APPENDIX B – Air Quality Report

AIR QUALITY REPORT

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Pasadena, California
(Los Angeles County)

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Acronyms and Abbreviations

$\mu g/m^3$	microgram per cubic meter
AAQS	Ambient Air Quality Standards
AP-42	EPA's Compilation of Air Pollution Emission Factors
AQMP	air quality maintenance plan
AQR	Air Quality Report
ATCM	airborne toxics control measure
BACM	best available control measure
BACT	best available control technology
Basin	South Coast Air Basin
BSCF	brake-specific fuel consumption
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CALINE4	Caltrans Model to assess air quality impacts near transportation facilities
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO Protocol	Transportation Project-Level Carbon Monoxide Protocol
DPM	diesel particulate matter
EMFAC2011	CARB's tool for estimating emissions from on-road vehicles
EPA	United States Environmental Protection Agency
FCAA	Federal Clean Air Act
g/bhp-hr	grams per brake-horsepower-hour
g/m	grams per mile
HAP	hazardous air pollutants
HRA	health risk assessment
I-210	Interstate 210
IPCC	Intergovernmental Panel on Climate Change
LACDPW	Los Angeles County Department of Public Works
LOS	level of service
LST	localized significance thresholds
MACT	maximum available control technology
mph	miles per hour
MY2010	Model Year 2010
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
OFFROAD	CARB Model to estimate emissions from off-road equipment
PM	particulate matter
PM_{10}	respirable particulate matter of 10 micrograms or less in size

Acronyms and Abbreviations (cont.)

$PM_{2.5}$	fine particulate matter of 2.5 micrograms or less in size
ppm	parts per million
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SO_2	sulfur dioxide
SRA	Source-Receptor Area
TAC	toxic air contaminant
TIA	Traffic Impact Analysis
tpy	tons per year
VMT	vehicle miles traveled
VOC	volatile organic compound
WRCC	Western Regional Climate Center
yd^3	cubic yards

SECTION 1.0 – INTRODUCTION

1.1. REPORT PURPOSE

The purpose of this Air Quality Report (AQR) is to analyze the potential air quality impacts that could occur with the sediment removal and management at the Devil's Gate Reservoir Sediment Removal and Management Project (Project). The Proposed Project consists of a comprehensive sediment removal program at Devil's Gate Reservoir that will restore flood capacity and establish a reservoir configuration more suitable for routine maintenance activities including on-going sediment management. The Project is being undertaken in order to restore reservoir capacity to the facility to meet its intended level of flood protection for downstream communities. This AQR was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000 et seq.). The methodology follows the CEQA Air Quality Handbook[1] prepared by the South Coast Air Quality Management District (SCAQMD) for quantification of emissions.

1.2. PROJECT LOCATION

The Proposed Project is located in the City of Pasadena, in Los Angeles County approximately 14 miles north of downtown Los Angeles. The City of La Cañada Flintridge and the community of Altadena are located near the Proposed Project site to the west and east, respectively. Lying south of the San Gabriel Mountains, the Proposed Project site is located in the lower portion of the Arroyo Seco watershed. The Arroyo Seco extends approximately 11 miles from the border of the Angeles National Forest to its confluence with the Los Angeles River. Approximately 20,416 acres (39.1 square miles) of both residential and undeveloped land drain into Devil's Gate Reservoir.

1.3. PROJECT PURPOSE AND NEED

The Proposed Project is designed to remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to contain another major debris event safely and the outlet works have a risk of becoming clogged and inoperable. The Proposed Project would remove sediment from the reservoir behind Devil's Gate Dam to restore flood control capacity and establish a reservoir configuration more suitable for routine maintenance activities including sediment management.

The proposed excavation will remove approximately 2.9 million cubic yards of current excess sediment in the reservoir in addition to any sediment that accumulates prior to project commencement. The proposed configuration will involve approximately 178 acres of the reservoir. Excavated sediment will be trucked off-site to existing disposal site locations which are currently available to accept the sediment. The sediment will be trucked off-site either to the east and placed at the primary disposal site locations, the Vulcan Materials and the Waste Management facilities in Azusa or the Manning Pit Sediment Placement Site in Irwindale, or to the west and placed in one of the facilities in Sun Valley. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale.

1 CEQA Air Quality Handbook. South Coast Air Quality Management District. 1993.

SECTION 2.0 – EXISTING ENVIRONMENT

2.1. ATMOSPHERIC SETTING

The Project site will be located wholly within the South Coast Air Basin (Basin), which includes all of Orange County, as well as the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The distinctive climate of the Basin 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. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

Meteorology is the study of weather and climate. Weather refers to the state of the atmosphere at a given time and place with regard to temperature, air pressure, humidity, cloudiness, and precipitation. The term “weather” refers to conditions over short periods; conditions over long periods, generally at least 30 to 50 years, are referred to as climate. Climate, in a narrow sense, is usually defined as the “average weather,” or more rigorously as the statistical description in terms of the mean and variability of relevant quantities over a period ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind.

2.1.1 Temperature and Precipitation

The annual average temperature varies little throughout the 6,600 square-mile Basin ranging from the low 60's to the high 80’s. However, with a less pronounced oceanic influence, the inland portion shows greater variability in the annual minimum and maximum temperatures. The mean annual high and low temperatures in the project area — as determined from the nearest weather station in Altadena[2], which has a period of record from 1922 to 2010— are 74.1 degrees Fahrenheit (°F) and 50.0 °F, respectively. The overall climate is a mild Mediterranean, with average monthly maximum temperatures reaching to over 86 °F in the summer and dipping to 42 °F in the winter.

In contrast to a fairly steady pattern of temperature, rainfall is seasonally and annually highly variable. The total average annual precipitation is 22.01 inches, with 83 percent of precipitation occurring between November and March.

2.1.2 Humidity

Although the Basin has a semi-arid climate, the air near the surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the Basin by offshore winds, the ocean effect is dominant. Periods of heavy fog, especially along the coastline, are frequent; and low stratus clouds, often referred to as “high fog” are a characteristic climatic feature. Annual average humidity ranges from a high of about 72 percent at the coast to about 58 percent in the eastern portion of the Basin.

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2 Western U.S. Climate Historical Summaries. Western Regional Climate Center. http://www.wrcc.dri.edu/Climsum.html. Accessed May 2013.

2.1.3 Wind

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. Wind speed is somewhat greater during the dry summer months than during the rainy winter season. Typical summer winds in the project area range from 4 to 7 miles per hour (mph) during the day and 2 to 6 mph during the night.

Between the periods of dominant airflow, periods of air stagnation may occur, both in the morning and evening hours. Whether such a period of stagnation occurs is one of the critical determinants of air quality conditions on any given day. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are carbon monoxide (CO) and nitrogen oxides (NO_X), because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

During the winter and fall months, surface high-pressure systems over the Basin, combined with other meteorological conditions, can result in very strong, downslope Santa Ana winds. These winds normally have a duration of a few days before predominant meteorological conditions are reestablished. Within the project area, Santa Ana winds have a decidedly distinct pattern. Santa Ana winds from a northerly direction flow through the Cajon Pass and then follow the Santa Ana River in a southwestward motion direction to the coast. The highest wind speeds typically occur during the afternoon due to daytime thermal convection caused by surface heating. This convection brings about a downward transfer of momentum from stronger winds aloft. While the maximum wind speed during Santa Ana conditions is undefined, sustained winds of 60 mph with higher gusts are not uncommon in the project vicinity.

2.1.4 Inversions

In conjunction with the two characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, there are two similarly distinct types of temperature inversions that control the vertical depth through which pollutants are mixed. These inversions are the marine/subsidence inversion and the radiation inversion. The height of the base of the inversion at any given time is known as the “mixing height.” This mixing height can change under conditions when the top of the inversion does not change. The combination of winds and inversions are critical determinants in leading to the highly degraded air quality in summer, and the generally good air quality in the winter in the project area.

2.2. AIR QUALITY ENVIRONMENT

2.2.1 Criteria Air Pollutants

As required by the Federal Clean Air Act (FCAA), the Environmental Protection Agency (EPA) has identified criteria pollutants and established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS have been established for ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), suspended particulate matter (PM), and lead. Suspended PM has standards for both PM with an aerodynamic diameter of 10 microns or less (respirable PM, or PM_{10}) and PM with an aerodynamic diameter of 2.5 microns or less (fine PM, or $PM_{2.5}$). The CARB has established separate standards for the State, i.e. the California Ambient Air Quality Standards (CAAQS). The CARB established CAAQS for all the federal pollutants and sulfates, hydrogen sulfide, and visibility-reducing particles.

For some of the pollutants, the identified air quality standards are expressed in more than one averaging time in order to address the typical exposures found in the environment. For example, CO is expressed as a one-hour averaging time and an eight-hour averaging time. Regulations have set NAAQS and CAAQS limits in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Table 1 summarizes the State and federal ambient air quality standards for all criteria pollutants.

2.2.1.1 Pollutants of Concern

As discussed below, the area surrounding the project is nonattainment or maintenance for ozone, PM, NO_2, and CO. Since reactive hydrocarbons and nitrogen oxides are precursors to ozone, that is, are photochemically combined to create ozone, these are considered pollutants of concern. Following is a brief description of these pollutants of concern, including health effects and the relative level of contributed emissions.

- **Carbon monoxide** (CO) is a colorless, odorless gas produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). CO levels tend to be highest during the winter months and low wind speed when the meteorological conditions favor the accumulation of the pollutants. This occurs when relatively low inversion levels trap pollutants near the ground and concentrate the CO. CO is essentially inert to plants and materials but can have significant effects on human health. CO gas enters the body through the lungs, dissolves in the blood, and creates a solid bond to hemoglobin, not allowing it to form a loose bond with carbon dioxide (CO_2), which is essential to the CO_2/oxygen exchange to occur. This firm binding therefore reduces available oxygen in the blood and oxygen delivery to the body's organs and tissues.

  A review of CARB's 2010 Emission Inventory[3] shows that the primary source of CO is from on-road motor vehicles, which contributes almost 60 percent of the total CO in the Basin portion of Los Angeles County. Other off-road engines and vehicles (such as construction equipment and recreational boats) contribute another 32 percent. Higher levels of CO generally occur in areas with heavy traffic congestion.

- **Volatile organic compounds[4]** (VOC) are defined as any compound of carbon, excluding CO, CO_2, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. It should be noted that there are no state or national ambient air quality standard for VOC because they are not classified as criteria pollutants. They are regulated, however, because a reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of ozone. VOC are also transformed into organic aerosols in the atmosphere, which contribute to higher PM_{10} and lower visibility.

[3] Almanac Emissions Projection Data. California Air Resources Board. http://www.arb.ca.gov/app/emsinv/. Accessed October 2011.

[4] VOCs are sometimes referred to as reactive organic gases (ROG), in this document the two terms are considered synonymous.

Table 1 – National and State Ambient Air Quality Standards[5]

Air Pollutant	Averaging Time	California Standard	National Standard
Ozone (O_3)	1 hour	0.09 ppm	—
	8 hour	0.070 ppm	0.075 ppm
Respirable particulate matter (PM_{10})	24 hour	50 µg/m^3	150 µg/m^3
	Mean*	20 µg/m^3	—
Fine particulate matter ($PM_{2.5}$)	24 hour	—	35 µg/m^3
	Mean	12 µg/m^3	15 µg/m^3
Carbon monoxide (CO)	1 hour	20 ppm	35 ppm
	8 hour	9.0 ppm	9 ppm
Nitrogen dioxide (NO_2)	1 hour	0.18 ppm	0.100 ppm ***
	Mean	0.030 ppm	0.053 ppm
Sulfur dioxide (SO_2)	1 hour	0.25 ppm	0.075 ppm ***
	24 hour	0.04 ppm	—
Lead	30-day	1.5 µg/m^3	—
	Rolling 3-month	—	0.15 µg/m^3
	Quarter	—	1.5 µg/m^3
Sulfates	24 hour	25 µg/m^3	**No Federal Standard**
Hydrogen sulfide	1 hour	0.03 ppm	
Vinyl chloride**	24 hour	0.01 ppm	
Visibility-reducing particles	8 hour	Extinction coefficient of 0.23 per kilometer, visibility of ten miles or more due to particles when relative humidity is less than 70%.	

Abbreviations:
ppm = parts per million   µg/m^3 = micrograms per cubic meter
30-day = 30-day average   Quarter = Calendar quarter
* Mean = Annual Arithmetic Mean
** The CARB 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.
*** The new 1-hour and annual mean NO_2 standards and 1-hour SO_2 standard are parts per billion (ppb) but in order to compare national and California standards directly, it has been converted to ppm.

5 Ambient Air Quality Standards. California Air Resources Board. June 7, 2012.

VOC emissions result primarily from incomplete fuel combustion and the evaporation of chemical solvents and fuels. On-road mobile sources are the largest single contributor to VOC emissions in the Basin portion of Los Angeles County with almost 30 percent of the total VOC emissions, with most of that coming from light-duty vehicles. Another 21 percent is contributed by off-road sources like construction equipment and recreational boats. Solvent evaporation VOC sources in the area contribute another 21 percent and are primarily from the use of consumer products.

- **Nitrogen oxides** (NO_X) serve as integral participants in the process of photochemical smog production. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown irritating gas formed by the combination of NO and oxygen. The Basin is designated a maintenance area for NO_2 but the primary concern is from the combined NO_X and its relationship to ozone. NO_X is an ozone precursor. A precursor is a directly emitted air contaminant that, when released into the atmosphere, forms, causes to be formed, or contributes to the formation of a secondary air contaminant for which an ambient air standard has been adopted, or whose presence in the atmosphere will contribute to the violation of one or more standards. When NO_X and VOC are released in the atmosphere, they can chemically react with one another in the presence of sunlight to form ozone.

  A review of the 2010 Emission Inventory shows that 86 percent of the total NO_X emissions in the Basin portion of Los Angeles County come from on- and off-road vehicles (50% from on-road and 39% from off-road). The largest portion of on-road NO_X emissions come from heavy-duty diesel trucks (36% of the total for on-road) and light-duty cars and trucks (28%). The largest contributors from off-road sources are construction and demolition equipment (55% of total off-road NO_X).

- **Particulate matter** (PM). Particle pollution is a mixture of microscopic solids and liquid droplets suspended in air. This pollution, also known as particulate matter, is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores). The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into lungs and the bloodstream. Being even smaller, $PM_{2.5}$ will travel further into the lungs. Exposure to such particles can affect both lungs and heart.

