

**AIR QUALITY CONFORMITY ASSESSMENT
TPM 34760 - RIVERSIDE CA**

Submitted to:

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EXECUTIVE SUMMARY

The findings contained within this *Air Quality Conformity Assessment* for the TPM 34760 project site indicate that no construction grading or operational air quality exceedances were identified for any criteria pollutant.¹ Further, VOC exceedances due to architectural coating application were found to be mitigated using low VOC paints. No adverse air basin impacts were identified.

Further, the proposed project would develop in accordance with the land use designation for the site and was found to be consistent with the proposed SCAG projections for growth in this area. The project therefore, satisfies the *Consistency Criterion* of the RAQS and would be consistent with *State Implementation Plan* (SIP) for all criteria pollutants under examination.



INTRODUCTION AND DEFINITIONS

Existing Site Characterization

The subject project site consists of approximately 65.4-acres divided amongst Assessor's Parcel Numbers (APN's) 114-040-019, 114-040-020, 275-100-003, and 275-100-004. The project site is partially situated in the City of Corona and the County of Riverside.² Regional access to the project site can be obtained from Ontario Avenue via Interstate 15 (I-15) to the east as is generally denoted in Figure 1 on the following page.

The project site is located south of the intersection of Shepard Crest Drive and Malaga Street and lies adjacent to the north border of the Cleveland National Forest as can be seen in Figure 2 on Page 3 of this report.

Existing Land uses and zoning adjacent to the project site include:

- o North: Single Family Residential, Estate Residential (E-R);
- o South: Cleveland National Forest;
- o East: Vacant, Estate Residential (E-R);
- o West: Vacant, Open Space (OS).

Currently the project site resides as an agricultural area, specifically an avocado grove. The current land use for the site is Agricultural and is zoned as *Hillside Development Overlay Rural Residential* (R-R). Onsite elevations on the site range from approximately 1,367 to 1,410 feet above mean sea level (MSL).

¹ Based upon the best available data for the site under consideration.

² The acreage breakdown between the City of Corona and the County of Riverside is 39.9-acres and 25.5-acres, respectively.

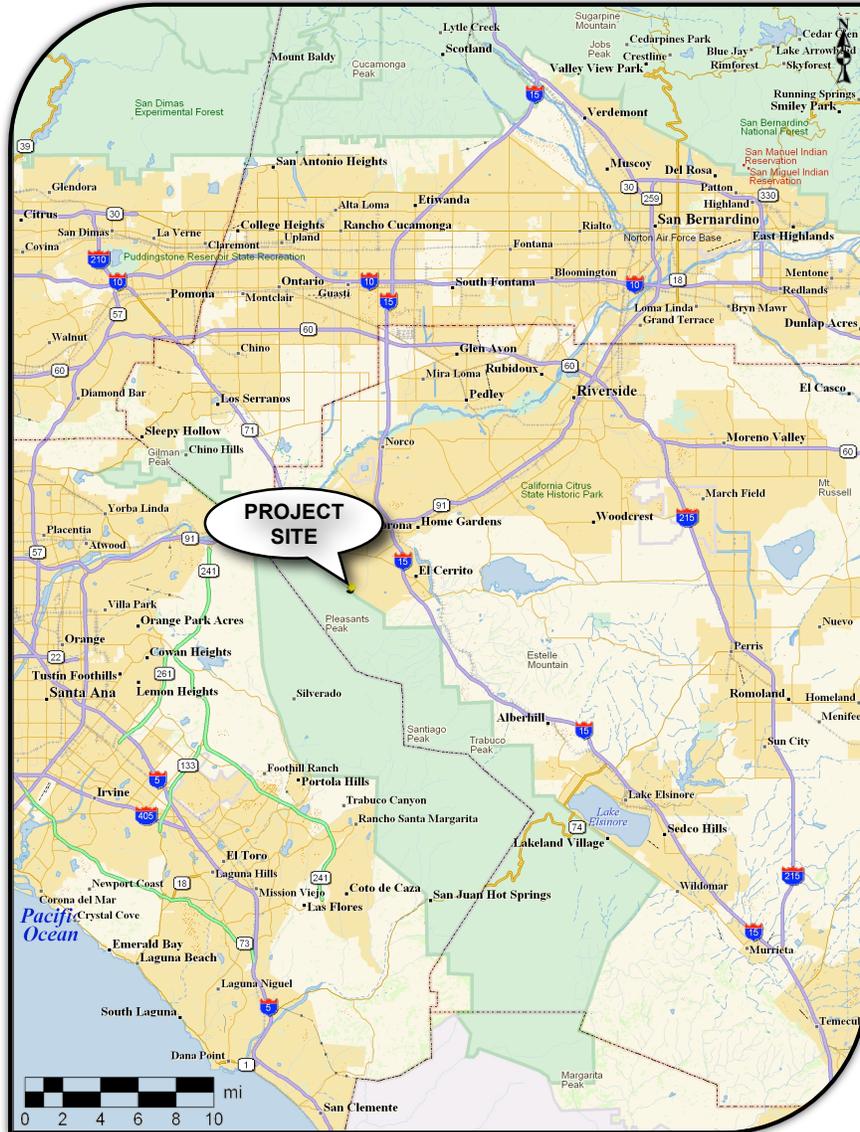


FIGURE 1: Project Vicinity Map (ISE 5/08)

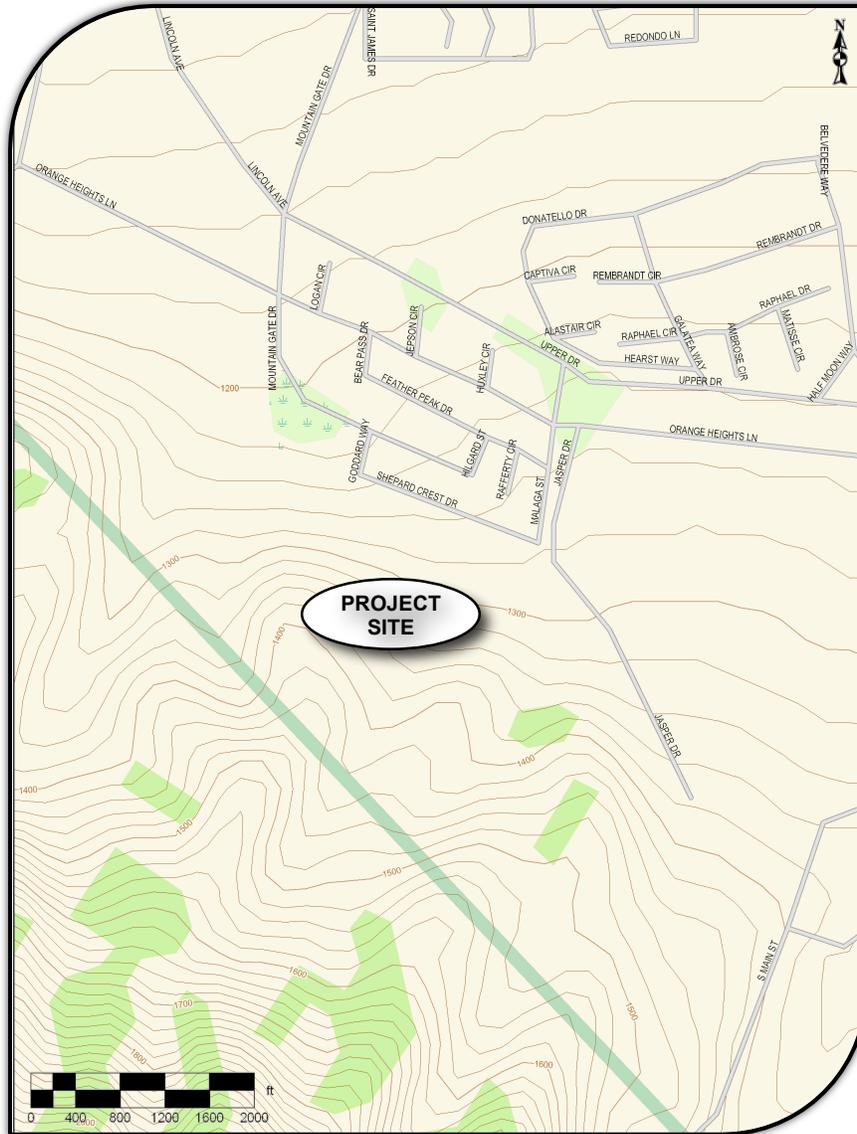


FIGURE 2: Project Site Location Map w/ Topography (ISE 5/08)

Project Description

The proposed TPM 34760 project includes the development of 34 lots on a total 65.4-acre site as can be seen in Figure 3 on Page 4 of this report. The average lot area will be approximately 20,100-square feet and each lot will include one residential dwelling. The project also proposes an annexation to be consistent in zoning with the Mountain Gate Specific Plan (SP-89-01).

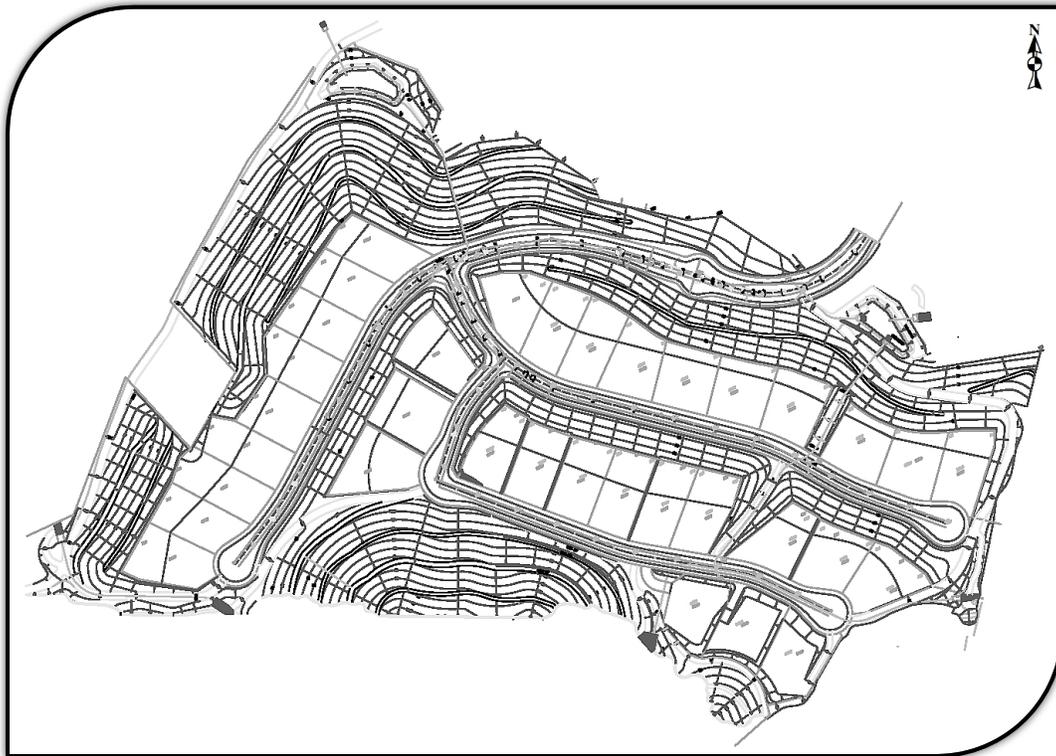


FIGURE 3: Proposed TPM 34760 (Armstrong & Brooks Consulting Engineers 6/07)

Air Quality Definitions

Air quality is defined by ambient air concentrations of specific pollutants determined by the Environmental Protection Agency (EPA) to be of concern with respect to the health and welfare of the public. The subject pollutants, which are monitored by the EPA, are Carbon Monoxide (CO), Sulfur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Ozone (O₃), respirable 10- and 2.5-micron particulate matter (PM₁₀), Volatile Organic Compounds (VOC), Reactive Organic Gasses (ROG), Hydrogen Sulfide (H₂S), sulfates, lead, and visibility reducing particles.

