

**AIR QUALITY
IMPACT ASSESSMENT**

FOR

**SR-99/ELK GROVE BOULEVARD
INTERCHANGE IMPROVEMENT PROJECT
ELK GROVE, CA**

PREPARED FOR:

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ENVIRONMENTAL SETTING

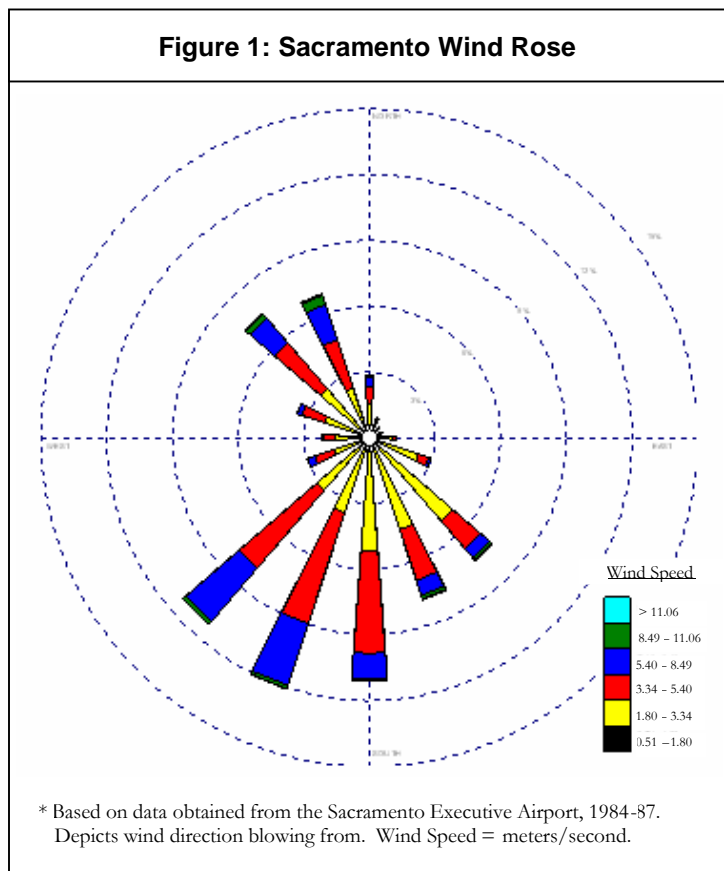
Air quality in a region is determined by its topography, meteorology, and existing air pollutant sources. These factors are discussed below, together with the current regulatory structure that applies to the Sacramento Valley Air Basin (SVAB) pursuant to the regulatory authority of the Sacramento Metropolitan Air Quality Management District (SMAQMD).

CLIMATE AND METEOROLOGY

Ambient air quality is commonly characterized by climatological conditions, the meteorological influences on air quality, and the quantity and type of pollutants released. The basin is subject to a combination of topographical and climatic factors that reduce the potential for high levels of regional and local air pollutants. The following section describes pertinent characteristics of the air basin and provides an overview of the physical conditions affecting pollutant dispersion in the project area.

Regional Climate

The project site is located in the Sacramento Valley Air Basin, which is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District. The SVAB is relatively flat, bordered by mountains to the east, west and the north. Air flows into the SVAB through the Carquinez Strait, moving across the Delta, and bringing with it pollutants from the heavily populated San Francisco Bay Area. The climate is characterized by hot, dry summers and cool, rainy winters. Characteristic of SVAB winter weather are periods of dense and persistent low-level fog, which are most prevalent between storms. From May to October, the region's intense heat and sunlight lead to high ozone concentrations. Summer inversions are strong and frequent, but are less troublesome than those that occur in the fall. Autumn inversions, formed by warm air subsiding in a region of high pressure, have accompanying light winds that do not provide adequate dispersion of air pollutants.



Most precipitation in the Central Valley area results from air masses moving in from the Pacific Ocean during the winter months. These storms usually move through the area from the west or northwest. During the winter rainy season (November through February) over half the total annual precipitation falls while the average winter temperature is a moderate 49 degrees. During the summer, daytime temperatures can exceed 100 degrees Fahrenheit. Dense fog occurs mostly in mid-winter and never in the summer. Daytime temperatures from April through October average between 70 and 90 degrees with extremely low humidity. The inland location and surrounding mountains shelter the valley from much of the ocean breezes that keep the coastal regions moderate in temperature. The only breach in the mountain barrier is the Carquinez Straits, which exposes the midsection of the valley to the coastal air mass.

Winds across the study area are an important meteorological parameter because they control the dilution of locally-generated air pollutant emissions and their regional trajectory. Based on data obtained from the Sacramento Executive Airport, the closest station that measures wind speed and direction, southwest winds are the most predominant (Figure 1). Long-term wind data recorded at the Sacramento Executive Airport indicates that daily winds average approximately 7 mph with west winds typically averaging approximately 10 mph (California Air Resources Board 1992).

Meteorological Influences on Air Quality

Regional flow patterns affect air quality patterns by directing pollutants downwind of sources. Localized meteorological conditions, such as moderate winds disperse pollutants and reduce pollutant concentrations. When a warm layer of air traps cooler air close to the ground, an inversion layer is produced. Such temperature inversions hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground. During summer mornings and afternoons, these inversions are present over the project area. During summer's longer daylight hours, plentiful sunshine provides the energy needed to fuel photochemical reactions between oxides of nitrogen (NO_x) and reactive organic gases (ROG), which result in ozone (O₃) formation.

In the winter, temperature inversions dominate during the night and early morning hours but frequently dissipate by afternoon. During the winter months, the greatest pollution problems are from carbon monoxide (CO) and NO_x. High CO concentrations occur on winter days with strong surface inversions and light winds. Carbon monoxide transport is extremely limited.

REGULATORY FRAMEWORK

Air quality within the SVAB is regulated by several jurisdictions including the U.S. EPA, California Air Resources Board (ARB), and the SMAQMD. Each of these jurisdictions develops rules, regulations, and policies to attain the goals or directives imposed upon them through legislation. Although U.S. EPA regulations may not be superseded, both state and local regulations may be more stringent.

Pollutants subject to federal ambient standards are referred to as "criteria" pollutants because the U.S. EPA publishes criteria documents to justify the choice of standards. One of the most important reasons for air quality standards is the protection of those members of the population who are most sensitive to the adverse health effects of air pollution, termed "sensitive receptors." The term sensitive receptors refers to specific population groups, as well as the land uses where they would reside for long periods. Commonly identified sensitive population groups are children, the elderly, the acutely ill, and the chronically ill. Commonly identified sensitive land uses are residences, schools, playgrounds, childcare centers, retirement homes or convalescent homes, hospitals, and clinics. Criteria air pollutants, common sources, and associated effects are summarized in Table 1. The federal and state standards for the criteria pollutants and other state regulated air pollutants are shown in Table 2.

Federal Air Quality Regulations

At the federal level, the U.S. EPA has been charged with implementing national air quality programs. The U.S. EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (FCAA), which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990.

The FCAA required the USEPA to establish National Ambient Air Quality Standards (NAAQS), and also set deadlines for their attainment. Two types of NAAQS have been established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions.

State Air Quality Regulations

The California Clean Air Act (CCAA), 1988, requires that all air districts in the state endeavor to achieve and maintain California Ambient Air Quality Standards (CAAQS) for O₃, CO, SO₂, and nitrogen dioxide (NO₂) by the earliest practical date. Plans for attaining CAAQS were to be submitted to ARB by June 30, 1991. The CCAA specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with authority to regulate indirect sources. Each district plan is required to either (1) achieve a 5% annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each non-attainment pollutant or its precursors, or (2) to provide for implementation of all feasible measures to reduce emissions. Any planning effort for air quality attainment would thus need to consider both state and federal planning requirements.