  A review of the 2010 Emission Inventory shows that almost 69 percent of the total PM_{10} emissions in the Basin portion of Los Angeles County come from the category labeled Miscellaneous Processes. The largest portion of the PM_{10} emissions from miscellaneous processes come from paved road dust (66% of the total for miscellaneous processes) and construction and demolition (13%). Whereas a significant portion of PM_{10} emissions come from dislocation processes, $PM_{2.5}$ is smaller and is more often a result of particulates coming from combustion sources. Subsequently, Miscellaneous Processes only represent 42 percent of the total $PM_{2.5}$, with paved road dust (39% of Miscellaneous Processes $PM_{2.5}$), cooking (32%), and residential fuel combustion (14%) being the main contributors.

2.2.1.2 Other Criteria Pollutants

The standards for other criteria pollutants are either being met, maintained, or are unclassified in the Basin, and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future.

2.2.2 Toxic Air Contaminants

In addition to the above-listed criteria pollutants, toxic air contaminants (TACs) are another group of pollutants of concern. According to the California's latest Almanac[6], the Health and Safety Code defines a TAC as an air pollutant which may cause or contribute to an increase in mortality or serious illness, or which may pose a present or potential hazard to human health. There are almost 200 compounds that have been designated as TACs in California. The ten TACs posing the greatest known health risk in California, based primarily on ambient air quality data, are acetaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, hexavalent chromium, formaldehyde, methylene chloride, para-dichlorobenzene, perchloroethylene, and diesel particulate matter (DPM). Similar to the criteria pollutants, TACs are emitted from stationary sources, area-wide sources, and mobile sources.

The Almanac relates that an analysis of 2007 State-wide health risks demonstrated that 79 percent of entire State's risks from TACs are attributed to DPM. The California Air Resources Board (CARB) identified the PM emissions from diesel-fueled engines as a TAC in August 1998 under California's TAC program. In California, diesel engine exhaust has been identified as a carcinogen. DPM is emitted from both mobile and stationary sources but in California, on-road diesel-fueled vehicles contribute approximately 38 percent of the statewide total, with an additional 60 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources, contributing about one percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations.

Existing sources of TAC emissions in the Project area is primarily Highway I-210.

2.2.3 Sensitive Receptors

Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. These people include children, the elderly, persons with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Structures that house these persons or places where they gather are defined as sensitive receptors by SCAQMD.

Residential areas are considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution even though exposure periods during exercise are generally short. In addition, noticeable air pollution can detract

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6 The California Almanac of Emissions and Air Quality, 2009 Edition. Planning and Technical Support Division. California Air Resources Board. www.arb.ca.gov/aqd/almanac/almanac09/almanac2009all.pdf. Accessed March 2013.

from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

The Project is located adjacent to residential areas and 10 schools within one half mile; i.e. Crestview Preparatory, Franklin Elementary, Hillside, Jackson Elementary, La Cañada High, Nanny’s Nursery, Odyssey Charter, Pasadena Unified, Sycamore, and Woodbury Preschool Village.

SECTION 3.0 – REGULATORY CONTEXT

Air pollutants are regulated at the national, State, and air basin level; each agency has a different degree of control. The EPA regulates at the national level; the CARB regulates at the State level; and the SCAQMD regulates at the air basin level in the Project area.

3.1. REGULATORY AGENCIES

3.1.1 Environmental Protection Agency (EPA)

The EPA is the federal agency responsible for overseeing state air programs as they relate to the FCAA, approving State Implementation Plans (SIP), establishing NAAQS and setting emission standards for mobile sources under federal jurisdiction. EPA has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

3.1.2 California Air Resources Board (CARB)

CARB is the State agency responsible for establishing CAAQS, adopting and enforcing emission standards for various sources including mobile sources (except where federal law preempts their authority), fuels, consumer products, and toxic air contaminants. CARB is also responsible for providing technical support to California's 35 local air districts, which are organized at the county or regional level, overseeing local air district compliance with State and federal law, approving local air plans and submitting the SIP to the EPA. CARB also regulates mobile emission sources in California, such as construction equipment, trucks, and automobiles.

For the purposes of managing air quality in California, the California Health & Safety Codes Section 39606(a)(2) gave CARB the responsibility "based upon similar meteorological and geographic conditions and consideration for political boundary lines whenever practicable" to divide the State into air basins. Los Angeles County is located within three different air basins, i.e. the Mojave Desert Air Basin; Salton Sea Air Basin, and the Basin. The Project area is in the Basin portion of Los Angeles County.

3.1.3 South Coast Air Quality Management District (SCAQMD)

The air pollution control agency designated the authority for regulating air quality for the Basin is the SCAQMD. SCAQMD is responsible for controlling emissions primarily from stationary sources and maintains air quality monitoring stations throughout the Basin to document ambient conditions. The Basin contains an area of 10,743 square miles that is home to over 16.7 million people - about half the population of the whole state of California. It is the second most populated urban area in the United States and one of the smoggiest.

3.2. ATTAINMENT STATUS

3.2.1 Federal

EPA has identified nonattainment and attainment areas for each criteria air pollutant. Under amendments to the FCAA, EPA has classified air basins, or portions thereof, as "attainment," "nonattainment," or "unclassifiable," based on whether or not the national standards have been achieved. EPA uses two categories to designate areas with respect to $PM_{2.5}$ and NO_2, which include (1) does not meet the standard (nonattainment) and (2) cannot be classified or better than national standards (unclassifiable/attainment). EPA uses four categories to designate for SO_2 but the only two that are applicable in California are nonattainment or unclassifiable. EPA uses three categories to designate for PM_{10}: attainment, nonattainment, and unclassifiable.

The FCAA uses the classification system to design clean-up requirements appropriate for the severity of the pollution and set realistic deadlines for reaching clean-up goals. If an air basin is not in federal attainment (that is, it does not meet federal standards) for a particular pollutant, the basin is classified as a marginal, moderate, serious, severe, or extreme nonattainment area, based on the estimated time it would take to reach attainment. Nonattainment areas must take steps towards attainment by a specific timeline. Table 2 shows the federal attainment designations and classifications for the Basin.

3.2.2 State

The current State Area Designations[7] were adopted by CARB December 28, 2012 and became effective April 1, 2013. The area designations are made on a pollutant-by-pollutant basis, for all pollutants listed above. The State designation criteria specify four categories: nonattainment, nonattainment-transitional, attainment, and unclassified. A nonattainment designation indicates one or more violations of the State standard have occurred. A nonattainment-transitional designation is a subcategory of nonattainment that indicates improving air quality, with only occasional violations or exceedances of the State standard. In contrast, an attainment designation indicates no violations of the State standard. Finally, an unclassified designation indicates either there are no air quality data or an incomplete set of air quality data. State attainment designations in the affected area are listed in Table 2.

Table 2 – Designations/Classifications for the Basin

Pollutant	State Designation	Federal Designation (Classification)
Ozone	Nonattainment	Nonattainment (Extreme)
Suspended Particulate Matter (PM_{10})	Nonattainment	Nonattainment (Serious)
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment (Maintenance)
Nitrogen Dioxide (NO_2)	Nonattainment	Attainment (Maintenance)
Sulfur Dioxide (SO_2)	Attainment	Attainment
Lead	Attainment	Unclassifiable/Attainment
Sulfates	Attainment	**No federal standards**
Hydrogen Sulfide (H_2S)	Unclassified	
Visibility Reducing Particles	Unclassified	

[7] Proposed 2012 Amendments to Area Designations for State Ambient Air Quality Standards. Staff Report: Initial Statement of Reasons for Rulemaking. Attachment C: Maps and Tables of Area Designations for State and National Ambient Air Quality Standards. California Air Resources Board. July 20, 2012.

3.2.3 Federal Clean Air Act Requirements

The FCAA requires plans to provide for the implementation of all reasonably available control measures including the adoption of reasonably available control technology for reducing emissions from existing sources. The FCAA encourages market-based approaches to emission control innovations. Other federal requirements addressed include mechanisms to track plan implementation and milestone compliance for ozone and CO.

3.2.4 2007 Air Quality Management Plan (AQMP)

To ensure continued progress toward clean air and comply with State and federal requirements, the SCAQMD, in conjunction with CARB and Southern California Association of Governments (SCAG), prepared the 2012 revision to its AQMP[8]. The AQMP incorporated 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.

The AQMP was designed to address the federal 24-hour $PM_{2.5}$ air quality standards in the Basin, to satisfy the planning requirements of the FCAA, and to provide an update on the strategy to meet the 8-hour ozone standard. The AQMP established basin-wide and episodic short-term $PM_{2.5}$ measures; 8-hour ozone implementation measures; and transportation control measures.

In the AQMP, $PM_{2.5}$ measures focused primarily on directly emitted $PM_{2.5}$ and NO_X reductions which could be feasibly achieved by the attainment date of 2014. Direct $PM_{2.5}$ emissions could be substantially reduced by episodically curtailing residential wood burning and open burning from agricultural or prescribed (e.g., brush clearing) sources. NO_X is a precursor to both $PM_{2.5}$ and ozone, and thus NO_X reductions are preferred since they are also needed for ozone.

The 8-hour ozone strategy is more complex since the deadline for attainment is 2023. The SCAQMD has another scheduled AQMP for 2015. The AQMP pursues actions that need to be implemented over the next two to three years to work towards meeting the 8-hour ozone standards. Proposed measures to reduce ozone include emission reductions from coatings, consumer products, and RECLAIM facilities as well as early transitions to cleaner technologies.

3.2.5 SCAQMD Rules and Regulations

All projects are subject to SCAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the Proposed Project may include, but are not limited to, the following:

- **Rule 401 – Visible Emissions.** A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines.

8 Final 2012 Air Quality Management Plan. South Coast Air Quality Management District. Adopted December 7, 2012.

- **Rule 402 – Nuisance.** This Rule prohibits discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property. The provisions of this rule do not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.
- **Rule 403 – Fugitive Dust.** This rule is intended to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. Rule 403 applies to any activity or man-made condition capable of generating fugitive dust. Some specific requirements of Rule 403 are addressed below:
  - Use of applicable best available control measures (BACMs) included in Tables 1 and 2 of Rule 403.
  - No vehicular track-out beyond 25 feet and all track-out shall be removed daily.
- **Rule 431.1 and 431.2 – Sulfur Content of Gaseous Fuels and Sulfur Content of Liquid Fuels.** This Rule requires the use of low sulfur fuel for stationary construction equipment
- **Rule 1108 – Emulsified Asphalt.** This Rule sets limitations on VOC content in asphalt.

3.3. TOXIC AIR CONTAMINANTS

Air quality regulations also focus on TACs. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established. Instead, EPA and CARB regulate hazardous air pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology (MACT or BACT) for toxics to limit emissions at the source. These, in conjunction with additional rules set forth by SCAQMD, establish the regulatory framework for TACs.

3.3.1 Federal Hazardous Air Pollutant Programs

EPA has programs for identifying and regulating HAPs. Title III of the FCAA directed EPA to promulgate National Emissions Standards for HAPs (NESHAP). The NESHAP may be different for major sources than for area sources of HAPs. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (tpy) of any HAP or more than 25 tpy of any combination of HAPs; all other sources are considered area sources. The FCAA called on EPA to promulgate emissions standards in two phases. In the first phase (1992 through 2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk-based emissions standards, where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The FCAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum for benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the FCAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

3.3.2 State and Local Toxic Air Contaminant Programs

TACs in California are primarily regulated through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Hot Spots Act) (AB 2588). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. DPM was added to the CARB list of TACs in 1998.

Once a TAC is identified, CARB adopts an airborne toxics control measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions (e.g., an ATCM limits truck idling to 5 minutes).

CARB published an Air Quality and Land Use Handbook[9], which provides guidance concerning land use compatibility with TAC sources. While not a law or adopted policy, the Handbook offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities, to help protect children and other sensitive populations.

At the local level, air pollution control or management districts may adopt and enforce CARB control measures. Under SCAQMD Regulation XIV (Toxics and Other Non-Criteria Pollutants), and in particular Rule 1401 (New Source Review), all sources that possess the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new source review standards and air toxics control measures. SCAQMD limits emissions and public exposure to TACs through a number of programs. SCAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

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[9] Air Quality and Land Use Handbook: A Community Health Perspective. California Air Resources Board. 2005.

SECTION 4.0 – HISTORICAL AMBIENT CONDITIONS

4.1. LOCAL AMBIENT AIR QUALITY

Existing levels of ambient air quality and historical trends and projections in the Project area are best documented by ambient measurements made by the SCAQMD. The SCAQMD has an extensive air-monitoring network that measures levels of several air pollutants throughout the Basin. The SCAQMD has subdivided the Basin into 38 Source-Receptor Areas (SRA), each containing one or more monitoring station. These SRAs provide a general representation of the local meteorological and air quality conditions within the particular area.

The Project is located within the western portion of the San Gabriel Valley Area. The Project site is in SRA 8 and has a monitoring station located only 5 miles southeast of the Project site. However, this site (the Pasadena, S. Wilson Ave Site) only measures ozone, CO, NO_2, and $PM_{2.5}$. The nearest site that measures PM_{10} is located in Burbank on West Palm (8 miles west). Table 3 summarizes 2007 through 2012 published monitoring data from the CARB's Aerometric Data Analysis and Management System (ADAM)[10] for the Pasadena and Burbank Stations.

The monitoring data shows that there were no violations of CO or NO_2 in the most recent six years, however the Pasadena Station demonstrates the general air quality problems of the Basin in that it exceeded both federal and State 8-hour ozone standards and the State 1-hour ozone standard in all the last six years. The State PM_{10} in Burbank was exceeded in five of the six years and the federal $PM_{2.5}$ standards in Pasadena was exceeded in four of the six years, with the 2010 season not exceeding either. The federal PM_{10} standard was not exceeded in Burbank in any of the years.

[10] ADAM Air Quality Data Statistics. California Air Resources Board. http://www.arb.ca.gov/adam/welcome.html. Accessed October 2014.