Examples of sources and effects of these pollutants are identified below:

- o Carbon Monoxide (CO): Carbon monoxide is a colorless, odorless, tasteless and toxic gas resulting from the incomplete combustion of fossil fuels. CO interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects. CO is a criteria air pollutant.
- o Oxides of Sulfur (SO_x): Typically strong smelling, colorless gases that are formed by the combustion of fossil fuels. SO₂ and other sulfur oxides contribute to the problem of acid deposition. SO₂ is a criteria pollutant.
- o Nitrogen Oxides (Oxides of Nitrogen, or NO_x): Nitrogen oxides (NO_x) consist of nitric oxide (NO), nitrogen dioxide (NO₂) and nitrous oxide (N₂O) and are formed when nitrogen (N₂) combines with oxygen (O₂). Their lifespan in the atmosphere ranges from one to seven days for nitric oxide and nitrogen dioxide, to 170 years for nitrous oxide. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO₂ is a criteria air pollutant, and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility.
- o Ozone (O₃): A strong smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy. Ozone exists in the upper atmosphere ozone layer as well as at the earth's surface. Ozone at the earth's surface causes numerous adverse health effects and is a criteria air pollutant. It is a major component of smog.
- o PM₁₀ (Particulate Matter less than 10 microns): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the lungs where they may be deposited, resulting in adverse health effects. PM₁₀ also causes visibility reduction and is a criteria air pollutant.
- o PM_{2.5} (Particulate Matter less than 2.5 microns): A similar air pollutant consisting of tiny solid or liquid particles which are 2.5 microns or smaller (which is often referred to as fine particles). These particles are formed in the atmosphere from primary gaseous emissions that include sulfates formed from SO₂ release from power plants and industrial facilities and nitrates that are formed from NO_x release from power plants, automobiles and other types of combustion sources. The chemical composition of fine particles highly depends on location, time of year, and weather conditions.
- o Volatile Organic Compounds (VOC): Volatile organic compounds are hydrocarbon compounds (any compound containing various combinations of hydrogen and carbon atoms) that exist in the ambient air. VOC's contribute to the formation of smog through atmospheric photochemical reactions and/or may be toxic. Compounds of carbon (also known as organic compounds) have different levels of reactivity; that is, they do not react at the same speed or do not form ozone to the same extent when exposed to photochemical processes. VOC's often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints. Exceptions to the VOC designation include: carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.
- o Reactive Organic Gasses (ROG): Similar to VOC, Reactive Organic Gasses (ROG) are also precursors in forming ozone and consist of compounds containing methane, ethane, propane, butane, and longer chain hydrocarbons which are typically the result of some type of combustion/decomposition process. Smog is formed when ROG and nitrogen oxides react in the presence of sunlight.

- Hydrogen Sulfide (H₂S): A colorless, flammable, poisonous compound having a characteristic rotten-egg odor. It often results when bacteria break down organic matter in the absence of oxygen. High concentrations of 500-800 ppm can be fatal and lower levels cause eye irritation and other respiratory effects.
- Sulfates: An inorganic ion that is generally naturally occurring and is one of several classifications of minerals containing positive sulfur ions bonded to negative oxygen ions.
- Lead: A malleable metallic element of bluish-white appearance that readily oxidizes to a grayish color. Lead is a toxic substance that can cause damage to the nervous system or blood cells. The use of lead in gasoline, paints, and plumbing compounds has been strictly regulated or eliminated such that today it poses a very small risk.
- Visibility Reducing Particles (VRP): VRP's are just what the name implies, namely, small particles that occlude visibility and or increase glare or haziness. Since sulfate emissions (notably SO₂) have been found to be a significant contributor to visibility-reducing particles, Congress mandated reductions in annual emissions of SO₂ from fossil fuels starting in 1995.

The EPA (under the Federal Clean Air Act of 1970, and amended in 1977) established ambient air quality standards for these pollutants. This standard is called the National Ambient Air Quality Standards (NAAQS). The California Air Resources Board (CARB) subsequently established the more stringent California Ambient Air Quality Standards (CAAQS).

Both sets of standards are shown in Figure 4 on the following page.³ Areas in California where ambient air concentrations of pollutants are higher than the state standard are considered to be in “non-attainment” status for that pollutant.



THRESHOLDS OF SIGNIFICANCE

California Environmental Quality Act (CEQA) Thresholds

Section 15382 of the California Environmental Quality Act (CEQA) guidelines defines a significant impact as,

“... a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.”

The minimum change in ambient air quality conditions within Riverside County as identified by the South Coast Air Quality Management District (SCAQMD) are outlined below in the following standards.

³ The new CARB eight-hour ozone standard became effective in early 2006. The new federal PM_{2.5} standard became effective in early 2007.

Pollutant	Averaging Time	California Standards		Federal Standards			
		Concentration	Method	Primary	Secondary	Method	
Ozone (O ₃)	1 Hour	0.09 ppm (180 µg/m ³)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry	
	8 Hour	0.070 ppm (137 µg/m ³)		0.08 ppm (157 µg/m ³)			
Respirable Particulate Matter (PM ₁₀)	24 Hour	50 µg/m ³	Gravimetric or Beta Attenuation	150 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis	
	Annual Arithmetic Mean	20 µg/m ³		—			
Fine Particulate Matter (PM _{2.5})	24 Hour	No Separate State Standard		35 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis	
	Annual Arithmetic Mean	12 µg/m ³	Gravimetric or Beta Attenuation	15 µg/m ³			
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m ³)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m ³)	None	Non-Dispersive Infrared Photometry (NDIR)	
	1 Hour	20 ppm (23 mg/m ³)		35 ppm (40 mg/m ³)			
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m ³)		—			
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.030 ppm (56 µg/m ³)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m ³)	Same as Primary Standard	Gas Phase Chemiluminescence	
	1 Hour	0.18 ppm (338 µg/m ³)		—			
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m ³)	—	Spectrophotometry (Pararosaniline Method)	
	24 Hour	0.04 ppm (105 µg/m ³)		0.14 ppm (365 µg/m ³)			
	3 Hour	—		—			0.5 ppm (1300 µg/m ³)
	1 Hour	0.25 ppm (655 µg/m ³)		—			—
Lead	30 Day Average	1.5 µg/m ³	Atomic Absorption	—	—	—	
	Calendar Quarter	—		1.5 µg/m ³			Same as Primary Standard
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards			
Sulfates	24 Hour	25 µg/m ³	Ion Chromatography				
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m ³)	Ultraviolet Fluorescence				
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m ³)	Gas Chromatography				

FIGURE 4: Ambient Air Quality Standards Matrix (after CARB/EPA, updated 2/22/07)

CEQA Air Quality Screening Standards

In the absence of formally adopted thresholds, the City of Corona and the County of Riverside uses Appendix G.III of the State CEQA guidelines as thresholds of significance and recognizes the SCAQMD's established screening thresholds for air quality emissions as screening standards. These standards focus on the following potential impact areas, namely, would the project:

- 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 is a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?
- d) Expose sensitive receptors to substantial pollutant concentrations?

- e) Create objectionable odors affecting a substantial number of people?

These screening standards will be applied throughout this air quality conformity assessment for the basis of determination of both regional as well as localized air quality impacts due to the proposed project.

South Coast AQMD Screening Standards

The South Coast Air Quality Management District (SCAQMD) establishes significance criteria for air quality emissions.⁴ The aggregate project-related maximum levels are shown quantitatively in Table 1 below. These standards are compatible with those utilized elsewhere in the State and are currently enforced within the City of Corona and the County of Riverside. For Projects whose stationary-source emissions are below these criteria, no AQIA is typically required, and project level emissions are presumed to be less than significant.

TABLE 1: Thresholds of Significance for Air Quality Impacts - SCAQMD

Pollutant	Operational Thresholds of Significance (Pounds per Day)	Construction Thresholds of Significance (Pounds per Day)	Clean Air Act <i>less than</i> significant Levels (Tons per Year)
Carbon Monoxide (CO)	550	550	100
Oxides of Sulfur (SO _x)	150	150	100
Volatile / Reactive Organic Compounds & Gasses (VOC/ROG)	55	75	50
Oxides of Nitrogen (NO _x)	55	100	50
Particulate Matter (PM ₁₀)	150	150	100
Particulate Matter (PM _{2.5})	55	55	100

Source: SCAQMD CEQA Air Quality Handbook, 1993, 1998, 2002

The PM_{2.5} threshold is based upon the proposed standard identified in the, "Final – Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds", published by SCAQMD in October 2006.

In the event that project emissions may approach or exceed these screening level criteria, modeling would be required to demonstrate that the project’s ground-level concentrations, including appropriate background levels, are below the Federal and State Ambient Air Quality Standards (i.e., the NAAQS and CAAQS standards).

The existing ambient conditions are compared for the with- and without project cases. If emissions exceed the allowable thresholds, additional analysis is conducted to determine whether the emissions would exceed an ambient air quality standard (i.e., the CAAQS values previously shown in Figure 4). Determination of significance considers both localized impacts (such as CO hotspots) and cumulative impacts. In the event that

⁴ Source: South Coast AQMD, Regulation XIII, Rule 1303, et. seq., amended 2/26/01; CEQA Air Quality Handbook, 1993, 1998, 2002.

any criteria pollutant exceeds the threshold levels, the proposed action's impact on air quality are considered significant and mitigation measures would be required.

Finally, under the General Conformity Rule, the EPA has developed a set of *de minimis* thresholds for all proposed federal actions in a non-attainment area for evaluating the significance of air quality impacts. It should be noted that the State (i.e., SCAQMD) standards are equal to, or more stringent than, the Federal Clean Air standards.⁵ Development of the proposed project would therefore fall under the stricter SCAQMD guidelines.

Combustion Toxics Risk Factors

When fuel burns in an engine, the resulting exhaust is made up of soot and gases representing hundreds of different chemical substances. The predominant constituents are:

- o Nitrous Oxide
- o Formaldehyde
- o Sulfur Dioxide
- o Carbon Dioxide
- o Nitrogen Dioxide
- o Benzene
- o Hydrogen Sulfide
- o Carbon Monoxide

Over ninety-percent (90%) of the exhaust emissions from an engine consist of soot particles whose size is equal to, or less than, 10-microns in diameter. Particles of this size can easily be inhaled and deposited in the lungs. Diesel exhaust contains roughly 20-100 times more emissive particles than gasoline exhaust. Of principal concern are particles of cancer causing substances known as *polynuclear aromatic hydrocarbons* (PAH)'s.⁶

There are inherent uncertainties in risk assessment with regard to the identification of compounds as causing cancer or other health effects in humans, the cancer potencies and Reference Exposure Levels (RELs)⁷ of compounds, and the exposure that individuals receive. It is common practice to use conservative (health protective) assumptions with respect to uncertain parameters. The uncertainties and conservative assumptions must be considered when evaluating the results of risk assessments.

Since the potential health effects of contaminants are commonly identified based on animal studies, there is uncertainty in the application of these findings to humans. In addition, for many compounds it is uncertain whether the health effects observed at higher exposure levels in the laboratory or in occupational settings will occur at lower environmental exposure levels. In order to ensure that potential health impacts are not

⁵ A fact that can be verified through multiplication of the SCAQMD standards by 365 days and dividing by 2,000 pounds.

⁶ PAH's are a group of approximately 10,000 compounds which result predominately from the incomplete burning of carbon-containing materials like oil, wood, garbage or coal.

⁷ The exposure level at which there are no biologically significant increases in the frequency or severity of adverse effect between the exposed population and the control group. Some effects may be produced at this level, but they are not considered adverse or precursors of adverse effects.

underestimated, it is commonly assumed that effects seen in animals or at high exposure levels could potentially occur in humans following low-level environmental exposure.

Estimates of potencies and RELs are derived from experimental animal studies or from epidemiological studies of exposed workers or other populations.⁸ Uncertainty arises from the application of potency or REL values derived from this data to the general human population. There is debate as to the appropriate levels of risk assigned to diesel particulates since the USEPA has not yet declared diesel particulates as a toxic air contaminant.