The California Air Resources Board (ARB) is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA) of 1988. The CCAA requires that all air districts in the state endeavor to achieve and maintain California Ambient Air Quality Standards (CAAQS) for O₃, CO, SO₂, and nitrogen dioxide (NO₂) by the earliest practical date. Plans for attaining CAAQS were to be submitted to ARB by June 30, 1991; however, some districts are still in the draft process. The CCAA specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with new authority to regulate indirect sources. Each district plan is to achieve a 5 percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each nonattainment pollutant or its precursors. Any additional development within the region obviously would impede the reduction goals of the CCAA.

Other ARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control districts (APCDs) and Air Quality Management Districts (AQMDs), establishing CAAQS (which in many cases are more stringent than the NAAQS), and setting emissions standards for new motor vehicles. The emission standards established for motor vehicles differ depending on various factors including the model year, and the type of vehicle, fuel and engine used.

Sacramento Metropolitan Air Quality Management District

The SMAQMD in coordination with the air quality management districts and air pollution control districts of El Dorado, Placer, Solano, Sutter, and Yolo counties prepared and submitted the 1991 Air Quality Attainment Plan (AQAP) in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and to a lesser extent, CO and PM₁₀. The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the attainment plan must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the 1994 Ozone Attainment Plan (OAP). The OAP stresses attainment of ozone standards and focuses on strategies for reducing ozone precursor emissions of ROG and NO_x. It promotes active public involvement, enforcement of compliance with SMAQMD rules and regulations, public education in both the public and private sectors, development and promotion of transportation and land use programs designed to reduce vehicle miles traveled (VMT) within the region, and implementation of stationary and mobile-source control measures. The OAP became part of the SIP in accordance with the requirements of the CCAA and amended the 1991 AQAP. However, at that time the region could not show that the national ozone (1-hour) standard would be met by 1999. In exchange for moving the deadline to 2005, the region accepted a designation of "severe nonattainment" coupled with additional emission requirements on stationary sources. Additional triennial reports were also prepared in 1997, 2000, and 2003 in compliance with the CCAA that act as incremental updates.

As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the CAAA. Milestone reports were prepared for 1996, 1999, and 2002. These milestone reports include compliance demonstrations that the requirements have been met for the Sacramento nonattainment area. The air quality attainment plans and reports present comprehensive strategies to reduce ROG, NO_x, and PM₁₀ emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations; enhancement of CEQA participation; implementation of a new and modified indirect source review program; adoption of local air quality plans; and stationary-, mobile-, and indirect-source control measures.

In July of 1997, the EPA promulgated a new 8-hour ozone standard. This change lowered the standard for ambient ozone from 0.12 ppm (parts per million) averaged over one hour to 0.08 ppm averaged over eight hours. In general, the 8-hour standard is more protective of public health and more stringent than the 1-hour standard. The promulgation of this standard prompted new designations and nonattainment classifications in June 2004, and resulted in the revocation of the 1-hour standard in June 2005. The region has been designated as a nonattainment (serious) area for the national (8-hour) ozone standard with an attainment deadline of June 2013.

Although the region has made significant progress in reducing ozone, a problem has arisen with regard to another issue. The region's transportation plan must conform and show that implementation will not harm the region's chances of attaining the ozone standard. The SIP is tied to a "motor vehicle emissions budget" and thus, transportation planners must ensure that emissions anticipated from plans and improvement programs remain within this budget. The region is not required to update the SIP before the ozone (8-hour) plans are due in 2006. However, since a conformity lapse began October 4, 2004, an expedited process to prepare a plan is underway (SMAQMD 2006).

AMBIENT AIR QUALITY

Ambient air quality in the project area can be inferred from ambient air quality measurements conducted by the SMAQMD at nearby air quality monitoring stations. The Elk Grove-Bruceville air quality monitoring station is the closest stations to the project site. The Elk Grove-Bruceville air quality monitoring station monitors ambient concentrations of ozone and nitrogen dioxide. Concentrations of carbon monoxide and airborne particulate matter were obtained from nearby monitoring stations located in Sacramento (i.e., Sacramento-3801 Airport Road and Sacramento-T Street air monitoring stations). Ambient emission concentrations will vary due to localized variations in emission sources and climate. As a result, data obtained from these nearby stations should be considered 'generally' representative of ambient concentrations within the project area.

Table 3 summarizes the last 3 years of published data from nearby monitoring stations. As depicted in Table 3, state and federal ozone and PM₁₀ standards have been exceeded on several occasions during the last three years of available data.

Table 1
Criteria Air Pollutants
Summary of Common Sources and Effects

Pollutant	Description	Sources	Health Effects	Welfare Effects
Carbon Monoxide	Colorless, odorless gas	Motor vehicle exhaust, indoor sources include kerosene wood-burning stoves	Headaches, reduced mental alertness, heart attack, cardiovascular diseases, impaired fetal development, death.	Contribute to the formation of smog.
Sulfur Dioxide	Colorless gas that dissolves in water vapor to form acid, and interacts with other gases and particulates in the air	Coal-fired power plants, petroleum refineries, manufacture of sulfuric acid and smelting of ores containing sulfur	Eye irritation, wheezing, chest tightness, shortness of breath, lung damage.	Contribute to the formation of acid rain, visibility impairment, plant and water damage, aesthetic damage to structures.
Nitrogen Dioxide	Reddish brown, highly reactive gas	Motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels	Susceptibility to respiratory infections, irritation of the lung and respiratory symptoms (e.g., cough, chest pain, difficulty breathing).	Contribute to the formation of smog, acid rain, water quality deterioration, global warming, and visibility impairment.
Ozone	Gaseous pollutant when it is formed in the troposphere	Vehicle exhaust and certain other fumes. Formed from the combination of reactive organic gases and oxides of nitrogen in the presences of sunlight.	Eye and throat irritation, coughing, respiratory tract problems, asthma, lung damage.	Plant and ecosystem damage.
Lead	Metallic element	Metal refineries, lead smelters, battery manufacturers, iron and steel producers and use of leaded fuels by racing and aircraft industries.	Anemia, high blood pressure, brain and kidney damage, neurological disorders, cancer, lowered IQ	Affects animal and plants, affects aquatic ecosystems.
Particulate Matter	Very small particles of dust, soot, or other matter, including tiny droplets of liquids	Diesel engines, power plants, industries, windblown dust, wood stoves.	Eye irritation, asthma, bronchitis, lung damage, cancer, heavy metal poisoning, cardiovascular effects.	Visibility impairment, atmospheric deposition, aesthetic damage to structures, impaired plant photosynthesis.
Source: USEPA 2006				

**Table 2
Summary of Ambient Air Quality Standards**

Pollutant	Averaging Time	California Standards ^{a, d}	National Standards ^{b, d}	
			Primary ^e	Secondary ^f
Ozone (O ₃)	1-hour	0.09 ppm (180 µg/m ³)	--	Same as Primary
	8-hour	0.070 ppm (137 µg/m ³)	0.08 ppm (157 µg/m ³)	
Particulate Matter (PM ₁₀)	AAM	20 µg/m ^{3 c}	50 µg/m ^{3 f}	
	24-hour	50 µg/m ³	150 µg/m ³	
Fine Particulate Matter (PM _{2.5})	AAM	12 µg/m ^{3 c}	15 µg/m ³	
	24-hour	No Standard	65 µg/m ³	
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	None
	8-hour	9 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	
	8-hour (Lake Tahoe)	6 ppm (7 mg/m ³)	–	
Nitrogen Dioxide (NO ₂)	AAM	–	0.053 ppm (100 µg/m ³)	Same as Primary
	1-hour	0.25 ppm (470 µg/m ³)	–	
Sulfur Dioxide (SO ₂)	AAM	–	0.03 ppm (80 µg/m ³)	–
	24-hour	0.04 ppm (105 µg/m ³)	0.14 ppm (365 µg/m ³)	–
	3-hour	–	–	0.5 ppm (1,300 µg/m ³)
	1-hour	0.25 ppm (655 µg/m ³)	–	–
Lead ^g	30-day Average	1.5 µg/m ³	–	–
	Calendar Quarter	–	1.5 µg/m ³	Same as Primary
Sulfates	24-hour	25 µg/m ³	No Federal Standards	
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m ³)		
Vinyl Chloride ^g	24-hour	0.01 ppm (26 µg/m ³)		
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70%.		

