407 | 0.942307 |
| 50 | 1.82587423 | 0.24059281 | 0.6718157 | 15145.88496 | 0.241105 | 0.0317701 | 0.124975 |
| 120 | 13.6229651 | 1.21929952 | 1.44894903 | 40023.5387 | 0.6807477 | 0.0609291 | 0.102001 |
| 175 | 11.7802412 | 0.67410355 | 0.95116453 | 18366.27558 | 1.2828122 | 0.0734067 | 0.145916 |
| 250 | 9.93005831 | 0.48886325 | 0.74251108 | 13548.87194 | 1.4658133 | 0.0721629 | 0.154408 |
| 500 | 114.936589 | 5.36479956 | 8.33748868 | 91635.48673 | 2.5085607 | 0.11709 | 0.256354 |
| 750 | 12.6370359 | 0.46453798 | 0.75724199 | 6618.545118 | 3.8186749 | 0.1403747 | 0.32236 |
| 50 | 5.27757401 | 0.58672321 | 1.51680666 | 51565.28184 | 0.2046949 | 0.0227565 | 0.082878 |
| 120 | 169.740285 | 14.7692141 | 17.1226869 | 683442.4323 | 0.4967215 | 0.0432201 | 0.070589 |
| 175 | 348.243148 | 19.5374104 | 27.8104161 | 921783.9575 | 0.7555852 | 0.0423904 | 0.085006 |
| 250 | 420.59786 | 14.3244918 | 25.7460843 | 928111.8228 | 0.9063517 | 0.030868 | 0.078159 |
| 500 | 531.940512 | 20.2427278 | 35.7135605 | 782365.9589 | 1.3598253 | 0.0517475 | 0.128615 |
| 750 | 86.4476079 | 3.42168467 | 6.03996912 | 75351.91777 | 2.2945032 | 0.0908188 | 0.225844 |
| 1000 | 34.1479403 | 0.99507985 | 1.7453651 | 15287.75605 | 4.4673581 | 0.13018 | 0.321671 |

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|---|---|---|---|---|---|---|---|---|
| 9999 | 12.96067 | 0.37398186 | 0.69879807 | 3358.035953 | 7.7191967 | 0.2227384 | 0.586321 |
| 50 | 0.13245287 | 0.01766003 | 0.05194243 | 1025.883945 | 0.2582219 | 0.0344289 | 0.142657 |
| 120 | 6.86572927 | 0.51134704 | 0.5773739 | 21670.71129 | 0.6336413 | 0.0471925 | 0.075068 |
| 175 | 82.8615195 | 4.39827572 | 6.23149863 | 117341.9718 | 1.4123083 | 0.0749651 | 0.149626 |
| 250 | 109.565219 | 5.02300025 | 7.63843553 | 101732.4871 | 2.1539868 | 0.0987492 | 0.21155 |
| 500 | 675.410907 | 27.448113 | 43.0568286 | 521338.3253 | 2.5910656 | 0.1052987 | 0.232697 |
| 750 | 248.679541 | 9.53257493 | 15.1961012 | 161069.2664 | 3.0878584 | 0.1183662 | 0.26582 |
| 1000 | 10.1463097 | 0.47305805 | 0.7348983 | 1499.779821 | 13.530399 | 0.6308367 | 1.380602 |
| 9999 | 19.7111856 | 0.73914957 | 1.13444673 | 2635.029555 | 14.960884 | 0.561018 | 1.213018 |
| 50 | 21.1905226 | 1.3443326 | 2.59271293 | 262908.35 | 0.1612008 | 0.0102266 | 0.027786 |
| 120 | 110.837598 | 6.49346185 | 6.95619806 | 960973.5668 | 0.2306777 | 0.0135143 | 0.020395 |
| 175 | 0.77936559 | 0.03552831 | 0.04700055 | 3020.223957 | 0.5160979 | 0.0235269 | 0.043846 |
| 250 | 0.51177988 | 0.01816917 | 0.02865248 | 1785.592618 | 0.5732325 | 0.0203509 | 0.045211 |
| 500 | 0.12398366 | 0.00436185 | 0.00755322 | 359.2008474 | 0.6903306 | 0.0242864 | 0.059247 |
| 750 | 0.09949194 | 0.00411743 | 0.00488414 | 192.6149471 | 1.0330657 | 0.042753 | 0.071444 |