Using the CARB threshold, a risk concentration level of one in one million (1:1,000,000) of continuous 70-year exposure is considered less than significant. A risk exposure level of ten in one million (10:1,000,000) is acceptable if *Toxic Best Available Control Technologies* (T-BACT's) are used.⁹

For purposes of analysis under this report, and to be consistent with the approaches used for other toxic pollutants, a functional comparison of the aforementioned risk probability per individual person exposed to construction contaminants will be examined. This approach has the advantage of not needing to quantify the population of the statistical group adjacent to the construction (which could yield false values) as well as allowing the per-person risk to be expressed as a final percentage (with a percentage level of 100% being equal to the impact threshold). Of course, for a large enough population sample (i.e., a million people or more) the results are the same as CARB's predictions.



ANALYSIS METHODOLOGY

The analysis criteria for air quality impacts are based upon the approach recommended by the *South Coast Air Quality Management District's (SCAQMD) CEQA Handbook*.¹⁰ The handbook establishes aggregate emission calculations for determining the potential significance of a proposed action. In the event that the emissions exceed the established thresholds, air dispersion modeling may be conducted to assess whether the proposed action results in an exceedance of an air quality standard. The City of Corona and County of Riverside have adopted this methodology.

⁸ Source: *CalEPA, USEPA, SCAQMD, 2001 et. seq.*

⁹ It should be noted that this type of reporting is only strictly applicable to large populations (such as entire air basins) where the sample group is sizeable and the exposure time is long (which is not the case for project-level construction projects).

¹⁰ The SCAQMD CEQA Handbook is a reference volume containing an extensive list of semi-empirical (quantified experimental) curve-fit equations describing various emissive sources having important context under CEQA. The equations are not perfect (in that they would not constitute an 'exact solution' in a scientific sense), but are nonetheless a reasonable approximation of the physical problem. In the same light, programs which utilize the SCAQMD semi-empirical methodology (such as *URBEMIS 2007* and the like) provide no greater problem understanding than using the equations directly. Such programs are still subject to all of the same limitations as the methods and equations on which they rely.

Ambient Air Quality Data Collection

The California Air Resources Board (CARB) monitors ambient air quality at approximately 250 air-monitoring stations across the state (representatively shown below as small red dots in Figure 5 on the following page). Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. Ambient air pollutant concentrations are measured at 19 air-quality-monitoring stations currently operated by the SCAQMD.

Two air-quality-monitoring stations providing a complete dataset are located approximately 6.2 miles from the proposed project site (i.e., the Norco-Norconian Station¹¹), and approximately 15.1 miles from the project site (i.e., the Riverside Rubidoux Station¹²). Due to the type of equipment employed at each station, not every station is capable of recording the entire set of criteria pollutants identified in Table 1; hence, other stations within the project vicinity either present redundant data or was determined not to be representative of localized ambient air quality conditions present at the project site.

The Norco station currently records only PM₁₀ while the Riverside Rubidoux station records a larger dataset consisting of CO, SO₂, NO₂, O₃, PM₁₀, TEOM_{PM10}, BAM_{PM2.5}, PM_{2.5}, TSP, Toxics, Cr⁶⁺, Dioxin, Outdoor Temperature, Relative Humidity, Wind Direction, Horizontal Wind Speed, Barometric Pressure, and Solar Radiation.¹³ Periodic audits of these stations are conducted to ensure calibration conformance.¹⁴

Construction Air Quality Modeling

Construction Vehicle Emission Modeling (CO, NO_x, SO_x, PM₁₀, PM_{2.5}, ROG)

Construction vehicle pollutant emission generators would consist primarily of haul truck activities such as earthwork haulage, concrete delivery and other suppliers, graders and pavers, contractor vehicles, and ancillary operating equipment such as diesel-electric generators and lifts. The analysis methodology utilized in this report is based upon the SCAQMD CEQA Handbook guidelines for construction operations.¹⁵ Construction emissions were based upon the EPA AP-42 Report generation rates identified by SCAQMD for the various classes of diesel construction equipment.

¹¹ Norco-Norconian Station (USNFAC Norco, Norco CA 92860) – ARB Station ID 33155.

¹² Riverside Rubidoux Station (5888 Mission Blvd., Riverside CA 92509) – ARB Station ID 33144.

¹³ TEOM = Tapered Element Oscillating Microbalance, BAM = Beta Attenuation Mass monitoring, TSP = Total Suspended Particulates, CR⁶⁺ = Chromium Metal (ionic).

¹⁴ Calibration of CARB equipment is performed in accordance with the U.S. Environmental Protection Agency's 40 CFR, Part 58, Appendix A protocol with all equipment traceable to National Institute of Standards and Technology (NIST) standards. The typical accuracy of the equipment is ±15% for gasses (such as CO, NO_x, etc.) and ±10% for PM₁₀.

¹⁵ This tabulation provided by the EPA is the foundation of all construction emission programs available by CARB such as *OFFROAD* and the like.

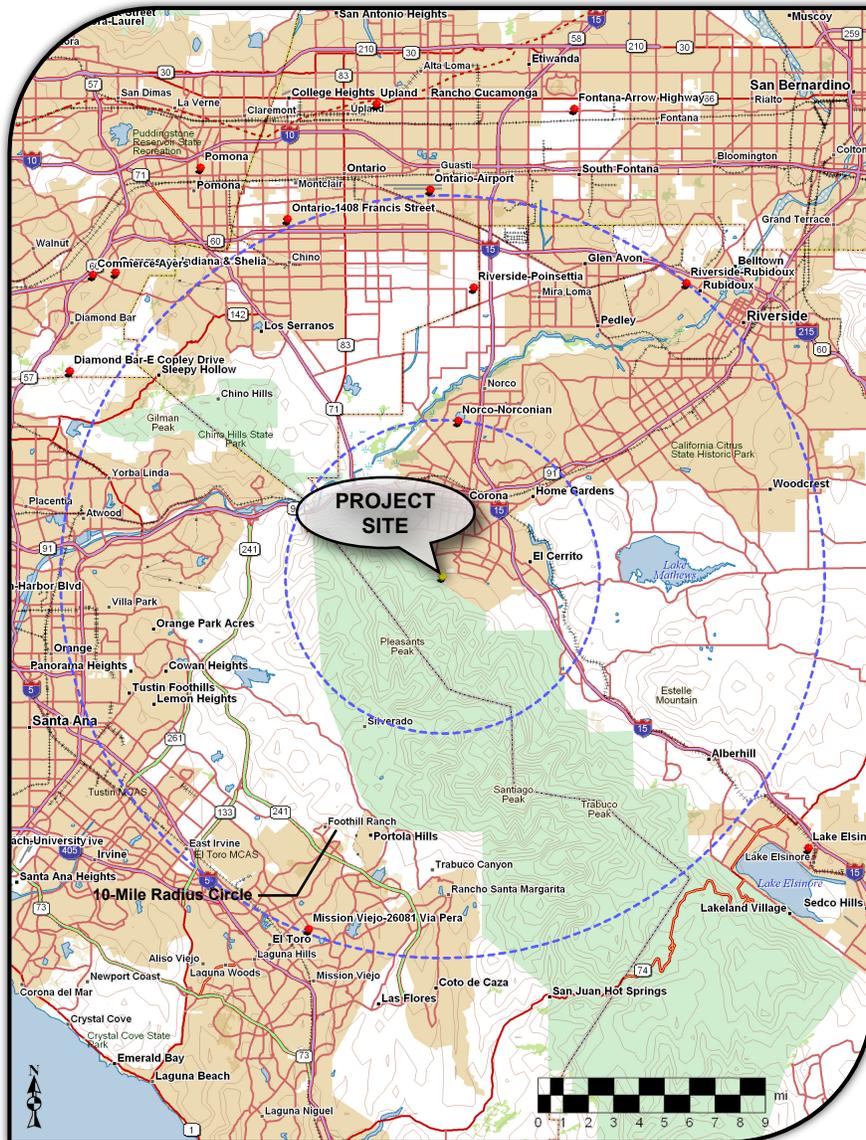


FIGURE 5: Ambient Air Quality Monitoring Station Location Map (ISE 5/08)

The generation rates are identified in Table 2 on the following page. Estimates of daily load factors (i.e., the amount of time during a day that any piece of equipment is under load) were based upon past ISE engineering experience of similar operations and consultation with the project applicant.

TABLE 2: Construction Equipment Pollutant Generation Levels by Class

Equipment Class	Generation Rates (pounds per horsepower-hour)					
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	ROG
Track Backhoe	0.0150	0.0220	0.0020	0.0010	0.0009	0.0030
Dozer - D8 Cat	0.0150	0.0220	0.0020	0.0010	0.0009	0.0030
Hydraulic Crane	0.0090	0.0230	0.0020	0.0015	0.0014	0.0030
Loader/Grader	0.0150	0.0220	0.0020	0.0010	0.0009	0.0030
Side Boom	0.0130	0.0310	0.0020	0.0015	0.0014	0.0030
Water Truck	0.0060	0.0210	0.0020	0.0015	0.0014	0.0020
Welding Rig	0.0110	0.0180	0.0020	0.0010	0.0009	0.0020
Concrete Truck	0.0060	0.0210	0.0020	0.0015	0.0014	0.0020
Concrete Pump	0.0110	0.0180	0.0020	0.0010	0.0009	0.0020
Dump/Haul Trucks	0.0060	0.0210	0.0020	0.0015	0.0014	0.0020
Paver	0.0070	0.0230	0.0020	0.0010	0.0009	0.0010
Roller	0.0070	0.0200	0.0020	0.0010	0.0009	0.0020
Scraper	0.0110	0.0190	0.0020	0.0015	0.0014	0.0010

Source:

U.S. EPA AP-42 "Compilation of Air Pollutant Emission Factors", 9/85. Ratings shown for full (100%) load factor.

The PM_{2.5} emission factors are based upon the methodology proposed in the SCAQMD document, "Final – Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds", 10/06. The correction factor for diesel equipment of this type is 0.920.

Fine particulate dust generation (PM_{2.5}) from construction equipment was analyzed using the methodology identified in the SCAQMD document entitled, "Methodology to Calculate Particulate Matter (PM) 2.5 and PM_{2.5} Significance Thresholds". This approach, which utilizes the California Emission Inventory Development and Reporting System (CEIDARS) database, estimates PM_{2.5} emissions as a fractional percentage of the aggregate PM₁₀ emissions. For diesel construction equipment, the fractional emission factor is 0.920 PM_{2.5} / PM₁₀.

Fugitive Dust Emission Modeling (PM₁₀, PM_{2.5})

Fugitive dust generation from the proposed grading plan was analyzed using the methodology recommended in the SCAQMD CEQA Handbook guidelines for calculating 10-micron Particulate Matter (PM₁₀) due to earthwork. The analysis assumed low-wind speeds and active wet suppression control. Aggregate levels of PM₁₀ based upon the best available surface grading estimates were calculated in pounds per day and compared to the applicable significance criteria shown in Table 1 above.

For surface grading operations, the fractional emission factor is 0.208 PM_{2.5} / PM₁₀ based upon the SCAQMD approach. For unpaved road travel, the fractional emission factor is 0.212 PM_{2.5} / PM₁₀.

Combustion-Fired Health-Risk Emission Modeling (CO, NO_x, SO_x, PM₁₀, PM_{2.5})

For the purposes of this analysis, construction vehicle pollutant emission generators would consist entirely of construction activities associated with rough-grading operations (which is the worst-case pollution emission scenario). The analysis

methodology utilized in this report is based upon the SCAQMD CEQA Handbook guidelines for construction operations. Construction emissions were based upon the EPA AP-42 Report generation rates identified by SCAQMD for the various classes of diesel construction equipment.