^a California standards for O₃, CO (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, PM (PM₁₀ and PM_{2.5}), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded.

^b National standards (other than O₃, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The O₃ standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM₁₀, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM_{2.5}, the 24-hour standard is attained when 98 percent of daily concentrations, average over three years, are equal to or less than the standard.

^c This concentration was approved by the Air Resources Board on April 28, 2005 and is expected to become effective in early 2006.

^d Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr.

^e The levels of air quality necessary to protect the public health.

^f The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

AAM = Annual Arithmetic Mean, µg/m³=Micrograms per Cubic Meter, ppm=Parts per Million
Source: ARB 2006

Table 3			
Summary of Ambient Air Quality Data			
Pollutant Standards	2003	2004	2005
Elk Grove–Bruceville Road Air Monitoring Station			
Ozone (O₃)			
Maximum concentration (1-hr/8-hr, ppm)	0.108/0.089	0.096/0.086	0.113/0.095
Number of days state standard exceeded	10	1	7
Number of days federal standard (1-hr/8-hr) exceeded	0/5	0/1	0/2
Nitrogen Dioxide (NO₂)			
Maximum 1-hour concentration (ppm)	0.045	0.041	0.050
Number of days state standard exceeded	0	0	0
Annual arithmetic mean (AAM)	--	0.008	0.008
AAM exceed federal standard?	--	0	0
Sacramento- T Street Air Monitoring Station			
Carbon Monoxide (CO)			
Maximum concentration, 1-hr/8-hr period (ppm)	5.8/3.40	3.5/2.96	4.9/3.64
Number of days state (1-hr/8-hr) standard exceeded	0/0	0/0	0/0
Number of days federal (1-hr/8-hr) standard exceeded	0/0	0/0	0/0
Respirable Particulate Matter (PM₁₀)			
Maximum daily concentration (National/State, µg/m ³)	65.0/66.0	58.0/58.0	53.0/55.0
Number of days state standard exceeded	1	1	3
Number of days federal standard exceeded	0	0	0
Fine Particulate Matter (PM_{2.5})			
Maximum 24-hour concentration (National/State, µg/m ³)	49.0/49.0	46.0/52.5	50.0/55.1
Number of days federal standard exceeded	0	0	0
AAM Annual Arithmetic Mean	(µg/m ³)	Micrograms per Cubic Meter	
ppm Parts per Million	--	Not Calculated or Insufficient Data Available	
Source: ARB 2006, EPA 2006			

ATTAINMENT STATUS FOR CRITERIA AIR POLLUTANTS

The attainment status of Sacramento County is summarized in Table 4. An attainment designation for an area signifies that pollutant concentrations did not violate the standard for that pollutant in that area. A nonattainment designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation(s) was caused by an exceptional event, as defined in the criteria.

As depicted in Table 4, Sacramento County is currently designated nonattainment for the state and federal ozone and PM₁₀ ambient air quality standards. Sacramento County is also designated nonattainment for the State PM_{2.5} standard. Sacramento County is designated either attainment or unclassified for the remaining federal and state ambient air quality standards.

ODORS

Although offensive odors rarely cause physical harm, they can be very unpleasant, leading to considerable stress among the public and often generating citizen complaints to local governments and agencies. Facilities commonly known to produce odors, including wastewater treatment facilities, chemical manufacturing, painting/coating operations, feed lots/dairies, composting facilities, landfills, and transfer stations. Because offensive odors rarely cause physical harm and no requirements for their control are included in state or federal air quality regulations. The SMAQMD has no rules or standards related to odor emissions, other than its nuisance rule (Rule 204). Any actions related to odors are based on citizen complaints to local governments and the SMAQMD.

Table 4 Attainment Status Designations		
Pollutant	California Standard	Federal Standard
Ozone	Non-Attainment Classification: Serious (1/8-hr Standards)	Non-Attainment Classification: Serious (8-hr Standards)
PM ₁₀	Non-Attainment (24-hr Standard and Annual Mean)	Non-Attainment Classification: Moderate (24-hr Standards)
PM _{2.5}	Non-Attainment (Annual Standard)	Attainment/Unclassified (24-hr Standard and Annual Mean)
Carbon Monoxide	Attainment (1-hr and 8-hr Standards)	Attainment (1-hr and 8-hr Standards)
Nitrogen Dioxide	Attainment (1-hr Standard)	Attainment (Annual Standard)
Sulfur Dioxide	Attainment (1-hr and 24-hr Standards)	Attainment (3-hr ,24-hr & Annual Standards)
Lead	Attainment (30-day Standard)	Attainment (Calendar Quarter)
Visibility Reducing Particles	Unclassified (8-hr Standard)	No Federal Standard
Sulfates	Attainment (24-hr Standard)	No Federal Standard
Hydrogen Sulfide	Unclassified (1-hr Standard)	No Federal Standard
Sources: SMAQMD 2006		

TOXIC AIR CONTAMINANTS

The ARB works in partnership with the local air districts to enforce regulations that reduce toxic air contaminants (TACs) in the state. The ARB has authority for motor vehicles, fuels, and consumer products. The ARB identifies the TACs, researches prevention or reduction methods, adopts standards for control, and enforces the standards. Particulate Matter (PM) emissions from diesel-fueled vehicles and engines are the primary TACs of concern for mobile sources. Of all controlled TACs, diesel-exhaust PM emissions are estimated to be responsible for about 70 percent of the total ambient TAC risk. The ARB has made the reduction of the public's exposure to diesel PM one of its highest priorities, with an aggressive plan to require cleaner diesel fuel and cleaner diesel engines and vehicles (ARB 2005).

STANDARDS OF SIGNIFICANCE

For the purpose of this analysis, the following thresholds of significance, as identified by the SMAQMD or the State CEQA Guidelines (Appendix G), have been used to determine whether implementation of the proposed project would result in significant air quality impacts. Implementation of the proposed projects would result in significant air quality impacts if:

- Construction-generated criteria air pollutant or precursor emissions exceed the SMAQMD-recommended threshold of 85 pounds per day (lbs/day) for NO_x, or substantially contribute to emissions concentrations (e.g., PM₁₀) that exceed the NAAQS or CAAQS. When emissions can be reduced to below 85 lbs/day with implementation of all feasible mitigation measures and offsets, short-term emissions of PM₁₀ can be assumed to be less than significant (SMAQMD 2005, Huss, pers. comm., 2006).

- Long-term regional criteria air pollutant or precursor emissions exceed the SMAQMD-recommended threshold of 65 lbs/day for ROG and NO_x, or substantially contribute to emissions concentrations (e.g., PM₁₀) that exceed the NAAQS or CAAQS.
- Local mobile-source emissions exceed or substantially contribute to CO concentrations that violate the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm.
- Exposure of sensitive receptors to TAC emissions exceeds 10 in one million for the Maximally Exposed Individual (MEI) to contract cancer and/or a Hazard Index of one for the MEI.
- Frequent exposure of a substantial number of individuals to odorous emissions would be considered significant.

IMPACT SUMMARY

Table 5 Impact Summary				
Impact	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

IMPACT DISCUSSION

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

Less than significant. A project would be considered to conflict with or obstruct implementation of the regional air quality plans if it would be inconsistent with the emissions inventories contained in the regional air quality plans. Emission inventories are developed based on projected increases in population growth and vehicle miles traveled (VMT) within the region. Project-generated increases in population or VMT could, therefore, potentially conflict with regional air quality attainment plans.