Table 3 – Ambient Air Quality Monitoring Summary[11]

Air Pollutant	2007	2008	2009	2010	2011	2012
Ozone (O_3) – Pasadena						
Max 1 Hour (ppm)	**0.149**	**0.122**	**0.176**	**0.101**	**0.107**	**0.111**
Days > CAAQS (0.09 ppm)	13	16	12	1	5	8
Max 8 Hour (ppm)	**0.101**	**0.100**	**0.114**	**0.081**	**0.084**	**0.086**
Days > NAAQS (0.08 ppm)	11	16	12	3	5	9
Days > CAAQS (0.070 ppm)	21	26	19	6	13	20
Carbon Monoxide (CO) – Pasadena						
Max 8 Hour (ppm)	2.28	2.21	2.13	1.94	2.15	1.58
Days > NAAQS (9 ppm)	0	0	0	0	0	0
Days > CAAQS (9.0 ppm)	0	0	0	0	0	0
Nitrogen Dioxide (NO_2) – Pasadena						
Max 1 Hour (ppm)	0.092	0.105	0.080	0.071	0.102	0.071
Days > CAAQS (0.18 ppm)	0	0	0	0	0	0
Particulate Matter (PM_{10}) – Burbank						
Max Daily California Measurement	**107**	**61**	**76**	50	**60**	**54**
Days > NAAQS (150 µg/m^3)	0	0	0	0	0	0
Days > CAAQS (50 µg/m^3)	5	5	10	0	2	1
Particulate Matter ($PM_{2.5}$) – Pasadena						
Max Daily National Measurement	**68.8**	**66.0**	**51.9**	35.2	**43.8**	30.5
Days > NAAQS (35 µg/m^3)	3	2	3	0	1	0

Abbreviations:
> = exceed   ppm = parts per million   µg/m^3 = micrograms per cubic meter
CAAQS = California Ambient Air Quality Standard   NAAQS = National Ambient Air Quality Standard
Mean = Annual Arithmetic Mean   **Bold** = exceedance
* No Data / Insufficient Data

11 *ibid*

SECTION 5.0 – THRESHOLDS OF SIGNIFICANCE

5.1. CEQA THRESHOLDS OF SIGNIFICANCE

The State CEQA Guidelines suggest, from an "air quality" perspective, that a project would normally be judged to produce a significant or potentially significant effect on the environment if the project were to:

a) Conflict with or obstruct implementation of the applicable air quality plan.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

c) 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 standards.

d) Expose sensitive receptors to substantial air pollutant concentrations.

e) Create objectionable odors affecting a substantial number of people.

As indicated in Section 15064(i)(1) of the State CEQA Guidelines, "cumulatively considerable" is defined to mean "that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."

As stated in CEQA Guidelines Appendix G, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. SCAQMD has established regional thresholds, as shown in Table 4. SCAQMD's regional significance thresholds approximately correlate to the reduction requirements to ensure that a project does not contribute to an existing or projected air quality violation, create new violations, or result in a cumulatively considerable net increase in nonattainment criteria pollutant or ozone precursor concentrations.

5.2. REGIONAL THRESHOLDS OF SIGNIFICANCE

The following regional significance thresholds (Table 4) for air quality have been established by the SCAQMD on a daily basis for construction and operations emissions. During construction or operation, if any of the identified daily air pollutant thresholds are exceeded by the Proposed Project, then the project's air quality impacts may be considered significant. The SCAQMD indicates in Chapter 6 of its CEQA Handbook that it considers a project to be mitigated to a level of insignificance if its primary effects are mitigated below the thresholds provided in Table 4.

Table 4 – Regional Thresholds of Significance[12]

Pollutant	Emissions in lbs/day	
	Construction	Operations
ROG	75	55
NO_X	100	55
CO	550	550
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150

5.3. LOCALIZED SIGNIFICANCE THRESHOLDS (LSTS)

The SCAQMD Governing Board adopted a methodology for calculating localized air quality impacts through Localized Significance Thresholds[13] (LSTs), which is consistent with SCAQMD's Environmental Justice Enhancement 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 state or national ambient air quality standard. The LSTs are developed based on the ambient concentrations of that pollutant for each source receptor area and are applicable to NO_X, CO, PM_{10}, and $PM_{2.5}$. The LST guidelines states that, for LST purposes, emissions include only on-site activities and that the $PM_{2.5}$ and PM_{10} emissions include both fugitive dust and exhaust from the stationary/mobile equipment on-site.

The Project is located in SRA 8. It is assumed that construction will disturb no more than 5 acres per day and that sensitive receptors are within 25 meters. Using the 2006-2008 look-up tables provided in the LST Guidelines for a conservative 5 acres per day disturbed at a receptor distance of 25 meters, Table 5 shows the appropriate LSTs for construction activity. Since on-going maintenance activity will be essentially be a reduce intensity version of the Project, construction LSTs will be used for maintenance.

Table 5 – SCAQMD Localized Thresholds for Construction[14]

Pollutant	Localized Significance Threshold (lbs/day)
Nitrogen Dioxide (NO_2)	148
Carbon Monoxide (CO)	1,540
Inhalable Particulate Matter (PM_{10})	12
Fine Particulate Matter ($PM_{2.5}$)	7

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12 Air Quality Significance Thresholds. South Coast Air Quality Management District. Revised October 2006.

13 Final Localized Significance Threshold Methodology. South Coast Air Quality Management District. Revised July 2008.

14 *ibid.*

5.4. ADDITIONAL INDICATORS

The SCAQMD recommends that "additional indicators" should be used as screening criteria with respect to air quality. Additional factors relevant to the project at hand identified in the Handbook include the following significance criteria:

- Interference with the attainment of the federal or State ambient air quality standards by either violating or contributing to an existing or projected air quality violation.
- Emit carcinogenic or toxic contaminants that exceed the maximum individual cancer risk of 10 in one million.

Again, the SCAQMD indicates in Chapter 6 of its Handbook that it considers a project to be mitigated to a level of insignificance if its effects are mitigated below the thresholds provided above.

SECTION 6.0 – ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1. ANALYSIS METHODOLOGY

Short-term activities related to the sediment removal and emissions from on-going maintenance activities of criteria air pollutants were assessed in accordance with methodologies recommended by CARB and SCAQMD. Emissions were calculated using methodologies and formulas from various agencies including CARB, EPA, and the SCAQMD. Modeled emissions were compared with applicable SCAQMD thresholds to determine significance. Calculations were based, in part, on information about vehicle trip generation from the Traffic Impact Analysis[15] (TIA) prepared for this project. Information on off-road equipment and project scheduling and logistics were supplied by the Los Angeles County Department of Public Works (LACDPW).

6.2. ANALYSIS OF ENVIRONMENTAL IMPACTS

IMPACT 1: Would the Project conflict with or obstruct implementation of the applicable air quality plan?

Typically assessments for air quality plan consistency uses four criteria for determining project consistency with the current AQMP. The first and second criteria are from the SCAQMD. According to the SCAQMD, there are two key indicators of AQMP consistency: 1) whether the 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 timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and 2) whether the project will exceed the assumptions in the AQMP based on the year of project build out and phase[16]. The third criterion is compliance with the control measures in the AQMP. The fourth criterion is compliance with the SCAQMD regional thresholds.

- <u>Project's Contribution to Air Quality Violations</u>

  As shown in Impact 2, the Project has the potential to violate air quality standard or contribute substantially to an existing or projected air quality violation. Mitigations were proposed but deemed unreasonable and unachievable; therefore, the Project would not meet the first indicator.

- <u>AQMP Assumptions</u>

  One way to assess project compliance with the AQMP assumptions is to ensure that the population density and land use are consistent with the growth assumptions used in the air plans for the air basin. According to CARB transportation performance standards, the rate of growth in vehicle miles traveled (VMT) and trips should be held to the rate of population growth[17]. Compliance with this performance standard is one way suggested by CARB of showing compliance with the growth assumptions used in the AQMP. If the total VMT generated by the Proposed Project at build-out is at

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15 Traffic Impact Analysis for Devil's Gate Reservoir Sediment Removal and Management Project. Hall & Foreman, Inc. September 2013.

16 Air Quality Significance Thresholds. South Coast Air Quality Management District. Revised October 2006.

17 *ibid*

or below that predicted by the AQMP, then the Proposed Project's mobile emissions is consistent with the AQMP. It is assumed that the existing and future pollutant emissions computed in the AQMP were based on land uses from area general plans.

The Proposed Project does not create any overall population growth therefore having no effect on growth assumptions used in the latest SCAQMD AQMP[18]. Total long-term VMT generated by the project is related to maintenance activities and is considered minimal and will not affect consistency with the AQMP.

Level of Significance before Mitigation
The Proposed Project would result in a potentially significant impact.

Mitigation
Mitigations AQ-1 and AQ-2 are addressed in Impact 2.

Level of Significance After Mitigation
This Project will be mitigated to a level of less than significant.

IMPACT 2: Would the Project violate any air quality standard or contribute to an existing or projected air quality violation?

Emissions related to the off-road equipment used to remove the sediment, including four front loaders with 4 yd^3 capacity buckets, two D-8 dozers, an excavator, a grader, water truck, and sorters/crushers. In addition, disposal trucks with 16 to 20 yd^3 of capacity are proposed to haul approximately 7,650 yd^3 per day. Removal of the sediment, vegetation, and organic debris is expected to require an average of 50 truck trips per hour, with an estimated maximum of 425 truck trips per day during excavation activities and only 300 truck trips per day during maintenance activity. The sediment disposal trucks will dispose of material either to the east and placed at the primary disposal site locations, the Vulcan Materials or Waste Management facilities in Azusa or the Manning Pit Sediment Placement Site in Irwindale or to the west and placed in one of the facilities in Sun Valley. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale. It is estimated that for approximately 3 weeks during the first year of the Proposed Project approximately 50 percent of the total trucking will be green waste debris trucked to greenwaste facility at Scholl Canyon and the remaining will be distributed to the other sites. After the first year including maintenance activities, during the first week approximately 25 percent of the debris will be trucked to the Scholl site and the remaining 75 percent of trucking will be sediment distributed to the other sites.

Construction activities emissions, including soil disturbance dust emissions and combustion pollutants from on-site construction equipment; from idling of haul trucks at loading and staging sites; from off-site trucks hauling sediment material; and from employees working on the Project would create a temporary

[18] Final 2012 Air Quality Management Plan. South Coast Air Quality Management District. Adopted December 7, 2012.

addition of pollutants to the local airshed. These emissions were estimated using the following assumptions and methods:

On-Road Truck Emissions

To estimate emissions from on-road sediment disposal trucks, mileages between the Project site and each of the disposal sites, using haul routes assumed in the TIA, were measured. Highway mileages were separated from surface street mileage in order to estimate emissions more accurately, since the VMT ratio between highways and surface streets may not mirror the general fleet average. For the five year life of the Proposed Project it is estimated that approximately 3 percent of the trips will travel to the Scholl Canyon site with green waste, and sediment will account for78 percent of the trips be delivered to the Irwindale sites, and 19 percent will go to the Sun Valley sites. During Maintenance activities, only 2 percent of the trips are assigned to Scholl Canyon, 75 percent will be delivered to the Irwindale sites, and 23 percent will go to the Sun Valley sites.

To generate expected exhaust emissions, this AQR used CARB's EMFAC2011 Web Based Data Access[19] with emission rate data for Los Angeles County for the years 2015 and 2020. This AQR used EMFAC2011's aggregate model years, which is an average age of vehicles specific for Los Angeles County for the specific years modeled. Since the average fleet emissions in the State is getting cleaner each year, the more conservative first year of sediment removal, Year 2015, was used. For maintenance activity Year 2020 emission factors were used. This AQR used "T7 single construction" as the most representative EMFAC2011 vehicle category for the sediment disposal trucks and generated an aggregate average emission factor for vehicle speeds 5 miles per hour (mph) to 45 mph for surface street mileage and 50 mph to 70 mph for highway mileage.

Off-Road Equipment Emissions

Off-road equipment brake horsepower and emission factors were obtained from the CalEEMod Users Guide[20]. Since CalEEMod uses 2007OFFROAD default load factors and CARB has released an updated load factor list which demonstrates that, for most equipment types, the 2007OFFROAD model will result in a fairly significant overestimation of emissions; this AQR uses equipment load factors from the Carl Moyer Program Guidelines[21].

Employee Vehicle Emissions

To generate expected exhaust emissions, this AQR used CARB's EMFAC2011 Web Based Data Access as mentioned in the on-road trucks section. In order to more accurately represent the type of vehicles used by the potential employee work pool, a weighted average emission factor was generated using 69 percent of the pool using light-duty automobiles and the rest using light-duty trucks. The percentages were derived from the distributions of VMT from EMFAC2011.

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[19] http://www.arb.ca.gov/msei/modeling.htm#emfac2011_web_based_data

[20] CalEEMod Users Guide - Appendix D, CalEEMod User's Tips (June 2011)

[21] The 2011 Carl Moyer Program Guidelines. California Air Resources Board. March 27, 2013.

Fugitive Dust Emissions

Emissions of PM_{10} and $PM_{2.5}$ from fugitive sources were calculated using various methods. Fugitive dust from excavation activities, grading, and material loading were calculated using EPA's AP-42[22] methods. Emissions estimates were reduced to reflect the Applicant's full compliance with the SCAQMD's Rule 403, including, but not limited to:

- Implementation of one of the measures in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road to reduce impacts from track-out;
- Submission of a Large Operation Notification (SCAQMD Form 403 N) to the SCAQMD Executive Officer within 7 days of qualifying as a large operation;
- Apply water or stabilizing agent during clearing and grubbing, crushing, or earth-moving activities in sufficient quantity to prevent the generation of dust plumes. Soil should be maintained in a damp condition so that visible emissions do not exceed 100 feet in any direction;
- During exporting of materials, use tarps or other suitable enclosures on all haul trucks. Haul loads should have at least six inches of freeboard space;
- Stabilize all off-road traffic on haul routes and in parking areas and stabilize all staging areas and stockpiled materials. Limit speeds of vehicles on haul routes, staging areas, and parking lots;
- Limit vehicular activity to established unpaved roads (haul routes) and unpaved parking lots;
- For all earth-moving activity within 100 feet of property lines, maintain soil moisture content at a minimum of 12 percent, as determined by American Society for Testing and Materials (ASTM) method D-2216 or other equivalent approved method.

Table 6 provides a summary of the unmitigated emission estimates for sediment removal activity. Operational emissions, defined as the on-going maintenance activities beginning in 2020, were calculated using the same methodology. Table 7 shows estimated emissions from on-going maintenance activities. Details of the air quality calculations are included in Appendix A.

[22] Compilation of Air Pollutant Emission Factors – AP-42, Volume 1, Fifth Edition. United States Environmental Protection Agency. January 1995.