A screening risk assessment of diesel-fired toxics from construction equipment was performed using the *SCREEN3* dispersion model developed by the EPA's Office of Air Quality Planning and Standards. The *SCREEN3* model uses a Gaussian plume dispersion algorithm that incorporates source-related and meteorological factors to estimate pollutant concentration from continuous sources.

It is assumed for this type of analysis that the pollutant does not undergo any chemical reactions, and that no other removal processes, such as wet or dry deposition, act on the plume during its transport from the source.¹⁶ Using the concentrations obtained from the screening model, the diesel toxic risk can be defined as below:

$$Risk = \frac{F_{wind} \times EMFAC \times URF_{70\text{-year exposure}}}{Dilution}$$

- where,
- Risk* is the excess cancer risk (probability in one-million);
 - F_{wind} is the frequency of the wind blowing from the exhaust source to the receptor (the default value is 1.0);
 - EMFAC* is the exhaust particulate emission factor (the level from the screening model);
 - $URF_{70\text{ year exposure}}$ is the Air Resource Board unit risk probability factor (300×10^{-6} , or 300 in a million cancer risk per $\mu\text{g}/\text{m}^3$ of diesel combustion generated PM_{10} inhaled in a 70-year lifetime based upon *ARB 1999 Staff Report from the Scientific Review Panel (SRP) on Diesel Toxics*); and,
 - Dilution* is the atmospheric dilution ratio during source-to-receptor transport (the default value of 1.0 assumes no dilution)

Given the above assumptions for wind frequency and atmospheric dilution ratio, and substituting the CARB recommended value for the unit risk probability factor gives the following expression:

$$Risk = 300 \times 10^{-6} \times EMFAC \text{ per person}$$

Thus, the percentage of risk of cancer to any given person being exposed to a concentration of pollution equal to *EMFAC* (in $\mu\text{g}/\text{m}^3$) over a continuous period of 70-years would be:

$$Risk(\%) = (300 \times 10^{-6} \times EMFAC) \times 100 = 300 \times 10^{-4} \times EMFAC \text{ per person}$$

¹⁶ The methodology is based upon the *Industrial Source Complex (ISC3)* source dispersion approach as outlined in the *EPA-454/B-95-003b* technical document. This model is used within the State of California and is typically more restrictive than the *ISC3* model.

Where it can be directly stated that a risk percentage of, say, 25% would indicate a 25% probability of inhaled cancer risk for the given level of exposure if consumed continuously for a period of 70-years. A 50% probability would correspond to a 50:50 chance of inhaled cancer risk if consumed continuously for a period of 70-years, and so on.

For the construction-related diesel-fired toxics analysis presented within this report, an area-source consistent in dimensions with the proposed grading area will be assumed. A simplified elevated terrain model (which is consistent with the area surrounding the project site) with no building downwash corrections and a worst-case wind direction was utilized.

VOC Emissions from Architectural Coatings Methodology

Volatile Organic Compound (VOC) emissions from architectural coatings such as painting will be analyzed within this report using the *SCAQMD CEQA Handbook Method A11-13* based upon the maximum total square-footage being painted per day. It will be assumed for the purposes of this assessment that all solvents used are water based with a maximum 50-percent by weight solids content and are capable of generating the maximum CARB level of 250 grams of VOC per liter regardless of the application method.

Aggregate Vehicle Emission Air Quality Modeling

Motor vehicles emissions associated with proposed future development were calculated by multiplying the appropriate emission factor (in grams per mile) times the estimated trip length and the total number of vehicles. Appropriate conversion factors were then applied to provide aggregate emission units of pounds per day. CARB estimates on-road motor vehicle emissions by using a series of models called the *Motor Vehicle Emission Inventory (MVEI) Models*.

Four computer models, which form the MVEI, are *CALIMFAC*, *WEIGHT*, *EMFAC*, and *BURDEN*.¹⁷ They function as follows:

- o The *CALIMFAC* model produces base emission rates for each model year when a vehicle is new and as it accumulates mileage and the emission controls deteriorate.
- o The *WEIGHT* model calculates the relative weighting each model year should be given in the total inventory, and each model year's accumulated mileage.
- o The *EMFAC* model uses these pieces of information, along with the correction factors and other data, to produce fleet composite emission factors.
- o Finally, the *BURDEN* model combines the emission factors with county-specific activity data to produce to emission inventories.

¹⁷ The module named *EMFAC* should not be confused with the entire *EMFAC 2007* program itself (which calls the subroutines *CALIMFAC*, *WEIGHT*, *EMFAC*, and *BURDEN* to determine the final emission inventory for a particular area).

For the current analysis, the *EMFAC 2007 Model v2.3* of the MVEI¹⁸ was run using input conditions specific to the Riverside County air basin to predict vehicle emissions based upon the estimated year 2010 project completion date. The aggregate emission factors from the CARB *EMFAC 2007* model are provided as an attachment at the end of this report.

A mix ratio consistent with the Caltrans ITS Transportation Project-Level Carbon Monoxide Protocol was used. This consisted of the following air standard Otto-Cycle engine vehicle distribution percentages:

Light Duty Autos = 69.0	Light Duty Trucks = 19.4
Medium Duty Trucks = 6.4	Heavy Duty Trucks = 4.7
Buses = 0.0	Motorcycles = 0.5

Fine particulate dust generation ($PM_{2.5}$) from motor vehicle internal combustion engine operation was analyzed using the methodology identified by SCAQMD.¹⁹ This approach, which utilizes the *California Emission Inventory Development and Reporting System* (CEIDARS) database, estimates $PM_{2.5}$ emissions as a fractional percentage of the aggregate PM_{10} emissions. For operational vehicular traffic, the fractional emission factor is $0.998 PM_{2.5} / PM_{10}$ based upon the SCAQMD approach.

Fixed Source Emissions Modeling

Fixed emission sources under the CEQA analysis context within this report would consist entirely of small gasoline engines used with landscaping equipment as well as emissive sources from natural gas powered appliances (such as hot water heaters, and stoves). An analysis of these small emission sources, consistent with the *SCAQMD CEQA Handbook* and current EPA protocols, will be quantified on a per unit basis²⁰ with the total aggregate emission levels identified at the end of this report.²¹



FINDINGS

Existing Climate Conditions

The climate of within the City of Corona is characterized by warm, dry summers and mild, wet winters and is dominated by a semi-permanent high-pressure cell located over the Pacific Ocean. This high-pressure cell maintains clear skies over the air basin for much of the year (refer to Figure 6 on Page 18 of this report). It also drives the dominated onshore

¹⁸ This is the most current CARB emissions model approved for use within the State of California.

¹⁹ This is detailed in the document entitled, "*Final Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Thresholds*", published by SCAQMD.

²⁰ This could be either a residential or a commercial facility depending on the use.

²¹ The analysis presented herein uses the same methodology identified in the CARB *URBEMIS* model, although providing a greater level of detail. The technical details are provided in the SCAQMD CEQA Handbook Tables A9-12 and A9-12A, -B as well as the EPA's AP-42 emission generation document previously referenced.

circulation and helps to create two types of temperature inversions, subsidence and radiation, that contribute to local air quality degradation.

Subsidence inversions occur during the warmer months, as descending air associated with the Pacific high-pressure cell meets cool marine air. The boundary between the two layers of air represents a temperature inversion that traps pollutants below it. Radiation inversion typically develops on winter nights, when air near the ground cools by radiation, and the air aloft remains warm. A shallow inversion layer that can trap pollutants is formed between the two layers.

Occasionally during the months of October through February, offshore flow becomes a dominant factor in the regional air quality. These periods, known as the so-called “*Santa Ana Conditions*”, are typically maximal during the month of December with wind speeds from the north to east approaching 35 knots and gusting to over 50 knots. Air movement observed during a *Santa Ana Condition* is caused by clockwise pressure circulation over the Great Basin (i.e., the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah), which results in significant downward air motion towards the ocean. Stronger Santa Ana winds can have gusts greater than 60 knots over widespread areas and gusts greater than 100 knots in canyon areas. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of onshore sea breezes. The overall result is a noticeable degradation in local air quality.

Finally, in the area of the proposed project site, the maximum and minimum average temperatures are 93° F and 40° F, respectively.²² Precipitation in the area averages 12.0 inches annually, 90 percent of which falls between November and April. The prevailing wind direction is from the west-northwest, with an annual mean speed of three to six miles per hour. Sunshine is usually plentiful in the proposed project area but night and morning cloudiness is common during the spring and summer. Fog can occur occasionally during the winter.

²² Source: National Weather Service (NWS) / National Oceanographic and Atmospheric Administration (NOAA), 2008.



FIGURE 6: Project Air Basin Aerial Map (Google Earth 2008, ISE 5/08)

Existing Air Quality Levels

Tables 3a through -h below provides a summary of the highest pollutant levels recorded at the previously identified monitoring stations for the last year available (2007) based upon the latest data from the CARB Aerometric Data Analysis and Management (ADAM) System database.

TABLE 3a: Norco Monitoring Station – Maximum Daily PM₁₀ Levels

Air Resources Board						
Highest 4 Daily PM10 Measurements						
Norco-Norconian						
Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Nov 6	79.0	Oct 26	74.0	Oct 21	332.0
Second High:	Apr 16	64.0	Nov 7	71.0	Apr 12	93.0
Thirld High:	Oct 7	59.0	Nov 1	67.0	Jul 5	92.0
Fourth High:	Jan 22	57.0	Feb 10	66.0	Oct 27	87.0
California:						
First High:	Nov 6	78.0	Oct 26	73.0	Apr 12	91.0
Second High:	Apr 16	63.0	Nov 7	70.0	Mar 7	71.0
Thirld High:	Oct 7	58.0	Nov 1	66.0	Jan 24	53.0
Fourth High:	Jan 22	56.0	Feb 10	64.0	Apr 30	49.0
Measured:						
# Days Above Nat'l Standard:	0		0		1	
# Days Above State Standard:	5		10		3	
Estimated:						
3-Yr Avg # Days Above Nat'l Std:	0.0		0.0		2.0	
# Days Above Nat'l Standard:	0.0		0.0		6.1	
# Days Above State Standard:	32.2		*		*	
State 3-Yr Maximum Average:	40		37		31	
State Annual Average:	31.0		*		*	
National 3-Year Average:	37		35		38	
National Annual Average:	31.6		36.6		44.3	
Year Coverage:	95		92		98	
Go Backward One Year		New Top 4 Summary			Go Forward One Year	
<p>Notes: All concentrations are expressed in micrograms per cubic meter. The national annual average PM10 standard was revoked in December 2006 and is no longer in effect. Statistics related to the revoked standard are shown in italics or italics. State exceedances are shown in yellow. National exceedances are shown in orange. An exceedance is not necessarily a violation. Statistics may include data that are related to an exceptional event. State and national statistics may differ for the following reasons: State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers. State statistics for 1998 and later are based on <i>local</i> conditions (except for sites in the South Coast Air Basin, where State statistics for 2002 and later are based on <i>local</i> conditions). National statistics are based on <i>standard</i> conditions. State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria. Measurements are usually collected every six days. Measured days counts the days that a measurement was greater than the level of the standard; Estimated days mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored. 3-Year statistics represent the listed year and the 2 years before the listed year. Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid. * There was insufficient (or no) data available to determine the value.</p>						

Source: CARB ADAM Ambient Air Quality Inventory – 5/08

TABLE 3b: Riverside-Rubidoux Monitoring Station – Maximum Hourly O₃ Levels

Air Resources Board						
Highest 4 Daily Maximum Hourly Ozone Measurements						
Riverside-Rubidoux						
FAQs						
Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	May 22	0.144	Jun 3	0.151	Sep 1	0.131
Second High:	Jul 17	0.134	Jul 22	0.146	Aug 31	0.126
Third High:	Jul 16	0.130	Jul 21	0.134	Aug 12	0.123
Fourth High:	May 15	0.123	Jun 4	0.132	Jul 2	0.120
# Days Above State Standard:	46		45		31	
California Designation Value:	0.15		0.14		0.14	
Expected Peak Day Conc.:	0.149		0.141		0.137	
# Days Above Nat'l Standard:	3		8		2	
National Design Value:	0.157		0.141		0.134	
Year Coverage:	94		99		98	
Go Backward One Year		New Top 4 Summary			Go Forward One Year	
<p>Notes: All concentrations are expressed in parts per million. The national 1-hour ozone standard was revoked in June 2005 and is no longer in effect. Statistics related to the revoked standard are shown in blue or orange. State exceedances are shown in yellow. Exceedances of the revoked national 1-hour standard are shown in orange. An exceedance is not necessarily a violation. Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. * There was insufficient (or no) data available to determine the value.</p>						