The proposed project would not result in an increase in the population. Vehicle traffic would be redistributed along area roadways, but would not be anticipated to result in a substantial change in overall VMT that would conflict with the projections used for development of regional air quality attainment plans. In addition, implementation of the proposed project would not obstruct implementation of any of the proposed control measures contained in regional air quality plans. As a result, this impact is considered less than significant. No mitigation would be required.

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

Long-term Air Quality Impacts

Less than Significant. Implementation of the proposed project would relieve congestion and reduce vehicle delay at nearby intersections, particularly during peak commute hours. At vehicle speeds below approximately 45 miles per hour, increases in vehicle speeds generally result in slight decreases in emissions of ROG and NO_x. As a result, slight increases in vehicle speeds due to reduced vehicle congestion at nearby intersections would be anticipated to result in a slight reduction in mobile-source emissions of ROG and NO_x. Slight increases in travel distances between the existing and proposed northbound onramps may occur for some vehicles. However, increases in travel distance for some vehicles would likely be offset by decreased travel distance for other vehicles, as well as predicted decreases in emissions due to reduced congestion at nearby intersections. As a result, overall increases in mobile-source emissions attributable to the proposed project would be negligible. Long-term air quality impacts attributable to the proposed project would be considered less than significant. No mitigation would be required.

Short-term Air Quality Impacts

Less than Significant with Mitigation Incorporated. Construction-generated emissions are short-term and of temporary duration, lasting only as long as construction activities occur, but possess the potential to represent a significant air quality impact. The construction and development of the proposed improvements would result in the temporary generation of emissions resulting from site grading and excavation, road paving, motor vehicle exhaust associated with construction equipment and worker trips, and the movement of construction equipment, especially on unpaved surfaces. Emissions of airborne particulate matter are largely dependent on the amount of ground disturbance associated with site preparation activities.

The SMAQMD recommends that construction-generated emissions of ozone precursor pollutants (i.e., ROG and NO_x) be quantified and presented as part of the analysis of project-generated emissions. However, construction equipment emit relatively low levels of ROG and emissions from construction processes (e.g., asphalt paving, architectural coatings) are typically regulated by the SMAQMD. As a result, the SMAQMD has not adopted a construction emissions threshold for ROG. The SMAQMD has, however, adopted a construction emissions threshold of 85 lbs/day for NO_x.

Short-term construction-generated emissions of ozone precursor pollutants (i.e., ROG, NO_x), and PM₁₀ were quantified using the SMAQMD's Road Construction Emissions Model. Emissions were modeled based on input data provided by the project applicant (i.e., duration of construction, construction area, daily area of disturbance, etc.) and default construction equipment assumptions contained in the model.

As depicted in Table 6, individual construction activities (e.g., grubbing, excavation, paving, etc.) would generate maximum daily emissions of approximately 9 lbs/day of ROG, 60 lbs/day of NO_x, and 15 lbs/day of PM₁₀. Daily emissions would vary, from day to day, depending on the specific activities conducted and would likely be greatest during initial site grading. Estimated daily emissions associated with individual construction processes (e.g., grading, utility installation, paving, etc.) would not exceed the SMAQMD's significance threshold of 85 lbs/day for NO_x. However, some construction activities could occur simultaneously; in which case, maximum daily emissions could potentially exceed the SMAQMD's significance threshold of 85 lbs/day for NO_x. Emissions of NO_x could contribute to existing ozone nonattainment conditions. As previously discussed, the project area is also designated nonattainment of state and federal PM₁₀ ambient air quality standards. Short-term emissions of NO_x and PM₁₀ in excess of applicable thresholds could contribute to existing nonattainment conditions. As a result, this impact is considered **significant**.

Table 6			
Short-Term Construction Emissions			
Source	Emissions (lb/day)		
	ROG	NO _x	PM ₁₀
Grubbing/Land Clearing	8	51	15
Grading/Excavation	9	60	15
Drainage/Utilities/Sub-Grade	9	54	15
Asphalt Paving	3	26	2
SMAQMD Significance Threshold:	None	85	None
Emissions were calculated using the SMAQMD Road Construction Emissions Model. Assumes 100-day construction period, 2 acres total area, 2 acres of active soil disturbance/day, total project roadway length of 0.7 miles. Predicted emissions of PM ₁₀ include exhaust and fugitive dust emissions. Fugitive dust emissions were calculated assuming an average 50-percent control efficiency from watering and associated dust control measures.			

Mitigation Measure

1. In accordance with the recommendations of the SMAQMD, the project applicant shall implement the following measures to reduce temporary mobile-source construction emissions. In addition to the measures identified below, construction operations are required to comply with all applicable SMAQMD rules and regulations.
 - a. The project shall implement the following measures to reduce NO_x and visible emissions from heavy-duty diesel equipment.
 - The project shall provide a plan for approval by the lead agency, in consultation with SMAQMD, demonstrating that the heavy-duty (greater than 50 horsepower), off-road vehicles to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project-wide fleet-average 20-percent NO_x reduction and 45-percent particulate reduction compared to the most recent ARB fleet average at the time of construction. Acceptable options for reducing emissions include the use of late-model engines, low-emission diesel products, alternative fuels, particulate matter traps, engine retrofit technology, after-treatment products, and/or such other options as become available.
 - The project representative shall submit to the lead agency and SMAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 hp, that will be used an aggregate of 40 or more hours during any portion of the project. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction operations occur. At least 48 hours before subject heavy-duty off-road equipment is used, the project representative shall provide the SMAQMD with the anticipated construction timeline including start date, and the name and phone number of the project manager and onsite foreman.
 - The project shall ensure that emissions from off-road, diesel-powered equipment used on the project site do not exceed 40-percent opacity for more than 3 minutes in any 1 hour, as determined by an on-site inspector trained in visual emissions assessment. Any equipment found to exceed 40-percent opacity (or Ringlemann 2.0) shall be repaired immediately, and the SMAQMD shall be notified of non-compliant equipment within 48 hours of identification. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of visual survey results shall be submitted throughout the duration of the construction project, except that the monthly summary shall not be required for any

30-day period in which no construction operations occur. The monthly summary shall include the quantity and type of vehicles surveyed, as well as the dates of each survey. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance.

- b. As recommended by the SMAQMD, the project shall reduce fugitive dust emissions by implementing the measures listed below:
- All disturbed areas, including storage piles that are not being actively used for construction purposes, shall be effectively stabilized of dust emissions using water, a chemical stabilizer or suppressant, or vegetative ground cover. Soil shall be kept moist at all times.
 - All onsite unpaved roads and offsite unpaved access roads shall be effectively stabilized of dust emissions using water or a chemical stabilizer or suppressant.
 - When materials are transported offsite, all material shall be covered, effectively wetted to limit visible dust emissions, or maintained with at least 2 feet of freeboard space from the top of the container.
 - All operations shall limit or expeditiously remove the accumulation of project-generated mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring.
 - After materials are added to or removed from the surfaces of outdoor storage piles, the storage piles shall be effectively stabilized of fugitive dust emissions using sufficient water or a chemical stabilizer/suppressant.
 - Onsite vehicle speeds on unpaved roads shall be limited to 15 mph.
 - Wheel washers shall be installed for all trucks and equipment exiting unpaved areas, or wheels shall be washed to remove accumulated dirt before such vehicles leave the site.
 - Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from adjacent project areas with a slope greater than 1 percent.
 - Excavation and grading activities shall be suspended when winds exceed 20 mph.
 - The extent of areas simultaneously subject to excavation and grading shall be limited, wherever possible, to the minimum area feasible.

Timing/Implementation: *During all construction phases of the project.*
Enforcement/Monitoring: *City of Elk Grove Planning Department.*

Significance After Mitigation

Implementation of Mitigation Measure 1(a) would result in a 20-percent reduction in NO_x emissions and a 45-percent reduction in visible emissions from heavy-duty diesel equipment. Offset fees would also be required to reduce NO_x emissions to a less-than-significant level. Implementation of Mitigation Measure 1(b) would reduce fugitive dust emissions by approximately 50- to 75-percent. Based on conversations with the SMAQMD, implementation of the above mitigation measures are typically considered sufficient to reduce construction-generated emissions of NO_x and localized concentrations of PM₁₀ to less-than-significant levels (pers. comm., Karen Huss, SMAQMD, January 24, 2006).