Table 6 – Unmitigated Sediment Removal Emissions

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	7.54	33.99	55.18	2.87	2.87
On-Road Trucks	7.15	34.87	314.93	5.33	4.91
Onsite Idling	0.44	1.89	7.88	0.05	0.05
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
Project Maximum Daily	**15.2**	**73.2**	**378.2**	**13.7**	**8.7**
SCAQMD Daily Threshold	75	550	100	150	55
Exceeds Threshold?	No	No	**Yes**	No	No

Table 7 – Unmitigated Maintenance Activity

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	2.86	17.29	19.26	0.98	0.98
On-Road Trucks	2.82	17.47	104.22	1.71	1.57
Onsite Idling	0.20	0.89	3.71	0.02	0.02
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
Project Maximum Daily	**5.9**	**36.4**	**127.3**	**6.0**	**3.3**
SCAQMD Daily Threshold	75	550	100	150	55
Exceeds Threshold?	No	No	No	No	No

As shown in the above tables, during both the sediment removal and maintenance portions Project emissions of NO_X would exceed the Daily Regional Threshold.

Level of Significance before Mitigation

The Proposed Project would result in a potentially significant impact during both the sediment removal and maintenance phases.

Mitigation
The two categories that combine to contribute most to the potentially significant impact are the emissions from on-road trucks and the off-road equipment.

On-Road – Mitigation of on-road trucks can be accomplished by requiring the contractor that receives the work make all efforts to utilize disposal trucks that meet EPA's emission standards for Model Year 2007 (MY2007) and later. Since the 2007 standards were established with a three year phase-in period, the effects of reduced emissions from the standard are not apparent until Model Year 2010 (MY2010).

To estimate the impacts of this mitigation, this AQR used EMFAC2011 emission factors for MY2010 trucks only and compared to the aggregate truck fleet for Year 2015 for sediment removal and Year 2020 for Maintenance, which resulted in the MY2010 trucks yielding a 79 percent NO_X reduction on surface roads and 83 percent reduction on highways and yielding a 68 percent PM_{10} and $PM_{2.5}$ reduction on surface roads and 53 percent reduction on highways for Year 2015 and a 59 percent NO_X reduction on surface roads and 62 percent reduction on highways and yielding a 5 percent PM_{10} and $PM_{2.5}$ reduction on surface roads and only 0.2 percent reduction on highways for Year 2020.

Off-Road – Mitigation of off-road equipment usage could be assisted by requiring the contractor to make all efforts to utilize new EPA Tier 3 or better equipment. Tier 4 emissions standards are addressed in 40 Code of Federal Regulations (CFR), Part 1039 and addresses new compression-ignition nonroad (i.e. CARB off-road equivalent) engines. Standards were phased in for various power categories with the latest being effective in 2011.

The emission factor used to estimate off-road equipment in this AQR was obtained from tables presented in CalEEMod's User Guidelines and represents the statewide average of equipment for each category. The factors for fleet year 2015 most closely compare to an average fleet of Tier 2 equivalent equipment. Using SCAQMD's Table II-E of the Off-Road Mitigation Measure Tables[23] and applying the percentage reductions from Tier 2 to Tier 3 to the unmitigated emissions represented above reduces the NO_X emissions from the off-road component for the sediment removal and maintenance portions of the Project.

In summary, sufficient reductions could potentially be achieved by implementing the following mitigations:

Mitigation AQ-1 – The Applicant could require all construction contractors during the sediment removal and maintenance portions of the Project to use dump trucks that meet the EPA's final phase emission standards for Model Year 2007.

23 Off-Road Engines Mitigation Measure Tables. South Coast Air Quality Management District. http://www.aqmd.gov/ceqa/handbook/mitigation/offroad/MM_offroad.html. Accessed May 2013.

Mitigation AQ-2 – The Applicant could require all construction contractors during the sediment removal and maintenance portions of the Project to use off-road equipment that meet the EPA's emission standards for Tier 3 or 4 equipment. After January 1, 2015, the Construction Contractor shall supply a copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit at the time of mobilization of each applicable unit of equipment.

Table 8 – Mitigated Sediment Removal Emissions

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	4.71	33.99	22.05	2.60	2.15
On-Road Trucks	7.15	34.87	56.90	2.40	2.20
Onsite Idling	0.44	1.89	2.48	0.01	0.01
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
Project Maximum Daily	**12.4**	**73.2**	**81.7**	**10.5**	**5.2**
SCAQMD Daily Threshold	75	550	100	150	55
Exceeds Threshold?	No	No	No	No	No

Table 9 – Mitigated Maintenance Emissions

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	2.86	17.29	19.26	0.98	0.98
On-Road Trucks	2.82	17.47	40.56	1.70	1.56
Onsite Idling	0.20	0.89	1.17	0.00	0.00
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
Project Maximum Daily	**5.9**	**36.4**	**61.1**	**10.5**	**3.3**
SCAQMD Daily Threshold	75	550	100	150	55
Exceeds Threshold?	No	No	No	No	No

Level of Significance After Mitigation

As shown in Table 8 and Table 9, implementation of these mitigations would result in a reduction of the Proposed Project's combined NO_X emissions during both the sediment removal and maintenance portions to less than the SCAQMD Regional Threshold for NO_X.

IMPACT 3: Would the Project result in 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 that exceed quantitative thresholds for ozone precursors)?

In accordance with CEQA Guidelines 15130(b), this analysis of cumulative impacts incorporates a summary of projections. The following three-tiered approach is to assess cumulative air quality impacts.

- Consistency with the SCAQMD project specific thresholds for construction and operation;
- Project consistency with existing air quality plans; and
- Assessment of the cumulative health effects of the pollutants.

<u>Project Specific Thresholds</u>

Although emissions of VOC, PM_{10}, and $PM_{2.5}$ are not expected to exceed the SCAQMD regional significance thresholds during sediment removal or on-going maintenance activities, NO_X emissions may remain significant for sediment removal activity.

<u>Air Quality Plans</u>

The Basin, in which the Project is located, is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$. As such, the SCAQMD is required to prepare and maintain an AQMP and a SIP to document the strategies and measures to be undertaken to reach attainment of air quality standards. While the SCAQMD does not have direct authority over land use decisions, it was recognized that changes in land use and circulation planning were necessary to maintain clean air. As discussed above in Impact 1, the Project is compliant with the AQMP.

<u>Cumulative Health Impacts</u>

The Basin is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$, which means that the background levels of those pollutants are at times higher than the air quality standards. The air quality standards were set to protect the health of sensitive individuals (i.e., elderly, children, and the sick). Therefore, when the concentration of those pollutants exceed the standard, it is likely that some of the sensitive individuals of the population experience adverse health effects.

The localized significance analysis in Impact 3 demonstrated that with mitigation during sediment removal or on-going maintenance activities, no localized significance threshold was expected to be exceeded; therefore, the emissions of particulate matter, NO_2, and CO would not result in a significant cumulative health impact.

Level of Significance before Mitigation

The Proposed Project would result in a potentially significant impact.

Mitigation
Mitigations AQ-1 and AQ-2 are addressed in Impact 2.

Level of Significance After Mitigation
The Project would be mitigated to less than significant.

IMPACT 4: Would the Project expose the public (especially schools, day care centers, hospitals, retirement homes convalescence facilities, and residences) to substantial pollutant concentrations?

An impact is potentially significant if emissions levels exceed the State or federal Ambient Air Quality Standards.

Localized Significance Thresholds

The SCAQMD's LST methodology was developed to be used as a tool to assist lead agencies to analyze localized impacts associated with project-specific level Proposed Projects. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The emissions used for the purpose of LST analysis include only on-site activities. The on-site emissions for sediment removal operations are presented in Table 10 and the on-site emissions for maintenance activities are presented in Table 11, which show that no LST thresholds are exceeded.

Table 10 – On-Site Sediment Removal Emissions

Category	Maximum Daily Emissions (lbs/d)			
	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	33.99	55.18	2.87	2.87
Idling	1.89	7.88	0.05	0.05
Fugitive	0.00	0.00	5.46	0.89
Max Daily Emissions	**35.9**	**63.1**	**8.4**	**3.8**
LST Threshold	1,540	148	12	7
Exceeds Threshold?	No	No	No	No

Carbon Monoxide Hotspot

Because CO is produced in greatest quantities from vehicle combustion and does not readily disperse into the atmosphere, adherence to the AAQSs is typically demonstrated through an analysis of localized CO concentrations. Areas of vehicle congestion have the potential to create "pockets" of CO called "hot spots." Hot spots are usually created in locations where vehicles are subject to congestion, reduced speeds, and queuing. These are most typically at intersections, but can also be along congested major arterials and freeways. Typically, for vehicles to produce a hot spot, the roadway/intersection level of service (LOS) must be degraded to "D" or worse.

Table 11 – On-Site Maintenance Emissions

Category	Maximum Daily Emissions (lbs/d)			
	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	17.29	19.26	0.98	0.98
Idling	0.89	3.71	0.02	0.02
Fugitive	0.00	0.00	3.30	0.75
Max Daily Emissions	**18.2**	**23.0**	**4.3**	**1.8**
LST Threshold	1,540	148	12	7
Exceeds Threshold?	No	No	No	No

The TIA[24] prepared for this project shows that there are five intersections that are modeled to be an LOS F or worse in 2014 with the Project. A CO hot-spot analysis was prepared in accordance with the Transportation Project-Level Carbon Monoxide Protocol[25] (CO Protocol). According to the CO Protocol, intersections with an LOS E or F could require detailed analysis.

The hot-spot analysis was performed on the five intersections. CALINE4 was used to predict the potential CO concentrations at these intersections. CALINE4 is a dispersion model produced by Caltrans that predicts CO impacts near roadways. CO modeling results are available in Appendix B.

There are several inputs to the CALINE4 model. One input is the traffic volumes, which was provided in the TIA, and another input is roadway widths. Table 12 shows estimated CO concentrations at the worst-case receptor location for these intersections. The CALINE4 output is added to the 1-hour and 8-hour backgrounds to produce the concentrations. Backgrounds were obtained from 2011 air quality data[26] of 8-hour CO monitoring data and dividing the 8-hour by a persistence factor of 0.7 to generate the 1-hour background. Significance impact shows the comparison of the 1-hour concentration to the State standard of 20 ppm and the 8-hour concentration to the State/national standard of 9 ppm.

24 Traffic Impact Analysis for Devil's Gate Reservoir Sediment Removal and Management Project. Hall & Foreman, Inc. September, 2013.

25 Transportation Project-Level Carbon Monoxide Protocol. Garza, V.J., Graney, P., Sperling, D. University of California Davis, Institute of Transportation Studies. 1997.

26 2011 Air Quality. South Coast Air Quality Management District. http://www.aqmd.gov/smog/historicaldata.htm. Accessed May 2013.

Table 12 – CO Concentrations Summary

Intersection Number[27] and Description		CO Concentration (ppm)	
		1-hour	8-hour
#11	Irwindale Ave @ Gladstone St	3.54	2.48
#13	Vincent Ave @ Arrow Hwy	3.74	2.62
#21	Figueroa St/Scholl Canyon @ SR-134 WB Ramps	3.34	2.34
#22	Figueroa St @ Eagle Vista Dr	3.34	2.34
#23	Figueroa St @ SR-134 EB Ramps	3.44	2.41
	Significance Thresholds	20	9
	Exceeds Threshold?	No	No

Level of Significance before Mitigation
The Proposed Project would result in less than significant impacts.

Mitigation
No mitigation measures are necessary.

Level of Significance After Mitigation
The Project would remain less than significant.

IMPACT 5: Would the Project create objectionable odors affecting a substantial number of people?

Impact Analysis: The CEQA guidelines indicate that a significant impact would occur if the Proposed Project would create objectionable odors affecting a substantial number of people.

Diesel exhaust will be emitted during sediment removal process, which is objectionable to some; however, as demonstrated in Impact 6, concentrations will disperse rapidly from the Project site; therefore impacts should not be at a level to induce a negative response.

Level of Significance before Mitigation
The Proposed Project would result in less than significant impacts.

Mitigation
No mitigation measures are necessary.

Level of Significance After Mitigation
The Project would remain less than significant.

27 Intersection number as represented in the Traffic Impact Analysis

IMPACT 6: Would the Project emit carcinogenic or toxic contaminants that exceed the maximum individual cancer risk of 10 in one million?

In order to ascertain the potential for the Proposed Project to emit carcinogenic or toxic contaminants that exceed the maximum individual cancer risk of 10 in one million, a Health Risk Assessment (HRA)[28] was performed and attached in Appendix C. The Proposed Project would generate TAC emissions from diesel truck emissions and on-site diesel equipment used during both the sediment removal activities and the annual maintenance activities. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of TACs over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology.

Since, the diesel truck emissions would operate in the closest proximity to sensitive receptors while on surface streets, the diesel truck travel modeling has been limited to the portion of the trips that would occur on surface streets. Two separate routes were modeled from the Project site to I-210, Haul Routes 1A /1E and Haul Routes 1B/1F. Even though the Project will use Haul Route 1D/H, these two routes were chosen as a worst-case, conservative comparison, since they would place all of the truck trips on the same roadway and would result in the greatest impact. In addition, Haul Route 2A and 4A were analyzed since they are the most likely two haul routes to be utilized by the Proposed Project.

Results of ISC-AERMOD modeling presented in the HRA show that the maximum off-site diesel cancer risk impact predicted from Haul Routes 1A/1E and 1B/1F were found to be 1.9 in a million and the maximum off-site diesel concentration cancer risk impact predicted from Haul Route 2A was only 0.34 in a million; thus significantly below the 10 in a million cancer risk threshold. In addition, all routes modeled resulted in less than significant non-cancer risk from diesel emissions created by the Proposed Project.

Level of Significance before Mitigation
The Proposed Project would result in less than significant impacts.

Mitigation
No mitigation measures are necessary.

Level of Significance After Mitigation
The Project would remain less than significant.

[28] Health Risk Assessment: Devil's Gate Reservoir Sediment Removal and Management Project. Vista Environmental. September 27, 2013.

SECTION 7.0 – ALTERNATIVES ANALYSIS

7.1. ALTERNATIVE 1 – CONFIGURATION B

Alternative 1 will only remove 2.8 million yd^3 of sediment instead of the 2.9 million yd^3 in the Proposed Project. Additionally the area excavated in Alternative 1 would only involve approximately 83 acres instead of the 178 acres of the Proposed Project. However, Alternative 1 has the same removal method, sediment disposal method, sediment removal truck routes, project schedule, and long-term sediment management methods as the Proposed Project.

7.1.1 Alt 1 - Impact 1

Alternative 1 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.1.2 Alt 1 - Impact 2

Even though the quantity of sediment removed would be slightly less for Alternative 1 than the Proposed Project and less acreage would be affected, the daily activity level of Alternative 1 would be no different from the Proposed Project. For Alternative 1, the LACDPW still estimates a rate of removal of 7,650 yd^3 per day and an average of 425 trucks per day travelling to the same disposal sites. The LACDPW expects the staffing needs and schedules to remain the same. Therefore, Alternative 1 would provide no significant difference in air quality emissions from the Proposed Project.