Source: CARB ADAM Ambient Air Quality Inventory – 5/08

TABLE 3c: Riverside-Rubidoux Monitoring Station – Maximum Eight-Hour O₃ Levels

Air Resources Board						
Highest 4 Daily Maximum 8-Hour Ozone Averages						
Riverside-Rubidoux						
FAQs						
Year:	2005		2006		2007	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National:						
First High:	May 22	0.129	Jul 1	0.117	Jul 2	0.111
Second High:	May 15	0.107	Jun 3	0.114	Sep 1	0.108
Third High:	Jul 17	0.107	Jun 4	0.113	Jul 4	0.098
Fourth High:	Aug 21	0.106	Jul 22	0.112	Jul 5	0.099
California:						
First High:	May 22	0.129	Jul 1	0.117	Jul 2	0.111
Second High:	Jul 17	0.108	Jun 3	0.114	Sep 1	0.108
Third High:	May 15	0.107	Jun 4	0.114	Jul 4	0.100
Fourth High:	Aug 21	0.107	Jul 22	0.112	Jul 5	0.100
National:						
# Days Above Nat'l 1997 Std.:	32		30		17	
Nat'l 1997 Std. Design Value:	0.112		0.109		0.105	
National Year Coverage:	95		99		99	
California:						
# Days Above State Standard:	83		75		69	
California Designation Value:	0.133		0.117		0.117	
Expected Peak Day Conc.:	0.133		0.127		0.123	
California Year Coverage:	94		99		98	
Go Backward One Year		New Top 4 Summary			Go Forward One Year	
<p>Notes: All averages are expressed in parts per million. National exceedances are shown in orange. State exceedances are shown in yellow. An exceedance is not necessarily a violation. Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. * There was insufficient (or no) data available to determine the value.</p>						

Source: CARB ADAM Ambient Air Quality Inventory – 5/08

TABLE 3d: Riverside-Rubidoux Monitoring Station – Maximum Daily PM₁₀ Levels

Year:		2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement	
National:							
First High:	Oct 22	123.0	Sep 29	109.0	Oct 21	559.0	
Second High:	Nov 30	98.0	May 11	101.0	Mar 16	118.0	
Third High:	Apr 16	96.0	May 17	100.0	Jul 5	117.0	
Fourth High:	Oct 7	92.0	Jul 22	100.0	Oct 27	111.0	
California:							
First High:	Oct 22	119.0	Sep 29	106.0	Mar 16	114.0	
Second High:	Nov 30	95.0	May 11	97.0	Apr 12	104.0	
Third High:	Apr 16	93.0	May 17	97.0	Jun 29	84.0	
Fourth High:	Oct 7	89.0	Jul 22	97.0	May 18	83.0	
Measured:							
# Days Above Nat'l Standard:	0		0		1		
# Days Above State Standard:	67		69		31		
Estimated:							
3-Yr Avg # Days Above Nat'l Std:	2.0		0.0		1.0		
# Days Above Nat'l Standard:	0.0		0.0		3.1		
# Days Above State Standard:	198.2		213.7		*		
State 3-Yr Maximum Average:	55		53		53		
State Annual Average:	50.4		52.7		*		
National 3-Year Average:	54		54		55		
National Annual Average:	51.8		55.1		59.5		
Year Coverage:	100		100		100		
		Go Backward One Year		New Top 4 Summary		Go Forward One Year	

Notes: All concentrations are expressed in micrograms per cubic meter.
 The national annual average PM₁₀ standard was revoked in December 2006 and is no longer in effect.
 Statistics related to the revoked standard are shown in *italics* or *italics*.
 State exceedances are shown in **yellow**. National exceedances are shown in **orange**.
 An exceedance is not necessarily a violation.
 Statistics may include data that are related to an exceptional event.
 State and national statistics may differ for the following reasons:
 State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods.
 State and national statistics may therefore be based on different samplers.
 State statistics for 1998 and later are based on *local* conditions (except for sites in the South Coast Air Basin, where State statistics for 2002 and later are based on *local* conditions).
 National statistics are based on *standard* conditions.
 State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
 Measurements are usually collected every six days. Measured days counts the days that a measurement was greater than the level of the standard; Estimated days mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored.
 3-Year statistics represent the listed year and the 2 years before the listed year.
 Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
 * There was insufficient (or no) data available to determine the value.

Source: CARB ADAM Ambient Air Quality Inventory – 5/08

TABLE 3e: Riverside-Rubidoux Monitoring Station – Maximum Daily PM_{2.5} Levels

Air Resources Board						
Highest 4 Daily PM _{2.5} Measurements						
Riverside-Rubidoux						
FAQs						
Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Oct 22	98.7	Dec 31	68.4	Mar 16	54.3
Second High:	Oct 23	95.9	Feb 4	60.7	May 18	53.5
Third High:	Oct 21	82.1	May 11	57.7	May 19	49.6
Fourth High:	Jul 5	79.8	May 1	57.2	Jul 5	48.9
California:						
First High:	Oct 22	98.7	Dec 31	68.4	Mar 16	54.3
Second High:	Oct 23	95.9	Feb 4	62.2	May 18	53.5
Third High:	Oct 21	82.1	May 11	59.0	May 19	49.6
Fourth High:	Jul 5	79.8	May 1	57.2	Jul 5	49.2
Est Days > Nat'l '97 24-Hr Std:	4.4		*			*
Measured Days > Nat'l '97 24-Hr Std:	4		1			0
Nat'l '97 24-Hour Std Design Value:	65		*			*
Nat'l '97 24-Hr Std 98th Percentile:	58.3		*			*
National Annual Std Design Value:	22.6		20.7			19.3
National Annual Average:	20.9		19.0			17.9
State Ann'l Std Designation Value:	25		21			21
State Annual Average:	21.0		*			*
Year Coverage:	92		79			50
Go Backward One Year		New Top 4 Summary			Go Forward One Year	

Notes: All concentrations are expressed in micrograms per cubic meter.
 State exceedances are shown in **yellow**. National exceedances are shown in **orange**.
 An exceedance is not necessarily a violation.
 State and national statistics may differ for the following reasons:
 State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods.
 State and national statistics may therefore be based on different samplers.
 State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
 Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
 * There was insufficient data available throughout the year to determine the value.

Source: CARB ADAM Ambient Air Quality Inventory – 5/08

TABLE 3f: Riverside-Rubidoux Monitoring Station – Maximum Hourly NO₂ Levels

Air Resources Board						
Highest 4 Daily Maximum Hourly Nitrogen Dioxide Measurements						
Riverside-Rubidoux						
FAQs						
Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Nov 14	0.077	Feb 3	0.076	Oct 26	0.072
Second High:	Oct 1	0.071	Dec 6	0.075	Nov 19	0.072
Third High:	Oct 14	0.071	Nov 18	0.070	Mar 16	0.070
Fourth High:	Oct 20	0.071	Nov 7	0.066	Aug 21	0.066
# Days Above State Standard:	0		0			0
Annual Average:	0.022		0.020			0.020
Year Coverage:	99		97			97
Go Backward One Year		New Top 4 Summary			Go Forward One Year	

Notes: All concentrations are expressed in parts per million.
 State exceedances are shown in **yellow**. National exceedances are shown in **orange**.
 An exceedance is not necessarily a violation.
 Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
 * There was insufficient (or no) data available to determine the value.

Source: CARB ADAM Ambient Air Quality Inventory – 5/08

TABLE 3g: Riverside-Rubidoux Monitoring Station – Maximum Eight-Hour CO Levels

Air Resources Board						
Highest 4 Daily Maximum 8-Hour Carbon Monoxide Averages						
Riverside-Rubidoux						
Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Dec 14	2.50	Nov 18	2.29	Mar 13	2.93
Second High:	Dec 1	2.31	Dec 15	2.11	Mar 13	2.47
Third High:	Dec 22	2.30	Nov 17	2.10	Apr 27	2.23
Fourth High:	Dec 1	2.28	Dec 22	1.96	Apr 25	2.17
California:						
First High:	Dec 14	2.50	Nov 18	2.29	Mar 13	2.93
Second High:	Nov 30	2.38	Dec 15	2.11	Apr 27	2.23
Third High:	Dec 22	2.30	Nov 17	2.10	Apr 25	2.17
Fourth High:	Dec 21	2.15	Dec 21	1.96	Nov 20	2.12
# Days Above Nat'l Standard:	0		0		0	
# Days Above State Standard:	0		0		0	
Year Coverage:	94		99		97	
Go Backward One Year		New Top 4 Summary		Go Forward One Year		

Notes: All averages are expressed in parts per million.
 State exceedances are shown in **yellow**. National exceedances are shown in **orange**.
 An exceedance is not necessarily a violation.
 Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period.
 * There was insufficient (or no) data available to determine the value.

Source: CARB ADAM Ambient Air Quality Inventory – 5/08

TABLE 3h: Riverside-Rubidoux Monitoring Station – Maximum 24-Hour SO₂ Levels

Air Resources Board						
Highest 4 Daily Maximum 24-Hour Sulfur Dioxide Averages						
Riverside-Rubidoux						
Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Sep 27	0.011	Nov 8	0.003	Mar 12	0.004
Second High:	Sep 25	0.011	Oct 28	0.003	Mar 6	0.004
Third High:	Sep 22	0.011	Oct 20	0.003	Feb 5	0.004
Fourth High:	Aug 26	0.011	Aug 23	0.003	Jan 24	0.003
# Days Above Nat'l Standard:	0		0		0	
# Days Above State Standard:	0		0		0	
Annual Average:	0.003		0.001		0.002	
Year Coverage:	96		98		91	
Go Backward One Year		New Top 4 Summary		Go Forward One Year		

Notes: All averages are expressed in parts per million.
 State exceedances are shown in **yellow**. National exceedances are shown in **orange**.
 National exceedances are also state exceedances.
 An exceedance is not necessarily a violation.
 Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period.
 * There was insufficient (or no) data available to determine the value.

Source: CARB ADAM Ambient Air Quality Inventory – 5/08

The project site is located in the north central portion of the South Coast Air Basin. The Basin continues to have a transitional-attainment status of federal standards for Ozone (O₃), PM₁₀ and PM_{2.5}. The Basin is either in attainment or unclassified for federal standards of CO, SO₂, NO₂, and lead. Furthermore, factors affecting ground level pollutant concentrations include the rate at which pollutants are emitted to the atmosphere, the height from which they are released, and topographic and meteorological features.

Given these factors, both stations reported exceedances for PM₁₀ along with exceedances being noted at the Riverside Station for O₃, PM₁₀ and PM_{2.5}.²³ All other criteria pollutants were within both federal and state standards or not monitored.

Project Construction Emission Findings

Construction Vehicle Emissions (CO, NO_x, SO_x, PM₁₀, PM_{2.5}, ROG)

The estimated construction equipment exhaust emissions are provided in Table 4 below for the typical construction activities/phases identified at the project site.²⁴ Based upon the findings, no criteria pollutant exceedances were indicated.

TABLE 4: Predicted Construction Emissions – All Earthwork Phases

Equipment Type	Qty. Used	HP	Daily Load Factor (%)	Duty Cycle (Hrs. / day)	Aggregate Emissions in Pounds / Day ²⁵						
					CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	ROG	
Rough Grading Operations											
Dozer - D8 Cat	2	400	50	6	21.6	55.2	4.8	3.6	3.3	7.2	
Loader	2	150	45	6	12.2	17.8	1.6	0.8	0.7	2.4	
Water Truck	1	200	50	6	3.6	12.6	1.2	0.9	0.8	1.2	
Scraper	1	300	35	6	6.9	12.0	1.3	0.9	0.8	0.6	
Total (Σ):					44.3	97.6	8.9	6.2	5.6	11.4	

²³ Monitoring for lead was discontinued entirely in 1998.