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 standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Less than Significant. Refer to Impacts a) and b), above. Implementation of the proposed project would result in short-term air quality impacts during construction. Mitigation measures have been included to reduce these emissions to less than significant levels. Implementation of the proposed project would serve to improve traffic conditions in the area and would not result in a substantial increase in criteria air pollutants that would conflict with the emissions inventories used for regional air quality planning purposes. In addition, the improved levels of service at nearby intersections would result in decreased concentrations of mobile source carbon monoxide concentrations at nearby receptors. As a result, implementation of the proposed project is not anticipated to result in a considerable net increase of any criteria pollutants for which the project region is designated as a maintenance or non-attainment area. This impact is considered less than significant. No mitigation is required.

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

Increases in localized concentrations of airborne pollutant concentrations can occur with long-term operation and short-term construction of roadway improvement projects. Long-term and short-term increases in pollutant concentrations are discussed separately, as follows:

Long-term Air Quality Impacts

Localized PM₁₀ Concentrations

Less than Significant. Changes in vehicle speeds would result in overall indistinguishable changes in emissions of PM₁₀. However, implementation of the proposed project would result in a redistribution of vehicle traffic on area roadways, which could contribute to localized increases in PM₁₀ concentrations at nearby receptors. As discussed earlier, the project area is designated nonattainment for federal and state ambient air quality standards for PM₁₀. In federal PM₁₀ nonattainment areas, a PM₁₀ hotspot analysis is required unless a project is exempt from federal conformity analysis requirements. In September 2001 EPA released national guidance for performing qualitative PM₁₀ hotspot analysis for conformity purposes. Neither the EPA nor Caltrans have released guidance for conducting a quantitative assessment of local PM₁₀ impacts. Caltrans currently recommends a qualitative assessment of PM₁₀ emissions (Caltrans 2002).

The nearest monitoring station for PM₁₀ is the Sacramento-T Street ambient air quality monitoring station. Ambient PM₁₀ air quality data obtained from this station is summarized in Table 3. As depicted, no violations of the PM₁₀ national ambient air quality standard have been recorded at this station during the last 3 years of available data. Maximum concentrations measured at this station over the last three years were approximately 31 to 33 percent of the federal 24-hour standard.

Studies conducted at U.C. Davis at representative intersections within Sacramento County have found that localized PM₁₀ contributions from vehicle traffic are typically negligible and do not typically contribute significantly to background ambient concentrations of PM₁₀ (UC Davis 1996). In addition, implementation of the proposed project would not result in a substantial increase in vehicle traffic along roadways located near existing sensitive receptors. Given that ambient concentrations in the project area are substantially less than the national ambient air quality standards, implementation of the proposed project is not anticipated to result in a substantial contribution to ambient PM₁₀ concentrations at nearby receptors that would exceed federal air quality standards. For these reasons, this impact would be considered less than significant. No mitigation is required.

Localized CO Concentrations

Less than Significant. Local mobile-source carbon monoxide (CO) emissions near roadway intersections are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. Under specific meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels. Modeling of CO concentrations is typically recommended for areas located near signalized roadway intersections that are projected to operate at unacceptable levels of service (i.e., LOS E or F) (Caltrans 1997).

Based on the traffic analysis prepared for this project, implementation of the proposed project would result in improved LOS at nearby intersections. However, predicted LOS levels at some intersections would continue to exceed acceptable levels. As a result, localized CO modeling was conducted for these intersections. The predicted 1-hour and 8-hour CO concentrations for buildout (year 2010) and future cumulative (year 2030) conditions for adversely affected intersections are summarized in Table 7. Predicted CO concentrations were calculated using the Caline4 computer model based, in part, on the traffic data obtained from the traffic analysis prepared for this project. To be conservative, background CO concentrations were based on the maximum 1-hour and 8-hour CO concentrations measured during the last three years of available data at the nearest air quality monitoring station, as presented in Table 3, and worst-case meteorological conditions. In actuality, future background concentrations are anticipated to be lower due to improved motor vehicle efficiency and use of reformulated fuels.

Based on the modeling conducted, predicted near-term (year 2010) maximum 1-hour and 8-hour mobile-source CO concentrations at nearby intersections would be approximately 7.6 and 5.5 ppm, respectively. By year 2030, predicted CO concentrations at nearby intersections would decrease to a maximum of 6.4 and 4.1 ppm, respectively. Predicted mobile-source CO concentrations would not exceed the 1-hour or 8-hour CAAQS (i.e., 20 ppm and 9.0 ppm, respectively). As a result, this impact would be considered less than significant. No mitigation is required.

Table 7				
Predicted Local Mobile Source Carbon Monoxide Concentrations				
	Predicted CO Concentration (ppm)			
	Year 2010		Year 2030	
Intersection	1-hour	8-hour	1-hour	8-hour
E.Stockton Blvd. & NB SR-99 Ramps	6.8	4.5	6.1	3.9
Elk Grove Blvd. & SB SR99 Ramps	7.6	4.7	6.3	3.9
Elk Grove Blvd & E Stockton Blvd	8.2	5.5	6.4	4.1
CAAQS:	20.0	9.0	20.0	9.0
1. To ensure a conservative analysis, background concentrations are based on the highest measured ambient CO concentrations obtained from the nearest monitoring station during the last three years of available data. 2. Predicted CO concentrations are the sums of a background component, which includes the cumulative effects of all CO sources in the project area vicinity, and the proposed project's contribution.				

Short-term Air Quality Impacts

Less than Significant with Mitigation Incorporated. Particulate exhaust emissions from diesel-fueled engines (DPM) were identified as a toxic air contaminant (TAC) by the ARB in 1998. Implementation of the proposed project would result in short-term emissions of DPM during construction associated with the use of off-road diesel equipment for site grading and excavation, paving, demolition, and other construction activities.

Health-related risks associated with diesel-exhaust emissions are primarily associated with long-term exposure and associated risk of contracting cancer. For residential land uses, the calculation of cancer risk associated with exposure to TACs are typically calculated based on a 70-year period of exposure. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. Assuming that construction activities were to occur over an approximate 5-month period, construction activities would constitute less than one percent of the total exposure period typically applied when calculating cancer risks for residential uses. For this reason, DPM generated by project construction, in and of itself, would not be expected to create conditions where the probability of contracting cancer is greater than 10 in 1 million for nearby receptors. As a result, long-term health risks associated with short-term construction activities would be considered less than significant.

However, depending on the construction activities conducted, as well as site and meteorological conditions, short-term non-carcinogenic risks associated with exposure to diesel-exhaust emissions, particularly acrolein, could potentially exceed the SMAQMD-recommended Hazard Index of 1 at nearby receptors. Such short-term health risks commonly include, but are not limited to, eye and respiratory tract irritation and increased occurrence of asthma-related incidents. Short-term (i.e., acute) health risks associated with intermittent exposure to diesel-exhaust emissions from construction equipment are, therefore, considered significant.

Mitigation Measure

2. The following mitigation measures are recommended to reduce potential exposure of nearby receptors to localized concentrations of DPM:
 - Implement Mitigation Measure 1(a) and 1(b).
 - Onsite diesel-powered stationary construction equipment, such as electrical power generators, should be located at the furthest distance from nearby receptors.
 - To the extent feasible, diesel-powered construction equipment should not be left idling.