7.1.3 Alt 1 - Impact 3

Alternative 1 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.1.4 Alt 1 - Impact 4

Even though the quantity of sediment removed would be slightly less for Alternative 1 than the Proposed Project and less acreage would be affected, the daily activity level of Alternative 1 would be no different from the Proposed Project. For Alternative 1, the LACDPW still estimates a rate of removal of 7,650 yd^3 per day and off-road equipment operating at 10 hours per day. The LACDPW expects the staffing needs and schedules to remain the same. Therefore, Alternative 1 would provide no significant difference in CO concentrations at intersections or exceedances of localized significant thresholds from the Proposed Project.

7.1.5 Alt 1 - Impact 5

Alternative 1 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.1.6 Alt 1 - Impact 6

Alternative 1 would provide no significant difference in the emissions of carcinogenic or toxic contaminants from the Proposed Project.

7.2. ALTERNATIVE 2 – CONFIGURATION C

Alternative 2 will remove approximately 4 million yd^3 instead of the 2.9 million yd^3 in the Proposed Project. The area excavated for Alternative 2 will only involve approximately 84 acres instead of the 178 acres of the Proposed Project. Alternative 2 will require 6 years to complete instead of 5 years for the Proposed Project but has the same daily activity level, removal method, sediment disposal method, and sediment removal truck routes as in the Proposed Project. Sediment management methods in Alternative 2 will involve approximately 47 acres and the southern end of the basin would need to be armored and maintained to prevent erosion using either concrete or stones and upstream adjustable weirs for directional discharge.

7.2.1 <u>Alt 2 - Impact 1</u>

Alternative 2 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.2.2 <u>Alt 2 - Impact 2</u>

Even though the quantity of sediment removed would be significantly more for Alternative 2 than the Proposed Project, Alternative 2 would disturb less overall acreage. However, even though Alternative 2 would require 6 years to complete the initial sediment removal, the daily activity level of the Proposed would not be expected to be different that the Proposed Project. The LACDPW still estimates a rate of removal of 7,650 yd^3 per day and off-road equipment operating at 10 hours per day. The LACDPW expects the staffing needs and schedules to remain the same. Alternative 2 would provide no significant difference in CO concentrations at intersections or exceedances of locally significant thresholds from the Proposed Project. In addition, maximum off-site diesel cancer risk impact predicted from Haul Route 1B/1F was found to be 2.3 in a million, still well below the 10 in a million threshold.

7.2.3 <u>Alt 2 - Impact 3</u>

Alternative 2 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.2.4 <u>Alt 2 - Impact 4</u>

Even though the quantity of sediment removed would be significantly more than the Proposed Project, Alternative 2 would disturb less overall acreage. However, even though Alternative 2 would require 6 years to complete the initial sediment removal, the daily activity level of the Proposed would not be expected to be different that the Proposed Project. The LACDPW still estimates a rate of removal of 7,650 yd^3 per day and an average of 425 trucks per day travelling to the same disposal sites. The LACDPW expects the staffing needs and schedules to remain the same. Alternative 2 would provide no significant difference in air quality emissions from the Proposed Project.

7.2.5 <u>Alt 2 - Impact 5</u>

Alternative 2 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.2.6 Alt 2 - Impact 6

Alternative 2 would provide a slight risk from carcinogenic or toxic contaminants, i.e. 2.3 in a million as opposed to 1.9 in a million from the Proposed Project, but this is still less than significant.

7.3. ALTERNATIVE 3 – CONFIGURATION D

Alternative 3 will only remove 2.4 million yd^3 of current sediment instead of the 2.9 million yd^3 in the Proposed Project and the area excavated will only involve approximately 76 acres instead of the 178 acres of the Proposed Project. It has the same removal method, sediment disposal method, sediment removal truck routes, and long-term sediment management methods as Option 1 in the Proposed Project.

7.3.1 Alt 3 - Impact 1

Alternative 3 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.3.2 Alt 3 - Impact 2

Even though the quantity of sediment removed would be slightly less than the Proposed Project and less acreage would be affected, the LACDPW has indicated the daily activity level would not be less. The LACDPW still estimates a rate of removal of 7,650 yd^3 per day and an average of 425 trucks per day travelling to the same disposal sites. The LACDPW expects the staffing needs and schedules to remain the same. Alternative 3 would provide no significant difference in air quality emissions from the Proposed Project.

7.3.3 Alt 3 - Impact 3

Alternative 3 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.3.4 Alt 3 - Impact 4

Even though the quantity of sediment removed would be slightly less for Alternative 3 than the Proposed Project and less acreage would be affected, the daily activity level of the Proposed would not be expected to lessen. The LACDPW still estimates a rate of removal of 7,650 yd^3 per day and off-road equipment operating 10 hours per day. The LACDPW expects the staffing needs and schedules to remain the same. Alternative 3 would provide no significant difference in CO concentrations at intersections or exceedances of locally significant thresholds from the Proposed Project.

7.3.5 Alt 3 - Impact 5

Alternative 3 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.3.6 Alt 3 - Impact 6

Alternative 3 would provide no significant difference in the emissions of carcinogenic or toxic contaminants from the Proposed Project.

7.4. ALTERNATIVE 4 – SLUICING METHOD

Alternative 4 will remove the 2.9 million yd^3 by a sluicing method. Sluicing utilizes flowing water to transport sediment. Therefore this Alternative does not include off-site sediment disposal using disposal trucks. Sluicing would only take place during the rainy season. In order to remove large amounts of accumulated sediment, the sluicing operation involves mechanical agitation, which would be achieved by using bulldozers and other heavy equipment to actively push sediment into the flow path of the water. Any heavy equipment activity would occur on the same daily/weekly schedule as in the Proposed Project but the amounts of usage would be unknown since sluicing activities without mechanical agitation can occur during all hours of the day and all days of the week as a passive removal system with lower efficiency rates. Total project duration of this alternative will depend on future yearly storm flows and is therefore difficult to estimate. Sediment transport studies indicate, if successful, it could take several decades to achieve removal of the 2.9 million yd^3 of sediment.

7.4.1 <u>Alt 4 - Impact 1</u>

Alternative 4 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.4.2 <u>Alt 4 - Impact 2</u>

While Alternative 4 would still require some off-road equipment usage to push the material for sluicing and some trucking to remove organics, exhaust emissions from on-road disposal trucks and off-road equipment would be greatly reduced. This would reduce the daily emissions levels for all criteria pollutants. In fact, the exceedance of the daily NO_X emissions that occurs in with the Proposed Project would be eliminated, thus eliminating the potential significance and the need for the mitigation measures proposed.

7.4.3 <u>Alt 4 - Impact 3</u>

Alternative 4 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.4.4 <u>Alt 4 - Impact 4</u>

While Alternative 4 would still require some off-road equipment usage to push the material for sluicing and some trucking to remove organics, exhaust emissions from on-road disposal trucks and off-road equipment would be greatly reduced.. This would reduce CO emissions levels and resultant concentrations. In addition, the heavy equipment operations would not produce emissions that would violate any LST, thus eliminating the potential significance and the need for the mitigation measure proposed.

7.4.5 <u>Alt 4 - Impact 5</u>

Alternative 4 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.4.6 Alt 4 - Impact 6

Alternative 4 would provide no significant difference in the emissions of carcinogenic or toxic contaminants from the Proposed Project.

7.5. ALTERNATIVE 5 – HAUL ROUTE ALTERNATIVE

Alternative 5 is identical to the Proposed Project with a change in haul routes from the site to the freeway.

7.5.1 Alt 5 - Impact 1

Alternative 5 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.5.2 Alt 5 - Impact 2

The change in haul routes from the project site to the highway creates only minimal changes in emissions estimates from that for the Proposed Project. Alternative 5 would provide no significant difference in air quality emissions from the Proposed Project.

7.5.3 Alt 5 - Impact 3

Alternative 5 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.5.4 Alt 5 - Impact 4

The change in haul routes from the project site to the highway creates only minimal changes in emissions estimates from that for the Proposed Project. Alternative 5 would provide no significant difference in CO concentrations at intersections or exceedances of locally significant thresholds from the Proposed Project.

7.5.5 Alt 5 - Impact 5

Alternative 5 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.5.6 Alt 5 - Impact 6

Alternative 5 would provide no significant difference in the emissions of carcinogenic or toxic contaminants from the Proposed Project.

7.6. ALTERNATIVE 6 – NO PROJECT

With Alternative 6 there would be no change from the existing conditions/activities and therefore Alternative 6 would have no air quality impact.

Air Quality Report Appendix A

Criteria Emissions Summary

Sediment Removal — Unmitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	7.54	33.99	55.18	2.87	2.87
On-road Trucks	7.15	34.87	314.93	5.33	4.91
Onsite Idling	0.44	1.89	7.88	0.05	0.05
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
TOTALS	***15.2***	***73.2***	***378.2***	***13.7***	***8.7***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***8.0***	***35.9***	***63.1***	***8.4***	***3.8***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

Sediment Removal — Mitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	4.71	33.99	22.05	2.60	2.15
On-road Trucks	7.15	34.87	56.90	2.40	2.20
Onsite Idling	0.44	1.89	2.48	0.01	0.01
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
TOTALS	***12.4***	***73.2***	***81.7***	***10.5***	***5.2***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***5.2***	***35.9***	***24.5***	***8.1***	***3.0***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

Maintenance Activities — Unmitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	2.86	17.29	19.26	0.98	0.98
On-road Trucks	2.82	17.47	104.22	1.71	1.57
Onsite Idling	0.20	0.89	3.71	0.02	0.02
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
TOTALS	***5.9***	***36.4***	***127.3***	***6.0***	***3.3***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***3.1***	***18.2***	***23.0***	***4.3***	***1.8***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

Maintenance Activities — Mitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	2.86	17.29	19.26	0.98	0.98
On-road Trucks	2.82	17.47	40.56	1.70	1.56
Onsite Idling	0.20	0.89	1.17	0.00	0.00
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
TOTALS	***5.9***	***36.4***	***61.1***	***6.0***	***3.3***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***3.1***	***18.2***	***20.4***	***4.3***	***1.7***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

GHG Emissions Summary

Sediment Removal

Emission Source	Total GHG Emissions (tonnes)			
	CO_2	CH_4	N_2O	CO_2e
Off-road	745.8	0.071	N/A	747.3
On-road Trucks	4,422.6	1.681	1.546	4,937.3
Employees	46.4	0.005	0.005	48.2
TOTALS	***5,215***	***1.76***	***1.55***	***5,733***

Maintenance

Emission Source	Total GHG Emissions (tonnes)			
	CO_2	CH_4	N_2O	CO_2e
Off-road	96.8	0.007	N/A	96.9
On-road Trucks	819.1	0.312	0.287	914.6
Employees	6.5	0.001	0.001	6.7
TOTALS	***922***	***0.32***	***0.29***	***1,018***

Construction Amortization

Year #	CO_2e		
1	5,733		
2	5,733		
3	5,733		
4	5,733		
5	5,733		**Plus**
Total	**28,664**		**Maintenance**
Amortized over 30 years =		955	1,974

Mileages for Disposal Sites

Disposal Area	Haul Route #	Mileage (round trip)			
		P-H	Highway	H-D	Total
Vulcan Materials	9	1.4	31.0	1.0	33.4
Manning's Pit	2A	1.4	31.0	4.7	37.1
Waste Management Pit	3A	1.4	31.0	3.2	35.5
Average of Irwindale Sites		**1.4**	**31.0**	**3.0**	**35.3**
Scholl Canyon Landfill	4A	1.4	8.6	3.2	13.2
Greenwaste Site		**1.4**	**8.6**	**3.2**	**13.2**
Sheldon Pit	5C	1.1	24.4	10.0	35.5
Cal-Mat Pit	6C	1.1	24.4	10.1	35.7
Bradley Landfill	7C	1.1	24.4	12.8	38.3
Boulevard Pit	8C	1.1	24.4	18.8	44.3
Average of Sun Valley Sites		**1.1**	**24.4**	**12.9**	**38.5**

Distributions	SedRem	Maint
Estimated Total Truck Trips per Day =	425	300
% of trips to Scholl Canyon =	3%	2%
% of trips to Irwindale sites =	78%	75%
% of trips to Sun Valley sites =	19%	23%
Scholl Canyon Trips per Day =	11	6
Irwindale Trips per Day =	333	225
Sun Valley Trips per Day =	81	69

P-H = Project to highway
H-D = Highway to disposal site

"Percent to Scholl" Calculations

	3	weeks	2015	5.8%
	1	week	2016+	1.9%
For first 5 years	7	weeks	SedRem	2.7%

On-Road Trucks Criteria Emissions
Unmitigated

Sediment Removal - Unmitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (lbs/day)				
				ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	11	53	0.04	0.16	1.18	0.02	0.02
Scholl Canyon Site - Highways	8.6		99	0.04	0.21	2.04	0.04	0.03
Irwindale Sites - Surface Streets	4	333	1,445	1.01	4.46	32.45	0.47	0.43
Irwindale Sites - Highways	31		10,323	4.43	22.29	213.12	3.74	3.44
Sun Valley Sites - Surface Streets	14	81	1,135	0.79	3.50	25.47	0.37	0.34
Sun Valley Sites - Highways	24.4		1,970	0.85	4.25	40.68	0.71	0.66
	Totals	***425***	***15,024***	***7.2***	***34.9***	***314.9***	***5.3***	***4.9***

Maintenance - Unmitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (lbs/day)				
				ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	6	26	0.01	0.04	0.30	0.00	0.00
Scholl Canyon Site - Highways	8.6		49	0.01	0.08	0.46	0.01	0.01
Irwindale Sites - Surface Streets	4	225	977	0.43	1.58	11.19	0.11	0.10
Irwindale Sites - Highways	31		6,975	1.56	11.44	65.38	1.20	1.10
Sun Valley Sites - Surface Streets	14	69	969	0.43	1.57	11.11	0.11	0.10
Sun Valley Sites - Highways	24.4		1,684	0.38	2.76	15.78	0.29	0.27
	Totals	***300***	***10,605***	***2.8***	***17.5***	***104.2***	***1.7***	***1.6***

Notes:

Trip distribution during sediment removal is 3% Scholl Canyon, 78% Irwindale SitesIrwindale, and 19% Sun Valley.

Trip distribution during maintenance is 2% Scholl Canyon, 79% Irwindale, and 19% Sun Valley.