²⁴ The typical construction phases, which are independent of the specific project being developed, are as follows:

Construction Phase	Work Performed	Typical Tasks
Rough Grading	Site clearing, grubbing, and general pad and road alignment formation.	Site mobilization, scraper hauls/finishing, and additional site finishing work.
Underground Utility Construction	General trench-work, pipe laying with associated base material and cover, and ancillary earthwork required to facilitate placement of sewer lift stations, manholes, etc.	This is typically performed as a single task.
Paving Activities	Movement of any remaining material as well as necessary curb and gutter work, road base material placement and blacktop.	This is typically performed as a single task.

²⁵ Values rounded to nearest significant figure.

TABLE 4 (cont.): Predicted Construction Emissions – All Earthwork Phases

Equipment Type	Qty. Used	HP	Daily Load Factor (%)	Duty Cycle (Hrs. / day)	Aggregate Emissions in Pounds / Day ²⁶					
					CO	NOx	SOx	PM ₁₀	PM _{2.5}	ROG
Underground Utility Construction										
Track Backhoe	3	150	50	8	27.0	39.6	3.6	1.8	1.7	5.4
Loader	2	150	45	8	16.2	23.8	2.2	1.1	1.0	3.2
Concrete Truck	6	250	25	0.5	1.1	3.9	0.4	0.3	0.3	0.4
Dump/Haul Trucks	5	300	45	0.5	2.0	7.1	0.7	0.5	0.5	0.7
Total (Σ):					46.3	74.4	6.9	3.7	3.5	9.7
Surface Paving Activities										
Skid Steer Cat:	1	150	50	8	9.0	13.2	1.2	0.6	0.6	1.8
Dump/Haul Trucks:	25	300	45	0.5	10.1	35.4	3.4	2.5	2.3	3.4
Paver:	1	150	35	8	2.9	9.7	0.8	0.4	0.4	0.4
Roller:	2	150	35	8	5.9	16.8	1.7	0.8	0.7	1.7
Total (Σ):					27.9	75.1	7.1	4.3	4.0	7.3
Significance Threshold (SCAQMD):					550	100	150	150	55	75

Fugitive Dust Emission Levels (PM₁₀, PM_{2.5})

Construction activities are also a source of fugitive dust emissions that may have a substantial, but temporary, impact on local air quality. These emissions are typically associated with land clearing, excavating, and construction of a proposed action. Substantial dust emissions also occur when vehicles travel on paved and unpaved surfaces and haul trucks lose material.

Dust emissions and impacts vary substantially from day to day, depending on the level of activity, the specific operation being conducted, and the prevailing meteorological conditions. Wet dust suppression techniques, such as watering and/or applying chemical stabilization, would be used during construction to suppress the fine dust particulates from leaving the ground surface and becoming airborne through the action of mechanical disturbance or wind motion.

The proposed TPM 34760 project site would have an estimated cut/fill grading quantity of 100,000 cubic-yards (cy) of material moved over any given 30-day period.²⁷ Thus, for alluvium-type material, the project would have an approximate working weight of,

²⁶ Values rounded to nearest significant figure.

²⁷ This is an estimate for the purposes of numerical comparison. The final grading quantities can be scaled either up or down with no loss of generality.

$$\text{Working Weight} = 100,000 \text{ cubic - yards} \times \frac{1.3 \text{ tons}}{\text{cubic - yard}} = 130,000 \text{ tons}$$

Out of the total quantity identified above, it is estimated that roughly 80-percent of the working weight would be capable of generating PM₁₀. Thus, for the purposes of analysis, the working weight of earthwork material capable of generating some amount of PM₁₀ would be 104,000 tons. The average earthwork movement per day would be 3466.7 tons/day.

Following the analysis procedure identified in the *SCAQMD CEQA Handbook* for PM₁₀ emissions from fugitive dust gives the following semi-empirical relationship for aggregate respirable dust generation,

$$PM_{10} = 0.00112 \times \left[\frac{\left(\frac{WS}{5}\right)^{1.3}}{\left(\frac{SMC}{2}\right)^{1.4}} \right] \times ET$$

where, PM₁₀ = Fugitive dust emissions in pounds,

WS = Ambient wind speed,

SMC = Surface Moisture Content, generally defined as the weight of the water (W_w) divided by the weight of the soil (W_s) as measured at the surface in grams per gram.

ET = Earthwork Tonnage moved per day,

Substituting a minimum SMC value of 0.25 (which extremely conservative for an ambient dirt condition) and a maximum credible wind speed scenario of 12 MPH (WS = 12) gives the following result,

$$PM_{10} = 0.00112 \times \left[\frac{\left(\frac{12}{5}\right)^{1.3}}{\left(\frac{0.25}{2}\right)^{1.4}} \right] \times 3466.7 = 222.6$$

or, a level of 222.6 pounds of PM₁₀ generated per day. It should be noted that surface wetting will be utilized during all phases of earthwork operations at a minimum level of three times per day, thus a control efficiency of 34% to 68% reduction in fugitive dust can be applied per SCAQMD standards.

Assuming a median 60% control efficiency due to the aforementioned watering yields,

$$PM_{10} = (1 - 0.6) \times 222.6 = 89.0$$

or a total fugitive dust generated load of 89 pounds. This level is below the 150 pounds per day threshold established by SCAQMD. Therefore, no impacts are expected from this operational phase. The commensurate PM_{2.5} level would be 18.5 pounds per day which is also below the proposed threshold of significance.

Additionally, following the analysis methods identified in the *SCAQMD CEQA Handbook* for PM₁₀ emissions due to unpaved haul roads gives the following semi-empirical relationship for aggregate respirable dust generation,

$$PM_{10} = VMT \times \left[2.1 \left(\frac{SLP}{12} \right) \left(\frac{MVS}{30} \right) \left(\frac{MVW}{3} \right)^{0.7} \left(\frac{NW}{4} \right)^{0.5} \left(\frac{365 - RD}{365} \right) \right]$$

where, PM₁₀ = Fugitive dust emissions in pounds due to haulage on unpaved roads,
 VMT = Vehicle Miles Traveled per day,
 SLP = Soil Silt Loading in Percent,
 MVS = Mean Vehicle Speed in miles per hour,
 MVW = Mean Vehicle Weight in tons,
 NW = Number of Wheels on the vehicle,
 RD = Mean number of Rain Days with at least 0.01 inches of precipitation

Unpaved road travel due to construction activities is unknown at this time. For the purposes of analysis, it will be assumed that contractors' vehicles moving onsite would traverse a total of 50 miles per day (VMT). Substituting the applicable project values of VMT = 25, SLP = 6.0 (sand/gravel road with watering), MVS = 15 miles per hour, MVW = 3 tons (gross vehicular weight), NW = 4 wheels (average number of wheels), and RD = 40.0²⁸ gives the following result,

$$PM_{10} = 25 \times \left[2.1 \left(\frac{6}{12} \right) \left(\frac{15}{30} \right) \left(\frac{3}{3} \right)^{0.7} \left(\frac{4}{4} \right)^{0.5} \left(\frac{365 - 44}{365} \right) \right] = 11.5$$

or, a level of approximately 23.4 pounds of PM₁₀ generated per day. This activity alone would not generate a significant impact. The commensurate PM_{2.5} level would be 5.0 pounds per day which is also below the proposed threshold of significance.

Combustion-Fired Health-Risk Emission Levels (CO, NO_x, SO_x, PM₁₀, PM_{2.5})

Onsite construction equipment was found to generate worst-case daily pollutant levels during the rough grading phase. These emissions are assumed to occur over any given 24-hour day (thereby providing an upper bound on expected emission concentrations) and direct comparison with CAAQS standards. Although all stable criteria pollutants are provided, it should be noted that for cancer-risk potential, only combustion-fired PM₁₀ particulates is considered.

²⁸ Based upon U.S. Weather Service average precipitation year data within Riverside County.

The proposed TPM 34760 development site has a maximum working area of roughly 2,848,824 square-feet (264,664 m²) based upon data obtained from the project site plans. The aggregate emission rates for the various criteria pollutants in grams per second and grams per square-meter (m²) per second²⁹ are given in Table 5 below. This methodology essentially applies all of the diesel emissions over this working area and provides a worst-case assessment of the impacts to sensitive receptors.

The expected combustion-fired construction emission concentrations from the SCREEN3 modeling are shown in Table 6. The output model results are provided as an attachment to this report.

TABLE 5: Predicted Onsite Diesel-Fired Construction Emission Rates

Criteria Pollutant	Max Daily Emissions (pounds)	Daily Site Emission Rates (grams/second)	Average Area Emission Rates (grams/m ² /second)
CO	46.3	0.2431	9.1841E-07
NO _x	97.6	0.5124	1.9360E-06
SO _x	8.9	0.0467	1.7654E-07
PM₁₀	6.2	0.0325	1.2298E-07
PM _{2.5}	5.6	0.0294	1.1108E-07

Total averaging time is 24 hours x 60 minutes/hour x 60 seconds/minute = 86,400 seconds per CAAQS standards.
 One pound-mass = 453.592 grams

TABLE 6: SCREEN3 Predicted Diesel-Fired Emission Concentrations

Criteria Pollutant	Pollutant Concentration (µg/m ³)	Pollutant Concentration (ppm)	Pollutant Risk Probability (percent risk per person for 70-year exposure)	Significant?
CO	19.34	0.0168	n/a	No
NO _x	40.76	0.0217	n/a	No
SO _x	3.72	0.0014	n/a	No
PM₁₀	2.59	--	0.078%	No
PM _{2.5}	2.4	--	n/a	No

Diesel risk calculation based upon ARB 1999 Staff Report from the Scientific Review Panel (SRP) on Diesel Toxics inhaled in a 70-year lifetime.

Conversion Factors (approximate):

CO: 1 ppm = 1,150 µg/m³ @ 25 deg-C STP, NO_x: 1 ppm = 1,880 µg/m³ @ 25 deg-C STP
 SO_x: 1 ppm = 2,620 µg/m³ @ 25 deg-C STP, PM₁₀ and PM_{2.5}: 1 ppm = 1 g/m³ (solid)

PM_{2.5} levels based upon the CEIDARS database fractional emission factor for diesel construction equipment of 0.920 PM_{2.5} / PM₁₀.

²⁹ As a required input parameter for the SCREEN3 model.

Based upon the model results, all criteria pollutants were below the recommended risk level with a PM₁₀ risk probability of 0.078% (or 7.8 one-hundredths of a percent risk per 70-year exposure duration assuming the implementation of T-BACT).³⁰ Given this, no significant carcinogenic impact potential is expected due to proposed grading operations.

Additionally, the analysis identified a worst-case PM₁₀ level of 2.6 µg/m³ occurring at a distance of 406 meters (1,332 feet) from the project site. This pollutant concentration is far below the California Ambient Air Quality Standard (CAAQS) of 50 µg/m³ established by the State for any given 24-hour exposure period.

Since the transport of this pollutant diminishes as a function of the aforementioned Gaussian curve (refer to Figure 7 below), any nearby (standing) receptor would experience levels far less than the identified maximum concentration with typical values ranging between 0.4 to 1.6 µg/m³.