Timing/Implementation: *During all construction phases of the project.*
Enforcement/Monitoring: *City of Elk Grove Planning Department.*

Significance After Mitigation

Implementation of Mitigation Measure 1(a) would require incorporation of diesel-emission control devices, such as diesel catalysts or use of biodiesel fuel, to achieve a minimum 45-percent particulate reduction from mobile equipment. Emission control devices can reduce emissions of volatile organic compounds, including acrolein, by approximately 50 to 90 percent, or more (U.S. EPA 2006). Visual emissions surveys would also be required to ensure that equipment would be maintained to ensure that exhaust emissions would not exceed 20 percent opacity. Implementation of the above mitigation measures, in addition to compliance with Mitigation Measure 1(b), which includes restricted activities within proximity of nearby residences and suspension of activities during high-wind conditions (i.e., 20 mph), would further reduce potential exposure of down-wind receptors to intermittent and short-term emissions of TACs. It's important to note that the nearest residential dwellings located in the southeastern quadrant of the interchange would not be located down-wind of the proposed onramp construction area, where the most intensive construction activities would occur. With implementation of recommended mitigation measures, this impact would be considered less than significant.

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

Less than Significant. Implementation of the proposed project would involve the use of a variety of gasoline or diesel-powered equipment that emits exhaust fumes. Exhaust fumes, particularly diesel-exhaust, may be considered objectionable by some people. However, construction-generated emissions would occur intermittently throughout the workday and would dissipate rapidly within the immediate vicinity of the equipment. In addition, pavement coatings and road striping paints used during project construction would also emit temporary odors. However, similar to mobile-source exhaust emissions, these emissions would also be intermittent and would dissipate rapidly. As a result, short-term construction activities would not expose a substantial number of people to frequent odorous emissions. In addition, implementation of the proposed project would not result in the location of mobile sources appreciably closer to existing land uses. This impact is considered less than significant. No mitigation is required.

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Appendix A
Air Quality Modeling

Road Construction Emissions Model

Version 5.1

Data Entry Worksheet

Note: Required data input sections have a yellow background.

Optional data input sections have a blue background. Only areas with a

yellow or blue background can be modified. Program defaults have a white background.

The user is required to enter information in cells C10 through C28.

Input Type

Project Name		
Construction Start Year	2006	Enter a Year between 2000 and 2010 inclusive
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	5	months
Predominate Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
On-Road Emission Factors: Enter 1, 2, or 3	4	1. Emfac7fv1.1 4. Emfac2002 2. Emfac7G 3. Emfac2001
Project Length	0.7	miles
Total Project Area	2	acres
Maximum Area Disturbed/Day	2	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0	yd ³ /day
Soil Exported	200	yd ³ /day
Average Truck Capacity	20	yd ³ (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

Road Construction Emissions Model, Version 5.1

Emission Estimates for ->					Exhaust	Fugitive Dust
	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)
Grubbing/Land Clearing	8	42	51	15	3	12
Grading/Excavation	9	51	60	15	3	12
Drainage/Utilities/Sub-Grade	9	48	54	15	3	12
Paving	3	16	26	2	2	0
Maximum (pounds/day)	9	51	60	15	3	12
Total (tons/construction project)	0	2	3	1	0	1

Notes: Project Start Year -> 2006
 Project Length (months) -> 5
 Total Project Area (acres) -> 2
 Maximum Area Disturbed/Day (acres) -> 2
 Total Soil Imported/Exported (yd³/day) -> 200
 PM10 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I.

Emission Estimates for ->

Exhaust Fugitive Dust

Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)
Grubbing/Land Clearing	4	19	23	7	1	5
Grading/Excavation	4	23	27	7	1	5
Drainage/Utilities/Sub-Grade	4	22	25	7	1	5
Paving	2	7	12	1	1	0
Maximum (kilograms/day)	4	23	27	7	1	5
Total (megagrams/construction project)	0	2	3	1	0	1

<-megagrams

Notes: Project Start Year -> 2006
Project Length (months) -> 5
Total Project Area (hectares) -> 1
Maximum Area Disturbed/Day (hectares) -> 1
Total Soil Imported/Exported (meters³/day)-> 153

PM10 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I.

Construction Emissions Mitigation Fee Calculation						
PART 1: PROJECT INFORMATION						
Project Name:	Elk Grove Blvd/SR99 Interchange Improvement Project					
Control/Application #:						
Single Family Dwelling Units:	0	<i>Note: Enter information only in blue bordered cells</i>				
Multi Family Dwelling Units:	0	Total Residential Acreage:	0			
Non-residential Square Feet:	0	Total Non-residential Acreage:	2			
PART 2: EMISSIONS INFORMATION						
	Activity Phase	NOx (lbs/day) unmitigated	NOx (lbs/day) mitigated*	NOx over threshold (lbs/day)	duration (days)	Total significant NOx (lbs)
Year 1	Demolition	51.00	40.80	0		0.00
Year 1	Grading	60.00	48.00	0		0.00
Year 1	Building Construction	54.00	43.20	0		0.00
Year 2	Building Construction		0.00	0		0.00
Year 2	Asphalt	26.00	20.80	0		0.00
		Total project Nox over threshold (lbs)	0.00			
		Total project Nox over threshold (tons)	0.00			
PART 3: MITIGATION FEE RESULTS						
	Total Mitigation fee (\$13,600/ton)	\$0				
	Mitigation Fee (\$/acre)			\$0.00		

* assumes a construction mitigation plan which achieves a 20% reduction in NOx

SUMMARY OF PREDICTED MOBILE-SOURCE CO CONCENTRATIONS	Year 2010						Year 2030					
	Maximum Contribution		Ambient Concentration		Total Concentration		Maximum Contribution		Ambient Concentration		Total Concentration	
	1hr	8hr	1hr	8hr	1hr	8hr	1hr	8hr	1hr	8hr	1hr	8hr
	EStockBlvd & NBSR99 Ramps	1	0.9	5.8	3.6	6.8	4.5	0.3	0.3	5.8	3.6	6.1
ElkGrove & SB SR99 Ramps	1.8	1.1	5.8	3.6	7.6	4.7	0.5	0.3	5.8	3.6	6.3	3.9
ElkGrove & E Stockton Blvd	2.4	1.9	5.8	3.6	8.2	5.5	0.6	0.5	5.8	3.6	6.4	4.1

1-hour and 8-hour receptors located at 3 and 7 meters from roadway edge, respectively. To be conservative ambient concentrations are based on the highest measured concentration obtained from the nearest monitoring station for the last three years of available data (2003-05).

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

JOB: EStock & NB SR99 Ramps 2010
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 11. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.0 DEGREE (C)

II. LINK VARIABLES

LINK * LINK COORDINATES (M) * EF H W
DESCRIPTION * X1 Y1 X2 Y2 * TYPE VPH (G/MI) (M) (M)
-----*

A. SR99 SB * 577 2701 928 1882 * AG 3050 3.1 .0 14.4
B. SR99 NB * 951 1886 590 2706 * AG 4045 3.1 .0 14.4
C. SR99NBoffram * 962 1924 858 2209 * AG 620 4.2 .0 10.0
D. SR99NBoffram * 858 2209 893 2233 * AG 620 4.2 .0 10.0
E. SR99NBoffram * 893 2233 948 2221 * AG 620 4.8 .0 10.0
F. SR99NBonram * 957 2234 901 2252 * AG 1110 4.2 .0 10.0
G. SR99NBonram * 901 2252 812 2272 * AG 1110 4.2 .0 10.0
H. SR99NBonram * 812 2272 735 2402 * AG 1110 4.2 .0 10.0
I. EStckSBAp * 1040 2422 1002 2283 * AG 1620 4.2 .0 10.0
J. EStckSBAp2 * 1002 2283 957 2234 * AG 1620 4.2 .0 10.0
K. EStckSBAp3 * 957 2234 948 2221 * AG 700 4.8 .0 10.0
L. EStckSBDp * 948 2221 924 2109 * AG 700 4.2 .0 10.0
M. EStckSBDp2 * 924 2109 986 1937 * AG 700 4.2 .0 10.0
N. EStckNBA * 995 1945 939 2109 * AG 430 4.2 .0 10.0
O. EStckNBA2 * 939 2109 956 2220 * AG 430 4.2 .0 10.0
P. EStckNBA3 * 956 2220 1010 2283 * AG 850 4.2 .0 10.0
Q. EStckNBA4 * 1010 2283 1054 2420 * AG 850 4.8 .0 10.0