Surface streets use vehicle speeds from 5 to 45 mph

Highway use vehicle speeds from 50 to 70 mph

On-Road Trucks Criteria Emissions Mitigated

Sediment Removal — Mitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (lbs/day)		
				NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	11	53	0.25	0.01	0.00
Scholl Canyon Site - Highways	8.6		99	0.35	0.02	0.02
Irwindale Sites - Surface Streets	4	333	1,445	6.86	0.15	0.14
Irwindale Sites - Highways	31		10,323	36.98	1.77	1.63
Sun Valley Sites - Surface Streets	14	81	1,135	5.39	0.12	0.11
Sun Valley Sites - Highways	24.4		1,970	7.06	0.34	0.31
Totals		***425***	***15,024***	***56.9***	***2.4***	***2.2***

Maintenance — Mitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (lbs/day)		
				NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	6	26	0.12	0.00	0.00
Scholl Canyon Site - Highways	8.6		49	0.18	0.01	0.01
Irwindale Sites - Surface Streets	4	225	977	4.64	0.10	0.09
Irwindale Sites - Highways	31		6,975	24.99	1.20	1.10
Sun Valley Sites - Surface Streets	14	69	969	4.60	0.10	0.09
Sun Valley Sites - Highways	24.4		1,684	6.03	0.29	0.27
Totals		***300***	***10,680***	***40.6***	***1.7***	***1.6***

On-Road Trucks Total GHG Emissions

Sediment Removal

Disposal Sites	Round Trip (mi)	Trips per day	Trips per year	VMT per year
Scholl Canyon Site - Surface Streets	5	11	2,693	12,332
Scholl Canyon Site - Highways	8.6			23,156
Irwindale Sites - Surface Streets	4	333	78,136	339,111
Irwindale Sites - Highways	31			2,422,218
Sun Valley Sites - Surface Streets	14	81	18,947	266,211
Sun Valley Sites - Highways	24.4			462,317
Totals		***425***	***80,829***	***2,784,484***

Emissions (tonnes per year)

CO_2	CH_4	N_2O	CO_2e
23	0.007	0.007	25
36	0.014	0.013	40
622	0.205	0.188	685
3,764	1.462	1.345	4,212
488	0.161	0.148	538
718	0.279	0.257	804
4,423	***1.681***	***1.546***	***4,937***

Maintenance

Disposal Sites	Round Trip (mi)	Trips per day	Trips per year	VMT per year
Scholl Canyon Site - Surface Streets	5	6	372	1,702
Scholl Canyon Site - Highways	8.6			3,195
Irwindale Sites - Surface Streets	4	225	14,665	58,661
Irwindale Sites - Highways	31			454,621
Sun Valley Sites - Surface Streets	14	69	4,497	62,963
Sun Valley Sites - Highways	24.4			109,735
Totals		***300***	***15,037***	***516,476***

Emissions (tonnes per year)

CO_2	CH_4	N_2O	CO_2e
3	0.001	0.001	3
5	0.002	0.002	6
108	0.035	0.033	118
707	0.274	0.252	791
116	0.038	0.035	127
171	0.066	0.061	191
819	***0.312***	***0.287***	***915***

Notes:

	Sed	Main
Months per year =	9	3
Days per month =	26.1	21.7
Days per year =	235	65

Employee Commute

Vehicle Activity

Activity	Days per Year	Trips per Day	Round Trip (mi)	VMT per day	VMT per Year
Sediment Removal	235	17	40	680	159,557
Maintenance	65	9	40	340	22,161

Criteria Emissions

Activity	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Sediment Removal	0.07	2.44	0.24	0.00	0.00
Maintenance	0.02	0.76	0.07	0.00	0.00

GHG

Activity	Total Tonnes per Year			
	CO_2	CH_4	N_2O	CO_2e
Sediment Removal	46.4	0.0046	0.0054	48.2
Maintenance	6.5	0.0006	0.0007	6.7

Notes:

Months per year = 9
Days per month = 30.4
Days per year = 274

Sediment Removal - Off-Road
Unmitigated

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
Excavator	157	0.38	8	235	1,877
Grader	162	0.41	8	235	1,877
Water Truck	381	0.38	8	235	1,877
Sorters/Crushers	85	0.78	2	235	469

Notes:

Months per year = *9*
Days per month = *26.1*
Days per year = *235*

Criteria Emissions - Unmitigated

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.44	2.18	2.78	0.23	0.23
Front Loaders	0.44	2.18	2.78	0.23	0.23
Front Loaders	0.44	2.18	2.78	0.23	0.23
Front Loaders	0.44	2.18	2.78	0.23	0.23
D-8 Dozer	1.59	6.75	12.98	0.53	0.53
D-8 Dozer	1.59	6.75	12.98	0.53	0.53
Excavator	0.56	3.54	3.95	0.21	0.21
Grader	0.70	3.93	5.12	0.28	0.28
Water Truck	1.10	3.17	7.55	0.27	0.27
Sorters/Crushers	0.23	1.13	1.47	0.13	0.13
Totals	***7.54***	***33.99***	***55.18***	***2.87***	***2.87***

GHG Emissions

Type	tonnes per year		
	CO_2	CH_4	CO_2e
Front Loaders	33.41	0.0042	33.50
Front Loaders	33.41	0.0042	33.50
Front Loaders	33.41	0.0042	33.50
Front Loaders	33.41	0.0042	33.50
D-8 Dozer	152.76	0.0151	153.08
D-8 Dozer	152.76	0.0151	153.08
Excavator	63.64	0.0054	63.76
Grader	70.86	0.0066	70.99
Water Truck	154.45	0.0098	154.65
Sorters/Crushers	17.68	0.0022	17.73
Totals	***745.80***	***0.0710***	***747.29***

Sediment Removal - Mitigated Off-Road

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
Excavator	157	0.38	8	235	1,877
Grader	162	0.41	8	235	1,877
Water Truck	381	0.38	8	235	1,877
Sorters/Crushers	85	0.78	2	235	469

Notes:

Months per year = *9*
Days per month = *26.1*
Days per year = *235*

Mitigated Criteria Emissions

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.28	2.18	1.17	0.13	0.01
Front Loaders	0.28	2.18	1.17	0.13	0.01
Front Loaders	0.28	2.18	1.17	0.13	0.01
Front Loaders	0.28	2.18	1.17	0.13	0.01
D-8 Dozer	0.98	6.75	5.67	0.53	0.53
D-8 Dozer	0.98	6.75	5.67	0.53	0.53
Excavator	0.34	3.54	1.26	0.21	0.21
Grader	0.38	3.93	1.40	0.24	0.24
Water Truck	0.83	3.17	3.05	0.52	0.52
Sorters/Crushers	0.09	1.13	0.35	0.06	0.06
Totals	***4.71***	***33.99***	***22.05***	***2.60***	***2.15***

Maintenance - Off-Road
Unmitigated

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	61	487
Front Loaders	87	0.36	8	61	487
D-8 Dozer	358	0.40	8	61	487
Excavator	157	0.38	8	61	487
Water Truck	381	0.38	1	61	61
Sorters/Crushers	85	0.78	8	61	487

Notes:

Months per year = *2*
Days per month = *21.7*
Days per year = *61*

Criteria Emissions

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.30	2.01	1.88	0.13	0.13
Front Loaders	0.30	2.01	1.88	0.13	0.13
D-8 Dozer	1.24	5.03	9.14	0.36	0.36
Excavator	0.37	3.54	2.06	0.10	0.10
Water Truck	0.10	0.36	0.50	0.02	0.02
Sorters/Crushers	0.55	4.35	3.80	0.24	0.24
Totals	***2.86***	***17.29***	***19.26***	***0.98***	***0.98***

GHG Emissions

Type	tonnes per year		
	CO_2	CH_4	CO_2e
Front Loaders	8.66	0.0007	8.68
Front Loaders	8.66	0.0007	8.68
D-8 Dozer	39.61	0.0031	39.67
Excavator	16.50	0.0009	16.52
Water Truck	5.01	0.0002	5.01
Sorters/Crushers	18.34	0.0014	18.37
Totals	***96.77***	***0.0071***	***96.92***

Maintenance - Off-Road
Mitigated

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	61	487
Front Loaders	87	0.36	8	61	487
D-8 Dozer	358	0.40	8	61	487
Excavator	157	0.38	8	61	487
Water Truck	381	0.38	1	61	61
Sorters/Crushers	85	0.78	8	61	487

Notes:

Months per year = *2*
Days per month = *21.7*
Days per year = *61*

Criteria Emissions

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.19	2.01	1.17	0.13	0.13
Front Loaders	0.19	2.01	1.17	0.13	0.13
D-8 Dozer	0.77	5.03	5.67	0.36	0.36
Excavator	0.23	3.54	1.26	0.10	0.10
Water Truck	0.06	0.36	0.31	0.02	0.02
Sorters/Crushers	0.34	4.35	2.36	0.24	0.24
Totals	***1.77***	***17.29***	***11.92***	***0.98***	***0.98***

GHG Emissions

Type	tonnes per year		
	CO_2	CH_4	CO_2e
Front Loaders	8.66	0.0007	8.68
Front Loaders	8.66	0.0007	8.68
D-8 Dozer	39.61	0.0031	39.67
Excavator	16.50	0.0009	16.52
Water Truck	5.01	0.0002	5.01
Sorters/Crushers	18.34	0.0014	18.37
Totals	***96.77***	***0.0071***	***96.92***

2015 Off-road Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.805	3.945	5.041	0.415	0.415	568.3	0.072
D-8 dozers	358	0.40	0.628	2.672	5.138	0.211	0.211	568.3	0.056
Excavator	157	0.38	0.532	3.369	3.751	0.204	0.204	568.3	0.048
Grader	162	0.41	0.595	3.356	4.372	0.241	0.241	568.3	0.053
Water truck	381	0.38	0.431	1.241	2.956	0.105	0.105	568.3	0.036
Sorters/Crushers	85	0.78	0.797	3.859	5.040	0.430	0.430	568.3	0.071

2020 Off-road Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.542	3.636	3.404	0.228	0.228	568.3	0.048
D-8 dozers	358	0.40	0.491	1.990	3.619	0.144	0.144	568.3	0.044
Excavator	157	0.38	0.355	3.361	1.958	0.098	0.098	568.3	0.032
Water truck	381	0.38	0.310	1.136	1.561	0.057	0.057	568.3	0.028
Sorters/Crushers	85	0.78	0.473	3.722	3.249	0.206	0.206	568.3	0.042

SCAQMD Off-Road Emission Rates Table II

Percentage Reduction from Tier 2 to Tier 3

Engine Size (hp)	Percent Reduction		
	ROG	NO_X	PM_{10}
75 to 99	38%	38%	0%
100 to 174	39%	39%	0%
175 to 299	39%	39%	0%
300 to 600	38%	38%	0%

2015 Off-road Mitigated Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.499	3.945	3.125	0.415	0.415	568.3	0.072
D-8 dozers	358	0.40	0.389	2.672	3.186	0.211	0.211	568.3	0.056
Excavator	157	0.38	0.325	3.369	2.288	0.204	0.204	568.3	0.048
Grader	162	0.41	0.363	3.356	2.667	0.241	0.241	568.3	0.053
Water truck	381	0.38	0.267	1.241	1.833	0.105	0.105	568.3	0.036
Sorters/Crushers	85	0.78	0.494	3.859	3.125	0.430	0.430	568.3	0.071

2020 Off-road Mitigated Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.336	3.636	2.110	0.228	0.228	568.3	0.048
D-8 dozers	358	0.40	0.304	1.990	2.244	0.144	0.144	568.3	0.044
Excavator	157	0.38	0.217	3.361	1.194	0.098	0.098	568.3	0.032
Water truck	381	0.38	0.192	1.136	0.968	0.057	0.057	568.3	0.028
Sorters/Crushers	85	0.78	0.293	3.722	2.014	0.206	0.206	568.3	0.042

From: CalEEMod Users Guide - Appendix D, CalEEMod User's Tips (June 2011), and 2011 Carl Moyer Program Guideline

2015 Estimated Annual Emission Rates

EMFAC 2011

EMFAC 2011 Vehicle Categories
Los Angeles County

EMPLOYEE VEHICLES

Veh_Class	Fuel	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
LDA	GAS	124,228,301	0.0399	1.3180	0.1154	318.20	0.0022	0.0020
	DSL	421,930	0.0490	0.2495	0.4813	275.97	0.0367	0.0337
LDA - Average		**124,650,231**	**0.0399**	**1.3143**	**0.1167**	**318.05**	**0.0023**	**0.0021**
LDT1	GAS	13,920,097	0.1158	3.6095	0.3503	378.39	0.0056	0.0051
	DSL	19,325	0.0948	0.4229	0.6895	294.64	0.0793	0.0729
LDT1 - Average		**13,939,422**	**0.1158**	**3.6051**	**0.3508**	**378.28**	**0.0057**	**0.0052**
LDT2	GAS	41,671,607	0.0528	1.9112	0.2241	454.73	0.0024	0.0022
	DSL	19,382	0.0632	0.3251	0.6529	294.15	0.0506	0.0465
LDT2 - Average		**41,690,989**	**0.0528**	**1.9105**	**0.2243**	**454.65**	**0.0024**	**0.0022**
Employee Weighted Average			***0.0488***	***1.6293***	***0.1597***	***354.30***	***0.0026***	***0.0023***

DIESEL TRUCKS

Veh_Class	Speed (mph)	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
T7 single construction	5	273	3.5045	6.0256	30.4992	3,919.55	0.6823	0.6277
T7 single construction	10	1,111	2.0592	4.2149	21.1424	3,237.84	0.4737	0.4358
T7 single construction	15	3,273	1.0518	2.8594	14.7722	2,658.53	0.3148	0.2896
T7 single construction	20	8,864	0.4283	1.8513	11.0830	2,097.32	0.1942	0.1787
T7 single construction	25	19,082	0.3519	1.5998	10.5006	1,956.84	0.1622	0.1493
T7 single construction	30	25,882	0.2890	1.3886	10.0244	1,836.80	0.1384	0.1273
T7 single construction	35	19,419	0.2394	1.2176	9.6540	1,737.17	0.1226	0.1128
T7 single construction	40	18,869	0.2031	1.0867	9.3942	1,657.98	0.1150	0.1058
T7 single construction	45	18,189	0.1803	0.9965	9.2244	1,599.20	0.1155	0.1063
T7 single construction - Surface Streets		**114,962**	**0.3170**	**1.3991**	**10.1837**	**1,834.92**	**0.1461**	**0.1344**
T7 single construction	50	17,465	0.1709	0.9466	9.1607	1,560.84	0.1242	0.1142
T7 single construction	55	17,232	0.1748	0.9369	9.2018	1,542.90	0.1409	0.1296
T7 single construction	60	40,396	0.1922	0.9676	9.3450	1,545.38	0.1658	0.1525
T7 single construction	65	29,825	0.2228	1.0384	9.5996	1,568.30	0.1988	0.1829
T7 single construction	70	73	0.2730	1.1037	11.0294	1,612.93	0.2421	0.2228
T7 single construction - Highways		**104,990**	**0.1945**	**0.9793**	**9.3643**	**1,554.10**	**0.1642**	**0.1511**