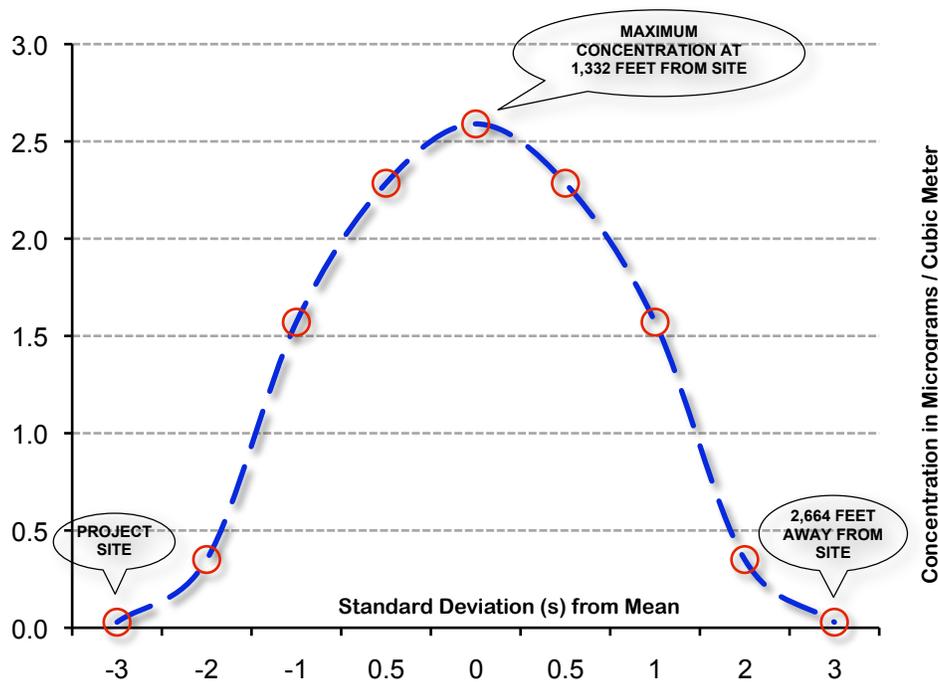


FIGURE 7: Predicted Combustion-Fired Diesel PM₁₀ Dispersion Pattern (ISE 5/08)

The project generated construction PM₁₀ level is expected to approach zero at distances approaching 2,664 feet (0.5 miles) from the project site (or roughly three standard deviations from the maximum). No cumulative contribution of PM₁₀ from the site would be physically possible beyond this point.

³⁰ The risk per million individuals would therefore be 780 over 70 years of continuous exposure (which is consistent with the original CARB definition, but not the case for this project).

Finally, anticipated diesel-fired PM_{2.5} levels would not be expected to exceed 2.4 µg/m³, which are also below the Federal NAAQS 24-hour threshold of 35 µg/m³ (there are no State thresholds for this pollutant). No cumulative contribution of PM_{2.5} from the site would be physically possible beyond the aforementioned 0.5-mile radius cited above.

VOC Emission Potential from Architectural Coatings

Following the analysis methods identified in the *SCAQMD CEQA Handbook* for VOC emissions due to architectural coatings gives the following semi-empirical relationship for aggregate emission levels,

$$VOC_{arch} = \left[\frac{WT \times A}{1000} \right] \times CT$$

where, VOC = Total pounds of Volatile Reactive Organic Compounds per day,
 WT = Specific VOC weight in pounds per mil per 1,000 square-foot application area,
 A = Total exterior and/or interior area to be coated in square-feet,
 CT = Required paint thickness in mils,

The proposed TPM 34760 site contractors could completely finish paint³¹ a maximum of 5,000 square-feet (denoted as A) of usable surface area every day (denoted as ΔT).

This yields the following modified expression:

$$VOC_{arch} = \left[\frac{\frac{WT}{\Delta T} \times A}{1000} \right] \times CT$$

Substituting the applicable unmitigated project values of WT = 7.12 pounds of VOC per 1000 square-feet of painted area (per SCAQMD Table A11-13-C), ΔT = 1 day, A = 5,000 square-feet, CT = 4.0 mils (as the default value for two passes using an HVLP³²) gives the following result,

$$VOC_{arch} = \left[\frac{7.12 \times 5000}{1000 \times 1} \right] \times 4.0 = 142.4$$

or, a total unmitigated architectural generated VOC level of 142.4 pounds per day. Since this level is above the SCAQMD threshold of 75 pounds per day, the project

³¹ Finish painting implies in the context of this report complete surface area painting consisting of two coats as well as any required trim work.

³² HVLP = High-Volume, Low-Pressure (HVLP) painting system.

applicant should utilize Low VOC paints to reduce this impact to below a level of significance.

Following the SCAQMD CEQA Handbook Table A11-13-C, it can be shown that the VOC load can be reduced by a factor of $2.56 / 7.12 = 0.36$ through the application of Low VOC paints. This would produce final (mitigated) levels of $0.36 \times 142.4 = 51.3$ pounds of VOC per day. No remedial impacts would be expected.

Project Vehicular Emission Levels / Powered Haulage for Material Export

Motor vehicles are the primary source of emissions associated with the proposed project area. Typically, uses such as the proposed project do not directly emit significant amount of air pollutants from onsite activities. Rather, vehicular trips to and from these land uses are the significant contributor.

The TPM 34760 site is expected to have a total trip generation level of 340 ADT based upon the cumulative trip generation produced by the proposed 34 single-family uses.³³ The average one-way trip length would be 20.0 miles since this facility would mostly service surrounding city and county areas.³⁴

The calculated emission levels are shown in Table 7 on the following page. A median speed of 45 MPH was used consistent with average values observed (i.e., combined freeway and surface street traffic activity). Based upon the findings, no criteria pollutant exceedances were identified.

Odor Impact Potential to Proposed Site

The inhalation of volatile organic compounds (VOCs) causes smell sensations in humans. These odors can affect human health in four primary ways:

- o The VOCs can produce toxicological effects;
- o The odorant compounds can cause irritations in the eye, nose, and throat;
- o The VOCs can stimulate sensory nerves that can cause potentially harmful health effects; and,
- o The exposure to perceived unpleasant odors can stimulate negative cognitive and emotional responses based on previous experiences with such odors.

Development of the proposed project site could generate trace amounts (less than $1 \mu\text{g}/\text{m}^3$) of substances such as ammonia, carbon dioxide, hydrogen sulfide, methane, dust, organic dust, and endotoxins (i.e., bacteria are present in the dust). Additionally, proposed onsite uses could generate such substances as volatile organic acids, alcohols, aldehydes, amines, fixed gases, carbonyls, esters, sulfides, disulfides, mercaptans, and nitrogen heterocycles.

³³ SCAG Trip Generation Rate for SF Dwelling Unit = 10 ADT.

³⁴ Estimate based upon proposed service area of the project site.

TABLE 7: Operational Vehicle Trip Emissions – TPM 34760

Development Phase	ADT	Aggregate Trip Emissions in Pounds / Day					
		CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	ROG
EMFAC 2007 Year 2010 Emission Rates (in grams/mile @ 45 MPH)							
Light Duty Autos (LDA):		1.919	0.227	0.003	0.008	0.008	0.05
Light Duty Trucks (LDT):		2.736	0.438	0.003	0.016	0.016	0.076
Medium Duty Trucks (MDT):		2.555	0.742	0.005	0.016	0.016	0.081
Heavy Duty Trucks (HDT):		3.672	12.771	0.015	0.371	0.370	0.554
Buses (UBUS):		9.046	10.672	0.013	0.072	0.072	0.657
Motorcycles (MCY):		32.929	1.562	0.002	0.028	0.028	2.81
Proposed Project Action @ 340 Net ADT							
Light Duty Autos (LDA):	235	19.85	2.35	0.03	0.08	0.1	0.52
Light Duty Trucks (LDT):	66	7.96	1.27	0.01	0.05	0.0	0.22
Medium Duty Trucks (MDT):	22	2.45	0.71	0.00	0.02	0.0	0.08
Heavy Duty Trucks (HDT):	16	2.59	9.00	0.01	0.26	0.3	0.39
Buses (UBUS):	0	0.00	0.00	0.00	0.00	0.0	0.00
Motorcycles (MCY):	2	2.47	0.12	0.00	0.00	0.0	0.21
Total:	340	35.3	13.4	0.1	0.4	0.4	1.4
Significance Threshold (SCAQMD):		550	55	150	150	55	55
<u>Assumes:</u>							
<ul style="list-style-type: none"> ○ Average 20-mile trip distance per vehicle (Proposed Project). ○ Riverside County wintertime conditions (50° F).³⁵ ○ For operational vehicular traffic, the fractional emission factor is 0.998 PM_{2.5} / PM₁₀. 							

Finally, it should be noted that odor generation impacts due to the project are not expected to be significant since any odor generation would be intermittent and would terminate upon completion of the construction phase of the project. As a result, no significant air quality impacts are expected to surrounding residential receptors. No mitigation for odors is identified.

Predicted Operational Emission Levels

As previously discussed, operational emission sources under this context would consist entirely of small gasoline engines used with landscaping equipment as well as emissive sources from natural gas powered appliances (such as hot water heaters and stoves). Each of these sources is discussed in detail below.

Small Gasoline Engine Emission Sources

Landscaping equipment utilized in the course of maintenance of the grounds typically would consist of a five horsepower four-stroke lawnmower and a small weed trimmer having a two-stroke engine with approximately 30 to 50 cubic-centimeter displacement. Assuming cleaner burning engines purchased new from the store by the

³⁵ Which is the condition whereby pollutant concentrations have the highest persistence and thus are most likely to produce an impact in a CEQA context.

ultimate user, the following emissions rates (in pounds per day per unit) are promulgated by CARB³⁶:

<u>Pollutant</u>	<u>Single-Family Emissions Per Unit</u>	<u>Multi-Family/Retail Emissions Per Unit</u>
CO	0.005760	0.27600
NO _x	0.000140	0.00500
SO _x ³⁷	0.000200	0.00010
PM ₁₀	0.000005	0.00037
ROG	0.000540	0.03150

For the proposed project, consisting of 34 single-family dwelling units, the following emissions are anticipated:

Single Family Classified Space: CO = 0.2, NO_x = 0.0, SO_x = 0.0, PM₁₀ = 0.0, and ROG = 0.0

No significant air quality impacts are anticipated due to these proposed onsite emission sources.

Natural Gas Emission Sources

Natural gas consumption is anticipated to produce the following approximate total pounds of combustion emissions:

$$CP_{combustion} = ER \times \left[\frac{NU \times UR}{30} \right] \times 1 \times 10^{-6}$$

- where,
- CP = The criteria pollutant under examination (i.e., CO, NO_x, PM₁₀, or ROG)
 - ER = Emissions rate of criteria pollutant per million-cubic-feet of natural gas consumed.
 - CO = 40 pounds/MM Cubic-feet
 - NO_x = 94 pounds/MM Cubic-feet
 - PM₁₀ = 0.18 pounds/MM Cubic-feet
 - ROG = 7.26 pounds/MM Cubic-feet
 - NU = Total number of units per land use type (i.e., residential/commercial),
 - UR = Specific natural gas usage rate per development type (Single-Family = 6,665 ft³/month, Multi-family = 4,011.5 ft³/month, Retail Space = 2.9 ft³/SF/month),

For the proposed project (i.e., 34 single-family dwelling units), this equates to the following fixed emission levels in pounds per day for the aggregate of the proposed development plan:

Single Family Classified Space: CO = 0.3, NO_x = 0.7, PM₁₀ = 0.0, and ROG = 0.1

These sources would be classified as insignificant emission sources and would not generate an air quality impact.

³⁶ These are also the emission factors utilized by the URBEMIS model.

³⁷ As a principal constituent of SO₂.

 **CONCLUSIONS / RECOMMENDATIONS**

Aggregate Project Emissions

The aggregate emission levels produced by the proposed TPM 34760 project site are shown below in Table 8. Based upon the analysis, no construction grading or operational air quality exceedances were identified for any criteria pollutant. Further, VOC exceedances due to architectural coating application were found to be mitigated using low VOC paints. No adverse air basin impacts were identified.