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

JOB: EStock & NB SR99 Ramps 2010
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

* COORDINATES (M)
RECEPTOR * X Y Z
-----*

1. NW8 * 953 2245 1.8
2. NW1 * 955 2242 1.8
3. E1 * 973 2231 1.8
4. E8 * 978 2231 1.8
5. SE1 * 961 2207 1.8
6. SE8 * 966 2203 1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

* * PRED * CONC/LINK
 * BRG * CONC * (PPM)
 RECEPTOR * (DEG) * (PPM) * A B C D E F G H

RECEPTOR	BRG (DEG)	CONC (PPM)	A	B	C	D	E	F	G	H
1. NW8	188.	.8*	.0	.0	.0	.0	.1	.0	.0	.0
2. NW1	188.	.9*	.0	.0	.0	.0	.2	.0	.0	.0
3. E1	286.	1.0*	.0	.0	.0	.0	.3	.1	.0	.0
4. E8	285.	.9*	.0	.0	.0	.0	.3	.1	.0	.0
5. SE1	300.	.7*	.0	.1	.0	.0	.2	.0	.1	.0
6. SE8	303.	.6*	.0	.1	.0	.0	.1	.0	.0	.0

* CONC/LINK
 * (PPM)
 RECEPTOR * I J K L M N O P Q

RECEPTOR	I	J	K	L	M	N	O	P	Q
1. NW8	.0	.0	.1	.2	.0	.0	.0	.0	.0
2. NW1	.0	.0	.2	.1	.0	.0	.1	.0	.0
3. E1	.0	.2	.0	.0	.0	.0	.1	.0	.0
4. E8	.0	.2	.0	.0	.0	.0	.1	.0	.0
5. SE1	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE8	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL

JUNE 1989 VERSION

PAGE 1

JOB: EStock & NB SR99 Ramps Y2030

RUN: Hour 1 (WORST CASE ANGLE)

POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 11. (M)

BRG= WORST CASE VD= .0 CM/S

CLAS= 7 (G) VS= .0 CM/S

MIXH= 1000. M AMB= .0 PPM

SIGTH= 5. DEGREES TEMP= 15.0 DEGREE (C)

II. LINK VARIABLES

LINK * LINK COORDINATES (M) * EF H W
 DESCRIPTION * X1 Y1 X2 Y2 * TYPE VPH (G/MI) (M) (M)

A. SR99 SB	577	2701	928	1882	AG	2266	.8	.0	14.4
B. SR99 NB	951	1886	590	2706	AG	2681	.8	.0	14.4
C. SR99NBoffram	962	1924	858	2209	AG	640	1.1	.0	10.0
D. SR99NBoffram	858	2209	893	2233	AG	640	1.1	.0	10.0
E. SR99NBoffram	893	2233	948	2221	AG	640	1.2	.0	10.0
F. SR99NBonram	957	2234	901	2252	AG	1720	1.1	.0	10.0
G. SR99NBonram	901	2252	812	2272	AG	1720	1.1	.0	10.0
H. SR99NBonram	812	2272	735	2402	AG	1720	1.1	.0	10.0
I. EStckSBAp	1040	2422	1002	2283	AG	1720	1.1	.0	10.0
J. EStckSBAp2	1002	2283	957	2234	AG	1720	1.1	.0	10.0
K. EStckSBAp3	957	2234	948	2221	AG	1720	1.1	.0	10.0
L. EStckSBDp	948	2221	924	2109	AG	700	1.2	.0	10.0
M. EStckSBDp2	924	2109	986	1937	AG	700	1.1	.0	10.0
N. EStckNBA	995	1945	939	2109	AG	450	1.1	.0	10.0
O. EStckNBA2	939	2109	956	2220	AG	450	1.1	.0	10.0
P. EStckNBA3	956	2220	1010	2283	AG	840	1.1	.0	10.0
Q. EStckNBA4	1010	2283	1054	2420	AG	840	1.2	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL

JUNE 1989 VERSION

PAGE 2

JOB: EStock & NB SR99 Ramps Y2030

RUN: Hour 1 (WORST CASE ANGLE)

POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

* COORDINATES (M)
 RECEPTOR * X Y Z

1. NW8	953	2245	1.8
--------	-----	------	-----

2. NW1 * 955 2242 1.8
 3. E1 * 973 2231 1.8
 4. E8 * 978 2231 1.8
 5. SE1 * 961 2207 1.8
 6. SE8 * 966 2203 1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

* * PRED * CONC/LINK
 * BRG * CONC * (PPM)
 RECEPTOR * (DEG) * (PPM) * A B C D E F G H

 1. NW8 * 187. * .3 * .0 .0 .0 .0 .0 .0 .0 .0
 2. NW1 * 188. * .3 * .0 .0 .0 .0 .0 .0 .0 .0
 3. E1 * 286. * .3 * .0 .0 .0 .0 .0 .1 .0 .0
 4. E8 * 285. * .3 * .0 .0 .0 .0 .0 .1 .0 .0
 5. SE1 * 300. * .2 * .0 .0 .0 .0 .0 .0 .0 .0
 6. SE8 * 303. * .2 * .0 .0 .0 .0 .0 .0 .0 .0

* CONC/LINK
 * (PPM)
 RECEPTOR * I J K L M N O P Q

 1. NW8 * .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
 2. NW1 * .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
 3. E1 * .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
 4. E8 * .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
 5. SE1 * .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
 6. SE8 * .0 .0 .0 .0 .0 .0 .0 .0 .0 .0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
 JUNE 1989 VERSION
 PAGE 1
 JOB: ElkGrove & Southbound SR99 Ramps Y2010
 RUN: Hour 1 (WORST CASE ANGLE)
 POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 11. (M)
 BRG= WORST CASE VD= .0 CM/S
 CLAS= 7 (G) VS= .0 CM/S
 MIXH= 1000. M AMB= .0 PPM
 SIGTH= 5. DEGREES TEMP= 15.0 DEGREE (C)

II. LINK VARIABLES

LINK * LINK COORDINATES (M) * EF H W
 DESCRIPTION * X1 Y1 X2 Y2 * TYPE VPH (G/MI) (M) (M)

 A. SR99 SB * 577 2701 803 2193 * AG 2265 3.1 .0 14.4
 B. SR99 NB * 817 2201 590 2706 * AG 2681 3.1 .0 14.4
 C. SR99 offramp * 577 2701 606 2440 * AG 1830 4.8 .0 10.0
 D. SR99 onramp * 623 2423 790 2184 * AG 640 4.8 .0 10.0
 E. ElkGrove EBA * 403 2419 623 2423 * AG 2490 4.2 .0 13.4
 F. ElkGrove EBD1 * 623 2423 918 2436 * AG 2760 4.2 .0 13.4
 G. ElkGrove EBA2 * 918 2436 1040 2422 * AG 2760 4.8 .0 13.4
 H. ElkGrove EBD2 * 1040 2422 1225 2425 * AG 2760 4.2 .0 13.4
 I. ElkGrove WBD1 * 1222 2436 1049 2434 * AG 1510 4.2 .0 13.4
 J. ElkGrove WBD2 * 1049 2434 917 2452 * AG 1510 4.8 .0 13.4
 K. ElkGrove WBD3 * 917 2452 606 2440 * AG 1510 4.2 .0 13.4
 L. ElkGrove WBD4 * 606 2440 403 2433 * AG 2420 4.2 .0 13.4