Notes:

- *Surface street speeds are from 5 mph to 45 mph*
- *Highway speeds are from 50 mph to 70 mph*
- *Employee average = 69% LDA + 8% LDT1 + 23% LDT2 based on VMT*

2020 Estimated Annual Emission Rates

EMFAC 2011

EMFAC 2011 Vehicle Categories
Los Angeles County

EMPLOYEE VEHICLES

Veh_Class	Fuel	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
LDA	GAS	127,356,491	0.0173	0.8226	0.0746	257.22	0.0020	0.0019
	DSL	434,476	0.0227	0.1407	0.3355	225.91	0.0162	0.0149
LDA - Average		**127,790,967**	**0.0173**	**0.8203**	**0.0755**	**257.11**	**0.0021**	**0.0019**
LDT1	GAS	14,187,931	0.0577	2.3382	0.2328	317.17	0.0042	0.0039
	DSL	20,940	0.0490	0.2398	0.4558	231.83	0.0395	0.0363
LDT1 - Average		**14,208,871**	**0.0577**	**2.3351**	**0.2331**	**317.04**	**0.0042**	**0.0039**
LDT2	GAS	43,317,321	0.0241	1.1652	0.1284	382.80	0.0021	0.0019
	DSL	20,329	0.0299	0.1759	0.4450	243.31	0.0210	0.0194
LDT2 - Average		**43,337,650**	**0.0241**	**1.1647**	**0.1285**	**382.74**	**0.0021**	**0.0019**
Employee Weighted Average			***0.0220***	***1.0170***	***0.1000***	***291.08***	***0.0022***	***0.0021***

DIESEL TRUCKS

Veh_Class	Speed (mph)	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
T7 single construction	5	422	1.9483	3.8034	15.3144	3,600.96	0.0896	0.0824
T7 single construction	10	1,387	1.1342	2.3921	11.1428	2,974.64	0.0743	0.0684
T7 single construction	15	3,732	0.5763	1.4076	8.1470	2,442.41	0.0618	0.0568
T7 single construction	20	10,499	0.2464	0.7769	6.1362	1,926.81	0.0509	0.0468
T7 single construction	25	22,096	0.2139	0.7260	5.6152	1,797.75	0.0474	0.0436
T7 single construction	30	29,986	0.1854	0.6886	5.1763	1,687.47	0.0459	0.0423
T7 single construction	35	23,319	0.1610	0.6648	4.8200	1,595.96	0.0465	0.0428
T7 single construction	40	22,600	0.1405	0.6544	4.5465	1,523.23	0.0491	0.0452
T7 single construction	45	21,535	0.1240	0.6578	4.3446	1,469.21	0.0537	0.0494
T7 single construction - Surface Streets		**135,576**	**0.1993**	**0.7337**	**5.1982**	**1,686.10**	**0.0493**	**0.0453**
T7 single construction	50	23,100	0.1115	0.6747	4.2229	1,433.95	0.0604	0.0556
T7 single construction	55	27,435	0.1031	0.7052	4.1830	1,417.46	0.0691	0.0635
T7 single construction	60	48,002	0.0986	0.7493	4.2250	1,419.74	0.0798	0.0734
T7 single construction	65	38,081	0.0981	0.8068	4.3501	1,440.80	0.0925	0.0851
T7 single construction	70	95	0.0998	0.8564	5.2530	1,484.20	0.1105	0.1016
T7 single construction - Highways		**136,714**	**0.1015**	**0.7440**	**4.2518**	**1,427.60**	**0.0779**	**0.0717**

Notes:

Surface street speeds are from 5 mph to 45 mph
Highway speeds are from 50 mph to 70 mph
Employee average = 69% LDA + 8% LDT1 + 23% LDT2 based on VMT

2015 EMFAC2011 On-road Vehicle Emission Factors

Veh Type	Emission Factors (grams per mile)							
	ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$	CH_4	N_2O
LDA	0.0399	1.3143	0.1167	318.1	0.0023	0.0021	0.0278	0.0294
LDT1	0.1158	3.6051	0.3508	378.3	0.0057	0.0052	0.0315	0.0433
LDT2	0.0528	1.9105	0.2243	454.7	0.0024	0.0022	0.0315	0.0433
Weighted Average - Surface Streets	*0.0488*	*1.6293*	*0.1597*	*354.3*	*0.0026*	*0.0023*	*0.0289*	*0.0337*
T7 single construction - Surface Streets	0.3170	1.3991	10.1837	1,834.9	0.1461	0.1344	0.6037	0.5554
T7 single construction - Highways	0.1945	0.9793	9.3643	1,554.1	0.1642	0.1511	0.6037	0.5554

2020 EMFAC2011 On-road Vehicle Emission Factors

Veh Type	Emission Factors (grams per mile)							
	ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$	CH_4	N_2O
LDA	0.0173	0.8203	0.0755	257.1	0.0021	0.0019	0.0278	0.0294
LDT1	0.0577	2.3351	0.2331	317.0	0.0042	0.0039	0.0315	0.0433
LDT2	0.0241	1.1647	0.1285	382.7	0.0021	0.0019	0.0315	0.0433
Weighted Average - Surface Streets	*0.0220*	*1.0170*	*0.1000*	*291.1*	*0.0022*	*0.0021*	*0.0289*	*0.0337*
T7 single construction - Surface Streets	0.1993	0.7337	5.1982	1,686.1	0.0493	0.0453	0.6037	0.5554
T7 single construction - Highways	0.1015	0.7440	4.2518	1,427.6	0.0779	0.0717	0.6037	0.5554

Notes: -

Criteria and CO_2 factors come from 2013 EMFAC2011 and represent Estimated Annual Emission Rates for Los Angeles County in the South Coast Air Basin

CH_4 and N_2O factors come from Local Government Operations Protocol: For the quantification and reporting of greenhouse gas emissions inventories. Version 1.1. California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and The Climate Registry. May 2010

Surface street emission factors are generated from weighted factors for vehicle speeds from 5 to 45 mph

Highway emission factors are generated from weighted factors for vehicle speeds from 50 to 70 mph

Weighted Average is 69% LDA + 8% LDT1 + 23% LDT2 based on VMT

EMFAC2011 Emission Rates

Region: Los Angeles -- Calendar Year: 2015

2010 Model Year Diesel Trucks

Veh_Class	Speed (mph)	VMT per day	Running Exhaust (grams per mile)		
			NO_X	PM_{10}	$PM_{2.5}$
T7 single construction	5	16	6.2652	0.0610	0.0562
T7 single construction	10	66	4.7102	0.0560	0.0515
T7 single construction	15	196	3.5437	0.0511	0.0470
T7 single construction	20	531	2.6785	0.0459	0.0422
T7 single construction	25	1,144	2.4014	0.0438	0.0403
T7 single construction	30	1,551	2.1653	0.0435	0.0400
T7 single construction	35	1,162	1.9701	0.0450	0.0414
T7 single construction	40	1,125	1.8159	0.0483	0.0444
T7 single construction	45	1,087	1.7026	0.0533	0.0490
Surface Streets		**6,879**	**2.1546**	**0.0467**	**0.0430**
T7 single construction	50	1,045	1.6303	0.0601	0.0553
T7 single construction	55	1,032	1.5989	0.0687	0.0632
T7 single construction	60	2,423	1.6085	0.0791	0.0728
T7 single construction	65	1,787	1.6591	0.0913	0.0840
T7 single construction	70	3	1.7610	0.1053	0.0969
Highways		**6,289**	**1.6250**	**0.0778**	**0.0715**

Veh_Class		Running Exhaust (grams per mile)		
		NO_X	PM_{10}	$PM_{2.5}$
2015 Aggregated	Surface	10.1837	0.1461	0.1344
	Highways	9.3643	0.1642	0.1511
2010 Model Year	Surface	2.1546	0.0467	0.0430
	Highways	1.6250	0.0778	0.0715
% Change	Surface	*-78.8%*	*-68.0%*	*-68.0%*
% Change	Highways	*-82.6%*	*-52.7%*	*-52.7%*

EMFAC2011 Emission Rates

Region: Los Angeles -- Calendar Year: 2020

2010 Model Year Diesel Trucks

Veh_Class	Speed (mph)	VMT per day	Running Exhaust (grams per mile)		
			NO_X	PM_{10}	$PM_{2.5}$
T7 single construction	5	16	6.2652	0.0610	0.0562
T7 single construction	10	66	4.7102	0.0560	0.0515
T7 single construction	15	196	3.5437	0.0511	0.0470
T7 single construction	20	531	2.6785	0.0459	0.0422
T7 single construction	25	1,144	2.4014	0.0438	0.0403
T7 single construction	30	1,551	2.1653	0.0435	0.0400
T7 single construction	35	1,162	1.9701	0.0450	0.0414
T7 single construction	40	1,125	1.8159	0.0483	0.0444
T7 single construction	45	1,087	1.7026	0.0533	0.0490
Surface Streets		**6,879**	**2.1546**	**0.0467**	**0.0430**
T7 single construction	50	1,045	1.6303	0.0601	0.0553
T7 single construction	55	1,032	1.5989	0.0687	0.0632
T7 single construction	60	2,423	1.6085	0.0791	0.0728
T7 single construction	65	1,787	1.6591	0.0913	0.0840
T7 single construction	70	3	1.7610	0.1053	0.0969
Highways		**6,289**	**1.6250**	**0.0778**	**0.0715**

Veh_Class		Running Exhaust (grams per mile)		
		NO_X	PM_{10}	$PM_{2.5}$
2020 Aggregated	Surface	5.1982	0.0493	0.0453
	Highways	4.2518	0.0779	0.0717
2010 Model Year	Surface	2.1546	0.0467	0.0430
	Highways	1.6250	0.0778	0.0715
% Change	Surface	*-58.6%*	*-5.3%*	*-5.3%*
% Change	Highways	*-61.8%*	*-0.2%*	*-0.2%*

Loading & Staging Idling Emissions

Activity Data

425 trucks per day during sediment removal

200 trucks per day during maintenance activities

Idling assumptions

1 minute per truck during loading

3 minutes per truck idling in queue

therefore

4 minutes per truck idling per load cycle

1,700 total minutes per day for sediment removal

800 total minutes per day for maintenance

Project Trucks	Emission Factor (grams per minute per vehicle)				
	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG
2003-2006	0.505	2.104	0.014	0.013	0.116
2007-2040	0.505	0.661	0.002	0.001	0.116

Unmitigated Emissions

Project Trucks	Emissions (lbs/day)				
	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG
Sediment removal	1.894	7.884	0.051	0.047	0.435
Maintenance	0.891	3.710	0.024	0.022	0.205

Mitigated Emissions

Project Trucks	Emissions (lbs/day)				
	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG
Sediment removal	1.894	2.476	0.006	0.005	0.435
Maintenance	0.891	1.165	0.003	0.002	0.205

Idling Emission Factors for T7 -Single Construction Vehicles

SCAB Air Basin, Calendar Year 2015 - Summer

Model Year Range	Emission Factor (grams per hour per vehicle)					
	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	ROG
1965-1986	51.915	60.352	5.442	5.006	6,289.7	30.252
1987-1990	42.801	92.707	2.714	2.497	6,637.1	17.716
1991-1993	39.380	103.626	2.030	1.867	6,789.2	14.136
1994-1997	36.244	112.670	1.524	1.402	6,941.2	11.306
1998-2002	32.577	121.671	1.054	0.970	7,136.6	8.484
2003-2006	30.319	126.211	0.818	0.752	7,266.9	6.970
2007-2040	30.319	39.644	0.091	0.084	7,266.9	6.970

Fugitive Dust - Excavation

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Dragline Overburden)

EF PM_{15} =	$0.0021 \times d^{0.7} \div M^{0.3}$ =	0.003	lb/hr
EF PM_{TSP} =	$0.0021 \times d^{1.1} \div M^{0.3}$ =	0.006	lb/hr

where: d =	*drop height (ft)*	*5*	*(estimate)*
and: M =	*material moisture content (%)=*	*12*	*(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.002	lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.000	lb/hr

Where: EF_{PM10} =	*PM_{10} scaling factor. The AP-42 default value is*	*0.75*
and $EF_{PM2.5}$ =	*$PM_{2.5}$ scaling factor. The AP-42 default value is*	*0.017*

(Based on excavation of 7,650 yd^3/d)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	17.64	3.53
$PM_{2.5}$	0.76	0.15

Control Effectiveness for Rule 403 compliance

80%

Fugitive Dust - Grading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Bulldozing Overburden)

EF PM_{15} =	$1.0 \times s^{1.5} \div M^{1.4}$ =	0.764	lb/hr
EF PM_{TSP} =	$5.7 \times s^{1.2} \div M^{1.3}$ =	2.939	lb/hr

where: s = *material silt content (%)* *8.5* *(estimate)*

and: M = *material moisture content (%)=* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.573	lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.309	lb/hr

Where: EF_{PM10} = *PM_{10} scaling factor. The AP-42 default value is* *0.75*

and $EF_{PM2.5}$ = *$PM_{2.5}$ scaling factor. The AP-42 default value is* *0.105*

(Based on 10 hours per day of grading)

Pollutant	Emissions *(lbs/day)*		Control Effectiveness for Rule 403 compliance
	Unmitigated	Mitigated	
PM_{10}	5.73	1.15	80%
$PM_{2.5}$	3.09	0.62	

Fugitive Dust - Material Loading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 13.4.2, *Aggregate Handling and Storage Piles* , of the EPA AP-42.