TABLE 8: Aggregate Emissions – TPM 34760

SCENARIO EXAMINED	Aggregate Emissions in Pounds / Day ³⁸					
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5} ³⁹	ROG/VOC
Construction Grading Operations						
Construction Grading Vehicle Emissions (Table 4):	44.3	97.6	8.9	6.2	5.6	11.4
Surface Grading Dust Generation:				89.0	18.5	
Powered Haulage Dust Generation:	0.0	0.0	0.0	23.4	5.0	0.0
Unmitigated Total (Σ):	44.3	97.6	8.9	118.6	29.1	11.4
Significance Threshold (SCAQMD):	550	100	150	150	55	75
Construction Building Operations						
Architectural Coating Application:						142.4
Unmitigated Total (Σ):	0.0	0.0	0.0	0.0	0.0	142.4
Mitigated w/ Low VOC Paint Application (Σ):	0.0	0.0	0.0	0.0	0.0	51.3
Significance Threshold (SCAQMD):	550	100	150	150	55	75
Project Operations						
Vehicular Traffic Generation (Table 7):	35.3	13.4	0.1	0.4	0.4	1.4
Fixed Source #1 (Small Engine Usage – SF):	0.2	0.0	0.0	0.0	--	0.0
Fixed Source #2 (Natural Gas Combustion - SF):	0.3	0.7	--	0.0	--	0.1
Total (Σ):	35.8	14.2	0.1	0.4	0.4	1.5
Significance Threshold (SCAQMD):	550	55	150	150	55	55

³⁸ Dashed areas indicate criteria pollutants that currently have no defined emission rates.

³⁹ Values shown in this column are for informational purposes only. PM_{2.5} emissions are not currently regulated by CARB. The 55 pound-per-day level shown is a proposed standard that has not been adopted.

Consistency with Regional Air Quality Management Plans

The South Coast Regional Air Quality Strategy (RAQS) establishes what could be thought of as an “emissions budget” for the South Coast Air Basin. This budget takes into account existing conditions, planned growth based on General Plans for cities within the Southern California Association of Governments (SCAG) region, and air quality control measures implemented by the SCAQMD.

The “emissions budget” accounts for current emissions associated with the proposed project as well as previously approved projects consistent with current General Plan policies. Therefore, to determine whether the proposed project is consistent with the RAQS requires a comparison of net emissions from the proposed development to the emissions associated with previously approved and accounted for plans (commonly known as the *Consistency Criterion* of the RAQS).

The proposed TPM 34760 project would develop a proposed use consistent with the current land use designation for the site and thus is by default consistent (i.e., conforming to the same principles or course of action) with the proposed SCAG projections for growth within this area. The project therefore, by default, satisfies the *Consistency Criterion* of the RAQS and would be consistent with State Implementation Plan (SIP) for the criteria pollutants under examination.



CERTIFICATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE). The members of its professional staff contributing to the report are listed below:

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Ph.D. Civil Engineering

ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (858) 451-3505.

Content and information contained within this report is intended only for the subject project and is protected under 17 U.S.C. §§ 101 through 810. Original reports contain non-photo blue ISE watermark at the bottom of each page.

Approved as to Form and Content:

Rick Tavares, Ph.D.
Project Principal
Investigative Science and Engineering, Inc.

Attachments to this report: *EMFAC 2007 Emission Factors – Riverside County (2010)*
SCREEN3 Model Output for Criteria Pollutants

Pollutant Name: Oxides of Nitrogen Temperature: 50F Relative Humidity: 40%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
10	0.344	0.676	1.047	22.853	13.712	1.313	2.224
15	0.306	0.596	0.927	16.797	11.760	1.329	1.718
20	0.279	0.538	0.843	14.447	10.573	1.354	1.502
25	0.258	0.496	0.785	13.795	9.908	1.385	1.423
30	0.244	0.466	0.748	13.304	9.628	1.421	1.366
35	0.234	0.448	0.729	12.970	9.665	1.463	1.329
40	0.229	0.438	0.727	12.791	10.003	1.510	1.311
45	0.227	0.438	0.742	12.771	10.672	1.562	1.311
50	0.229	0.446	0.774	12.917	11.756	1.618	1.331
55	0.235	0.463	0.827	13.242	13.416	1.680	1.373
60	0.246	0.492	0.907	13.768	15.938	1.747	1.439
65	0.262	0.534	1.023	14.532	19.824	1.822	1.536

Pollutant Name: Sulfur Dioxide Temperature: 50F Relative Humidity: 40%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
10	0.007	0.009	0.012	0.027	0.020	0.003	0.010
15	0.005	0.007	0.009	0.022	0.017	0.002	0.008
20	0.004	0.006	0.008	0.019	0.015	0.002	0.006
25	0.004	0.005	0.006	0.018	0.014	0.002	0.005
30	0.003	0.004	0.006	0.017	0.014	0.002	0.005
35	0.003	0.004	0.005	0.016	0.013	0.002	0.004
40	0.003	0.004	0.005	0.015	0.013	0.002	0.004
45	0.003	0.003	0.005	0.015	0.013	0.002	0.004
50	0.003	0.004	0.005	0.015	0.013	0.002	0.004
55	0.003	0.004	0.005	0.015	0.013	0.002	0.004
60	0.003	0.004	0.006	0.015	0.014	0.003	0.005
65	0.004	0.005	0.006	0.015	0.014	0.003	0.005

Pollutant Name: PM10 Temperature: 50F Relative Humidity: 40%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
10	0.037	0.075	0.070	1.311	0.270	0.041	0.148
15	0.026	0.052	0.049	0.870	0.201	0.034	0.099
20	0.018	0.038	0.036	0.615	0.155	0.029	0.071
25	0.014	0.029	0.028	0.516	0.123	0.026	0.058
30	0.011	0.023	0.022	0.443	0.102	0.025	0.049
35	0.010	0.020	0.019	0.394	0.088	0.025	0.043
40	0.009	0.018	0.017	0.370	0.078	0.025	0.039
45	0.008	0.016	0.016	0.371	0.072	0.028	0.039
50	0.008	0.016	0.015	0.395	0.069	0.031	0.040
55	0.008	0.017	0.016	0.443	0.068	0.037	0.044
60	0.009	0.018	0.017	0.514	0.070	0.046	0.051
65	0.011	0.021	0.020	0.610	0.074	0.060	0.060

SCREEN3 Model Output for Criteria Pollutants: CO, NO_x, SO_x, and PM₁₀

05/28/08
 11:21:46

*** SCREEN3 MODEL RUN ***
 *** VERSION DATED 96043 ***

TPM 34760 MASS GRADING - CO

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = AREA
 EMISSION RATE (G/(S-M**2)) = .918410E-06
 SOURCE HEIGHT (M) = 3.0000
 LENGTH OF LARGER SIDE (M) = 514.5000
 LENGTH OF SMALLER SIDE (M) = 514.5000
 RECEPTOR HEIGHT (M) = 10.0000
 URBAN/RURAL OPTION = URBAN
 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

 *** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
20.	11.48	5	1.0	1.0	10000.0	3.00	45.
100.	13.47	5	1.0	1.0	10000.0	3.00	45.
200.	15.62	5	1.0	1.0	10000.0	3.00	45.
300.	17.51	5	1.0	1.0	10000.0	3.00	45.
400.	19.32	5	1.0	1.0	10000.0	3.00	45.
500.	16.93	5	1.0	1.0	10000.0	3.00	45.
600.	14.10	5	1.0	1.0	10000.0	3.00	45.
700.	12.07	5	1.0	1.0	10000.0	3.00	45.
800.	10.58	5	1.0	1.0	10000.0	3.00	45.
900.	9.430	5	1.0	1.0	10000.0	3.00	45.
1000.	8.518	5	1.0	1.0	10000.0	3.00	45.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 20. M:
 406. 19.34 5 1.0 1.0 10000.0 3.00 45.

 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	19.34	406.	0.



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*** SCREEN3 MODEL RUN ***
 *** VERSION DATED 96043 ***

TPM 34760 MASS GRADING - NOX

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = AREA
 EMISSION RATE (G/(S-M**2)) = .193600E-05
 SOURCE HEIGHT (M) = 3.0000
 LENGTH OF LARGER SIDE (M) = 514.5000
 LENGTH OF SMALLER SIDE (M) = 514.5000
 RECEPTOR HEIGHT (M) = 10.0000
 URBAN/RURAL OPTION = URBAN
 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

 *** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
20.	24.19	5	1.0	1.0	10000.0	3.00	45.
100.	28.40	5	1.0	1.0	10000.0	3.00	45.
200.	32.93	5	1.0	1.0	10000.0	3.00	45.
300.	36.91	5	1.0	1.0	10000.0	3.00	45.
400.	40.73	5	1.0	1.0	10000.0	3.00	45.
500.	35.70	5	1.0	1.0	10000.0	3.00	45.
600.	29.71	5	1.0	1.0	10000.0	3.00	45.
700.	25.44	5	1.0	1.0	10000.0	3.00	45.
800.	22.29	5	1.0	1.0	10000.0	3.00	45.
900.	19.88	5	1.0	1.0	10000.0	3.00	45.
1000.	17.96	5	1.0	1.0	10000.0	3.00	45.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 20. M:
 406. 40.76 5 1.0 1.0 10000.0 3.00 45.

 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	40.76	406.	0.



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*** SCREEN3 MODEL RUN ***
 *** VERSION DATED 96043 ***

TPM 34760 MASS GRADING - SOX

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = AREA
 EMISSION RATE (G/(S-M**2)) = .176540E-06
 SOURCE HEIGHT (M) = 3.0000
 LENGTH OF LARGER SIDE (M) = 514.5000
 LENGTH OF SMALLER SIDE (M) = 514.5000
 RECEPTOR HEIGHT (M) = 10.0000
 URBAN/RURAL OPTION = URBAN

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

 *** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
20.	2.206	5	1.0	1.0	10000.0	3.00	45.
100.	2.590	5	1.0	1.0	10000.0	3.00	45.
200.	3.003	5	1.0	1.0	10000.0	3.00	45.
300.	3.366	5	1.0	1.0	10000.0	3.00	45.
400.	3.714	5	1.0	1.0	10000.0	3.00	45.
500.	3.255	5	1.0	1.0	10000.0	3.00	45.
600.	2.710	5	1.0	1.0	10000.0	3.00	45.
700.	2.319	5	1.0	1.0	10000.0	3.00	45.
800.	2.033	5	1.0	1.0	10000.0	3.00	45.
900.	1.813	5	1.0	1.0	10000.0	3.00	45.
1000.	1.637	5	1.0	1.0	10000.0	3.00	45.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 20. M:
 406. 3.717 5 1.0 1.0 10000.0 3.00 45.

 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	3.717	406.	0.



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*** SCREEN3 MODEL RUN ***
 *** VERSION DATED 96043 ***

TPM 34760 MASS GRADING - PM10

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = AREA
 EMISSION RATE (G/(S-M**2)) = .122980E-06
 SOURCE HEIGHT (M) = 3.0000
 LENGTH OF LARGER SIDE (M) = 514.5000
 LENGTH OF SMALLER SIDE (M) = 514.5000
 RECEPTOR HEIGHT (M) = 10.0000
 URBAN/RURAL OPTION = URBAN

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

 *** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
20.	1.537	5	1.0	1.0	10000.0	3.00	45.
100.	1.804	5	1.0	1.0	10000.0	3.00	45.
200.	2.092	5	1.0	1.0	10000.0	3.00	45.
300.	2.345	5	1.0	1.0	10000.0	3.00	45.
400.	2.587	5	1.0	1.0	10000.0	3.00	45.
500.	2.268	5	1.0	1.0	10000.0	3.00	45.
600.	1.888	5	1.0	1.0	10000.0	3.00	45.
700.	1.616	5	1.0	1.0	10000.0	3.00	45.
800.	1.416	5	1.0	1.0	10000.0	3.00	45.
900.	1.263	5	1.0	1.0	10000.0	3.00	45.
1000.	1.141	5	1.0	1.0	10000.0	3.00	45.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 20. M:
 406. 2.589 5 1.0 1.0 10000.0 3.00 45.

 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	2.589	406.	0.