| 1000 | 0.55929024 | 0.02002368 | 0.03566847 | 166.5859003 | 6.7147368 | 0.2404006 | 0.603275 |
| 50 | 0.22969927 | 0.01838417 | 0.03992917 | 3571.789006 | 0.1286186 | 0.0102941 | 0.031497 |
| 120 | 2.07399725 | 0.14701984 | 0.17354586 | 12742.81902 | 0.3255162 | 0.0230749 | 0.038372 |
| 175 | 1.1141465 | 0.05370356 | 0.0761591 | 3881.428472 | 0.574091 | 0.0276721 | 0.055284 |
| 250 | 2.15080544 | 0.06486376 | 0.10845314 | 5690.100565 | 0.7559815 | 0.0227988 | 0.053702 |
| 500 | 5.10972016 | 0.16462299 | 0.25698524 | 10892.83316 | 0.9381802 | 0.0302259 | 0.066472 |
| 750 | 3.96882156 | 0.12468048 | 0.17350265 | 5911.417637 | 1.3427647 | 0.0421829 | 0.082696 |
| 1000 | 1.12449895 | 0.02745543 | 0.048215 | 724.4337405 | 3.1044908 | 0.0757983 | 0.187522 |
| 9999 | 0.26830578 | 0.00604072 | 0.00940751 | 184.7686554 | 2.9042348 | 0.0653869 | 0.143455 |
| 50 | 50.8068003 | 4.66234724 | 10.5820025 | 603893.5766 | 0.1682641 | 0.015441 | 0.049371 |
| 120 | 918.611919 | 72.3226641 | 79.376756 | 4876841.326 | 0.3767241 | 0.0296596 | 0.045859 |
| 175 | 143.479514 | 7.24061391 | 10.1819741 | 492558.9548 | 0.5825882 | 0.0294 | 0.058243 |
| 250 | 82.7295477 | 2.68592606 | 4.55378206 | 200657.593 | 0.8245843 | 0.0267712 | 0.063942 |
| 500 | 100.830547 | 3.4215669 | 5.81599165 | 171623.8264 | 1.1750181 | 0.0398729 | 0.095481 |
| 750 | 13.554166 | 0.49065839 | 0.80430313 | 13684.66061 | 1.9809283 | 0.0717093 | 0.165598 |
| 1000 | 2.004947 | 0.04447549 | 0.07380621 | 1492.414296 | 2.6868504 | 0.0596021 | 0.139339 |
| 9999 | 40.2427563 | 1.20652267 | 1.99757428 | 9175.714639 | 8.7715797 | 0.2629817 | 0.613383 |
| 50 | 17.7725744 | 1.63396113 | 3.42663788 | 147601.8242 | 0.2408178 | 0.0221401 | 0.06541 |
| 120 | 19.0981046 | 1.49408888 | 1.79534043 | 57519.45207 | 0.6640573 | 0.0519507 | 0.087943 |
| 175 | 4.29498012 | 0.22194778 | 0.32064922 | 6804.680342 | 1.2623606 | 0.0652339 | 0.132767 |
| 250 | 6.83809374 | 0.27274183 | 0.43243739 | 8685.585749 | 1.5745844 | 0.0628033 | 0.140279 |
| 500 | 7.77766122 | 0.28671741 | 0.44989893 | 8961.871838 | 1.7357225 | 0.0639861 | 0.141444 |
| 750 | 1.45556816 | 0.04887314 | 0.07755227 | 2325.221325 | 1.2519825 | 0.0420374 | 0.093972 |
| 1000 | 0.62117535 | 0.02813193 | 0.04424837 | 99.46330321 | 12.490543 | 0.5656745 | 1.253439 |
| 50 | 16.411658 | 1.72401372 | 4.17947666 | 158978.6635 | 0.2064637 | 0.0216886 | 0.074072 |
| 120 | 34.3938408 | 3.03688875 | 3.43077251 | 124966.3346 | 0.5504497 | 0.0486033 | 0.077351 |
| 175 | 11.4999345 | 0.63896213 | 0.91684861 | 15185.68694 | 1.5145755 | 0.0841532 | 0.170111 |
| 250 | 4.37312936 | 0.17306579 | 0.27204552 | 6354.346484 | 1.3764214 | 0.0544716 | 0.120626 |
| 500 | 1.09148021 | 0.0471544 | 0.06848901 | 1193.031541 | 1.8297592 | 0.0790497 | 0.161748 |
| 1000 | 0.51223061 | 0.01302772 | 0.01664496 | 298.2578853 | 3.4348169 | 0.0873587 | 0.157239 |