Emission Factor Formula

Emissions = $k \times 0.0032 \times (U \div 5)^{1.3} \div (M \div 2)^{1.4}$ lb/ton

where: k =	*aerodynamic particle size multiplier*	*PM_{10} =*	*0.35*	*$PM_{2.5}$ =*	*0.053*
U =	*average wind speed (mph)*	*15*	*(AP-42)*		
M =	*material moisture content (%)*	*12*	*(SCAQMD Handbook Table A9-9-G-1)*		

EF PM_{10} = 3.80E-04 $lb\text{-}PM_{10}/ton_{mat}$

EF $PM_{2.5}$ = 5.76E-05 $lb\text{-}PM_{2.5}/ton_{mat}$

or

EF PM_{10} = 1.90E-07 $lb\text{-}PM_{10}/lb_{mat}$

EF $PM_{2.5}$ = 2.88E-08 $lb\text{-}PM_{2.5}/lb_{mat}$

or

EF PM_{10} = 5.13E-04 $lb\text{-}PM_{10}/yd^3_{mat}$

EF $PM_{2.5}$ = 7.77E-05 $lb\text{-}PM_{2.5}/yd^3_{mat}$

(based on 2,600 lbs/yd^3 density for aggregate)

(Based on excavation of 7,650 yd^3/d)

Pollutant	Emissions *(lbs/day)*	
	Uncontrolled	Compliance
PM_{10}	3.93	0.79
$PM_{2.5}$	0.59	0.12

Control Effectiveness for Rule 403 compliance

80%

Fugitive Dust - Summary

Uncontrolled

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	17.64	0.76
Grading	5.73	3.09
Material Unloading/Loading	3.93	0.59
Total	***27.30***	***4.44***

Compliance

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	3.53	0.15
Grading	1.15	0.62
Material Unloading/Loading	0.79	0.12
Total	***5.46***	***0.89***

Maintenance Fugitive Dust - Excavation

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Dragline Overburden)

EF PM_{15} =	$0.0021 \times d^{0.7} \div M^{0.3}$ =	0.003	lb/hr
EF PM_{TSP} =	$0.0021 \times d^{1.1} \div M^{0.3}$ =	0.006	lb/hr

where: d = *drop height (ft)* *5* *(estimate)*

and: M = *material moisture content (%)=* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.002	lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.000	lb/hr

Where: EF_{PM10} = *PM_{10} scaling factor. The AP-42 default value is* *0.75*

and $EF_{PM2.5}$ = *$PM_{2.5}$ scaling factor. The AP-42 default value is* *0.017*

(Based on excavation of 3,825 yd^3/d)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	8.82	1.76
$PM_{2.5}$	0.38	0.08

Control Effectiveness for Rule 403 compliance

80%

Maintenance Fugitive Dust - Grading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Bulldozing Overburden)

EF PM_{15} =	$1.0 \times s^{1.5} \div M^{1.4}$ =	0.764 lb/hr
EF PM_{TSP} =	$5.7 \times s^{1.2} \div M^{1.3}$ =	2.939 lb/hr

where: s = *material silt content (%)* *8.5* *(estimate)*

and: M = *material moisture content (%)=* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.573 lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.309 lb/hr

Where: EF_{PM10} = *PM_{10} scaling factor. The AP-42 default value is* *0.75*

and $EF_{PM2.5}$ = *$PM_{2.5}$ scaling factor. The AP-42 default value is* *0.105*

(Based on 10 hours per day of grading)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	5.73	1.15
$PM_{2.5}$	3.09	0.62

Control Effectiveness for Rule 403 compliance

80%

Maintenance Fugitive Dust - Material Loading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 13.4.2, *Aggregate Handling and Storage Piles* , of the EPA AP-42.

Emission Factor Formula

Emissions = $k \times 0.0032 \times (U \div 5)^{1.3} \div (M \div 2)^{1.4}$ lb/ton

where: k =	*aerodynamic particle size multiplier*	*PM_{10} = 0.35*		*$PM_{2.5}$ = 0.053*
U =	*average wind speed (mph)*	*15*	*(AP-42)*	
M =	*material moisture content (%)*	*12*	*(SCAQMD Handbook Table A9-9-G-1)*	

EF PM_{10} = 3.80E-04 lb-PM_{10}/ton_{mat}

EF $PM_{2.5}$ = 5.76E-05 lb-$PM_{2.5}$/ton_{mat}

or

EF PM_{10} = 1.90E-07 lb-PM_{10}/lb_{mat}

EF $PM_{2.5}$ = 2.88E-08 lb-$PM_{2.5}$/lb_{mat}

or

EF PM_{10} = 5.13E-04 lb-PM_{10}/yd^3_{mat}

EF $PM_{2.5}$ = 7.77E-05 lb-$PM_{2.5}$/yd^3_{mat}

(based on 2,600 lbs/yd^3 density for aggregate)

(Based on excavation of 3,825 yd^3/d)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	1.96	0.39
$PM_{2.5}$	0.30	0.06

Control Effectiveness for Rule 403 compliance

80%

Maintenance Fugitive Dust - Summary

Unmitigated

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	8.82	0.38
Grading	5.73	3.09
Material Unloading/Loading	1.96	0.30
Total	***16.52***	***3.76***

Mitigated

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	1.76	0.08
Grading	1.15	0.62
Material Unloading/Loading	0.39	0.06
Total	***3.30***	***0.75***

Air Quality Report Appendix B

APPENDIX B

CALINE4 Outputs

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Irwindale Ave @ Gladstone St
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	X (M)	Y (M)	Z (M)
1. Receptor	-9	742	2.0
2. Receptor	20	742	2.0
3. Receptor	20	769	2.0
4. Receptor	-9	769	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	82.	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	353.	0.9	0.0	0.0	0.4	0.0	0.0	0.1	0.1	0.1
3. Receptor	190.	0.7	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
4. Receptor	95.	0.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1
2. Receptor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
3. Receptor	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
4. Receptor	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.1

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

JOB: Vincent Ave @ Arrow Hwy
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 325. (M)
BRG= WORST CASE	VD= 0.0 CM/S	
CLAS= 7 (G)	VS= 0.0 CM/S	
MIXH= 1000. M	AMB= 0.0 PPM	
SIGTH= 5. DEGREES	TEMP= 10.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
	LINK COORDINATES (M)								
A. NB External	8	0	8	600	AG	640	2.5	0.0	11.4
B. NB Approach	8	600	8	755	AG	455	4.1	0.0	11.4
C. NB Depart	8	755	8	911	AG	525	4.1	0.0	11.4
D. NB External	8	911	8	1511	AG	525	2.5	0.0	11.4
E. NB Left	8	600	4	755	AG	185	4.1	0.0	11.4
F. SB Left	0	911	4	755	AG	35	4.1	0.0	11.4
G. SB External	0	1511	0	911	AG	455	2.5	0.0	11.4
H. SB Approach	0	911	0	755	AG	420	4.1	0.0	11.4
I. SB Depart	0	755	0	600	AG	560	4.1	0.0	11.4
J. SB External	0	600	0	0	AG	560	2.5	0.0	11.4
K. EB External	-750	750	-150	750	AG	725	2.5	0.0	13.7
L. EB Approach	-150	750	4	750	AG	665	4.1	0.0	13.7
M. EB Depart	4	750	158	750	AG	705	4.1	0.0	13.7
N. EB External	158	750	758	750	AG	705	2.5	0.0	13.7
O. WB External	758	761	158	761	AG	1555	2.5	0.0	13.7
P. WB Approach	158	761	4	761	AG	1425	4.1	0.0	13.7
Q. WB Depart	4	761	-150	761	AG	1585	4.1	0.0	13.7
R. WB External	-150	761	-750	761	AG	1585	2.5	0.0	13.7
S. EB Left	-150	750	4	755	AG	60	4.1	0.0	13.7
T. WB Left	158	761	4	755	AG	130	4.1	0.0	13.7

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Vincent Ave @ Arrow Hwy
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Receptor	-7	742	2.0
2. Receptor	16	742	2.0
3. Receptor	16	769	2.0
4. Receptor	-7	769	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	82.	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	277.	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3. Receptor	264.	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
4. Receptor	96.	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.1	0.0	0.0	0.0	0.3	0.0	0.1	0.2	0.0	0.0	0.0	0.0
2. Receptor	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0
3. Receptor	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.6	0.1	0.0	0.0
4. Receptor	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.5	0.0	0.0	0.0	0.0

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

JOB: Figueroa St/Scholl Canyon @ SR-134 WB Ra
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 325. (M)
BRG= WORST CASE	VD= 0.0 CM/S	
CLAS= 7 (G)	VS= 0.0 CM/S	
MIXH= 1000. M	AMB= 0.0 PPM	
SIGTH= 5. DEGREES	TEMP= 10.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NB External	8	0	8	600	AG	515	2.5	0.0	11.4
B. NB Approach	8	600	8	755	AG	515	4.1	0.0	11.4
C. NB Depart	8	755	8	910	AG	80	4.1	0.0	11.4
D. NB External	8	910	8	1510	AG	80	2.5	0.0	11.4
E. NB Left	8	600	4	755	AG	0	4.1	0.0	11.4
F. SB Left	0	910	4	755	AG	20	4.1	0.0	11.4
G. SB External	0	1510	0	910	AG	110	2.5	0.0	11.4
H. SB Approach	0	910	0	755	AG	90	4.1	0.0	11.4
I. SB Depart	0	755	0	600	AG	560	4.1	0.0	11.4
J. SB External	0	600	0	0	AG	560	2.5	0.0	11.4
K. EB External	-750	750	-150	750	AG	0	2.5	0.0	12.6
L. EB Approach	-150	750	4	750	AG	0	4.1	0.0	12.6
M. EB Depart	4	750	158	750	AG	520	4.1	0.0	12.6
N. EB External	158	750	758	750	AG	520	2.5	0.0	12.6
O. WB External	758	760	158	760	AG	535	2.5	0.0	12.6
P. WB Approach	158	760	4	760	AG	65	4.1	0.0	12.6
Q. WB Depart	4	760	-150	760	AG	0	4.1	0.0	12.6
R. WB External	-150	760	-750	760	AG	0	2.5	0.0	12.6
S. EB Left	-150	750	4	755	AG	0	4.1	0.0	12.6
T. WB Left	158	760	4	755	AG	470	4.1	0.0	12.6

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION

JOB: Figueroa St/Scholl Canyon @ SR-134 WB Ra
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Receptor	-7	742	2.0
2. Receptor	16	742	2.0
3. Receptor	16	767	2.0
4. Receptor	-7	767	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	84.	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	82.	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3. Receptor	186.	0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
4. Receptor	175.	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
2. Receptor	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3. Receptor	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
4. Receptor	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

JOB: Figueroa St @ Eagle Vista Dr
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 325. (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 1000. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NB External	10	0	10	600	AG	585	2.5	0.0	12.9
B. NB Approach	10	600	10	753	AG	470	4.1	0.0	12.9
C. NB Depart	10	753	10	907	AG	515	4.1	0.0	12.9
D. NB External	10	907	10	1507	AG	515	2.5	0.0	12.9
E. NB Left	10	600	5	753	AG	115	4.1	0.0	12.9
F. SB Left	0	907	5	753	AG	0	4.1	0.0	12.9
G. SB External	0	1507	0	907	AG	560	2.5	0.0	12.9
H. SB Approach	0	907	0	753	AG	560	4.1	0.0	12.9
I. SB Depart	0	753	0	600	AG	605	4.1	0.0	12.9
J. SB External	0	600	0	0	AG	605	2.5	0.0	12.9
K. EB External	-750	750	-150	750	AG	120	2.5	0.0	10.0
L. EB Approach	-150	750	5	750	AG	75	4.1	0.0	10.0
M. EB Depart	5	750	160	750	AG	0	4.1	0.0	10.0
N. EB External	160	750	760	750	AG	0	2.5	0.0	10.0
O. WB External	760	757	160	757	AG	0	2.5	0.0	10.0
P. WB Approach	160	757	5	757	AG	0	4.1	0.0	10.0
Q. WB Depart	5	757	-150	757	AG	145	4.1	0.0	10.0
R. WB External	-150	757	-750	757	AG	145	2.5	0.0	10.0
S. EB Left	-150	750	5	753	AG	45	4.1	0.0	10.0
T. WB Left	160	757	5	753	AG	0	4.1	0.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Figueroa St @ Eagle Vista Dr
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Receptor	-8	744	2.0
2. Receptor	18	744	2.0
3. Receptor	18	763	2.0
4. Receptor	-8	763	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	173.	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	186.	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
3. Receptor	186.	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
4. Receptor	174.	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3. Receptor	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4. Receptor	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

JOB: Figueroa St @ SR-134 EB Ramps
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

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     U=   1.0 M/S            Z0= 100. CM            ALT=   325. (M)
   BRG= WORST CASE           VD=  0.0 CM/S
  CLAS=     7 (G)            VS=  0.0 CM/S
  MIXH= 1000. M             AMB=  0.0 PPM
 SIGTH=    5. DEGREES      TEMP= 10.0 DEGREE (C)
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II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NB External	10	0	10	600	AG	815	2.5	0.0	12.9
B. NB Approach	10	600	10	755	AG	815	4.1	0.0	12.9
C. NB Depart	10	755	10	909	AG	585	4.1	0.0	12.9
D. NB External	10	909	10	1509	AG	585	2.5	0.0	12.9
E. NB Left	10	600	5	755	AG	0	4.1	0.0	12.9
F. SB Left	0	909	5	755	AG	115	4.1	0.0	12.9
G. SB External	0	1509	0	909	AG	600	2.5	0.0	12.9
H. SB Approach	0	909	0	755	AG	485	4.1	0.0	12.9
I. SB Depart	0	755	0	600	AG	980	4.1	0.0	12.9
J. SB External	0	600	0	0	AG	980	2.5	0.0	12.9
K. EB External	-750	750	-150	750	AG	0	2.5	0.0	12.2
L. EB Approach	-150	750	5	750	AG	0	4.1	0.0	12.2
M. EB Depart	5	750	160	750	AG	405	4.1	0.0	12.2
N. EB External	160	750	760	750	AG	405	2.5	0.0	12.2
O. WB External	760	759	160	759	AG	555	2.5	0.0	12.2
P. WB Approach	160	759	5	759	AG	60	4.1	0.0	12.2
Q. WB Depart	5	759	-150	759	AG	0	4.1	0.0	12.2
R. WB External	-150	759	-750	759	AG	0	2.5	0.0	12.2
S. EB Left	-150	750	5	755	AG	0	4.1	0.0	12.2
T. WB Left	160	759	5	755	AG	495	4.1	0.0	12.2

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION

JOB: Figueroa St @ SR-134 EB Ramps
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Receptor	-8	742	2.0
2. Receptor	18	742	2.0
3. Receptor	18	767	2.0
4. Receptor	-8	767	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	84.	0.6	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	353.	0.5	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1
3. Receptor	186.	0.6	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4. Receptor	174.	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
2. Receptor	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3. Receptor	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
4. Receptor	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0