III. RECEPTOR LOCATIONS

* COORDINATES (M)
 RECEPTOR * X Y Z

 1. NW8H * 591 2455 1.8
 2. NW1H * 597 2447 1.8
 3. SW8H * 613 2409 1.8
 4. SW1H * 616 2416 1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
 JUNE 1989 VERSION
 PAGE 2
 JOB: ElkGrove & Southbound SR99 Ramps Y2010

RUN: Hour 1 (WORST CASE ANGLE)
 POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	* (DEG)	* CONC * (PPM)	CONC/LINK (PPM)							
			A	B	C	D	E	F	G	H
1. NW8H	* 95.	* 1.1	* .0	.0	.2	.0	.0	.2	.0	.0
2. NW1H	* 93.	* 1.7	* .0	.0	.3	.0	.0	.2	.0	.0
3. SW8H	* 352.	* 1.1	* .0	.0	.7	.0	.3	.0	.0	.0
4. SW1H	* 83.	* 1.8	* .0	.0	.0	.1	.1	1.2	.0	.0

RECEPTOR	CONC/LINK (PPM)			
	I	J	K	L
1. NW8H	* .0	.0	.3	.0
2. NW1H	* .0	.0	.7	.0
3. SW8H	* .0	.0	.0	.0
4. SW1H	* .0	.0	.1	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL

JUNE 1989 VERSION

PAGE 1

JOB: ElkGrove & Southbound SR99 Ramps Y2030

RUN: Hour 1 (WORST CASE ANGLE)

POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 11. (M)
 BRG= WORST CASE VD= .0 CM/S
 CLAS= 7 (G) VS= .0 CM/S
 MIXH= 1000. M AMB= .0 PPM
 SIGTH= 5. DEGREES TEMP= 15.0 DEGREE (C)

II. LINK VARIABLES

LINK	* LINK COORDINATES (M)	* EF	H	W
DESCRIPTION	* X1 Y1 X2 Y2 * TYPE	VPH (G/MI)	(M)	(M)
A. SR99 SB	* 577 2701 803 2193 * AG	3050	.8	.0 14.4
B. SR99 NB	* 817 2201 590 2706 * AG	4045	.8	.0 14.4
C. SR99 offramp	* 577 2701 606 2440 * AG	1940	1.4	.0 10.0
D. SR99 onramp	* 623 2423 790 2184 * AG	650	1.1	.0 10.0
E. ElkGrove EBA	* 403 2419 623 2423 * AG	2640	1.1	.0 13.4
F. ElkGroveEBD1	* 623 2423 918 2436 * AG	2910	1.1	.0 13.4
G. ElkGroveEBA2	* 918 2436 1040 2422 * AG	2910	1.4	.0 13.4
H. ElkGroveEBD2	* 1040 2422 1225 2425 * AG	2910	1.1	.0 13.4
I. ElkGroveWBD1	* 1222 2436 1049 2434 * AG	1580	1.1	.0 13.4
J. ElkGroveWBD2	* 1049 2434 917 2452 * AG	1580	1.4	.0 13.4
K. ElkGroveWBD3	* 917 2452 606 2440 * AG	1580	1.1	.0 13.4
L. ElkGroveWBD4	* 606 2440 403 2433 * AG	2600	1.1	.0 13.4

III. RECEPTOR LOCATIONS

RECEPTOR	* COORDINATES (M)		
	X	Y	Z
1. NW8H	* 591	2455	1.8
2. NW1H	* 597	2447	1.8
3. SW8H	* 613	2409	1.8
4. SW1H	* 616	2416	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL

JUNE 1989 VERSION

PAGE 2

JOB: ElkGrove & Southbound SR99 Ramps Y2030

RUN: Hour 1 (WORST CASE ANGLE)

POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	* BRG	* CONC *	CONC/LINK (PPM)							
			A	B	C	D	E	F	G	H

RECEPTOR	*(DEG)*	*(PPM)*	A	B	C	D	E	F	G	H
1. NW8H	* 94.	* .3	* .0	* .0	* .0	* .0	* .0	* .0	* .0	* .0
2. NW1H	* 93.	* .5	* .0	* .0	* .0	* .0	* .0	* .0	* .0	* .0
3. SW8H	* 352.	* .3	* .0	* .0	* .2	* .0	* .0	* .0	* .0	* .0
4. SW1H	* 83.	* .5	* .0	* .0	* .0	* .0	* .0	* .3	* .0	* .0

* CONC/LINK
* (PPM)

RECEPTOR	* I	J	K	L
1. NW8H	* .0	* .0	* .0	* .0
2. NW1H	* .0	* .0	* .2	* .0
3. SW8H	* .0	* .0	* .0	* .0
4. SW1H	* .0	* .0	* .0	* .0

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

JOB: ElkGrove Blvd & E Stockton Blvd Y2010
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 11. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.0 DEGREE (C)

II. LINK VARIABLES

LINK	* LINK COORDINATES (M)	* EF	H	W
DESCRIPTION	* X1 Y1 X2 Y2 * TYPE	VPH (G/MI)	(M)	(M)
A. EStcktnSBAp	* 1075 2800 1041 2436 * AG	500	4.2	.0 14.4
B. EStcktnSBDep	* 1041 2436 1002 2283 * AG	1590	4.2	.0 14.4
C. EStcktnSBAp2	* 1002 2283 957 2234 * AG	1590	5.6	.0 10.0
D. EStcktnSBDp2	* 957 2234 924 2106 * AG	1590	4.2	.0 10.0
E. ElkGroveEBA	* 403 2419 623 2423 * AG	2760	4.2	.0 13.4
F. ElkGroveEBD1	* 623 2423 925 2436 * AG	2760	4.2	.0 13.4
G. ElkGroveEBA2	* 918 2436 1037 2422 * AG	2760	5.6	.0 13.4
H. ElkGroveEBD2	* 1037 2422 1331 2425 * AG	1670	4.2	.0 13.4
I. ElkGroveWBD1	* 1331 2436 1049 2434 * AG	1630	4.2	.0 13.4
J. ElkGroveWBD2	* 1049 2434 917 2452 * AG	2030	4.2	.0 13.4
K. ElkGroveWBD3	* 917 2452 606 2440 * AG	2030	5.6	.0 13.4
L. ElkGroveWBD4	* 606 2440 403 2433 * AG	2030	4.2	.0 13.4
M. EStckNBAP	* 933 2105 964 2231 * AG	850	4.2	.0 10.0
N. EStckNBAP2	* 964 2231 1010 2280 * AG	850	4.2	.0 10.0
O. EStckNBAP3	* 1010 2280 1046 2422 * AG	850	4.8	.0 10.0
P. EStckNBAP4	* 1046 2422 1049 2436 * AG	850	5.6	.0 10.0
Q. EStckNBDpt	* 1049 2436 1086 2805 * AG	450	4.2	.0 10.0

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

JOB: ElkGrove Blvd & E Stockton Blvd Y2010
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS
* COORDINATES (M)

RECEPTOR	* X	Y	Z
1. NW1	* 1037	2440	1.8
2. NW8	* 1033	2444	1.8
3. NE1	* 1054	2439	1.8
4. NE8	* 1058	2443	1.8
5. SW1	* 1031	2418	1.8
6. SW8	* 1026	2415	1.8
7. SE1	* 1050	2418	1.8
8. SE8	* 1054	2414	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	* PRED *	CONC/LINK	(PPM)							
*(DEG)	* BRG *	* CONC *	A	B	C	D	E	F	G	H
1. NW1	* 269.	* 1.9	* .0	.0	.0	.0	.0	.3	.3	.0
2. NW8	* 268.	* 1.7	* .0	.0	.0	.0	.0	.3	.2	.0
3. NE1	* 269.	* 2.0	* .0	.0	.0	.0	.0	.3	.3	.0
4. NE8	* 268.	* 1.5	* .0	.0	.0	.0	.0	.3	.2	.0
5. SW1	* 279.	* 2.2	* .0	.0	.0	.0	.0	.2	1.7	.0
6. SW8	* 83.	* 1.5	* .0	.2	.0	.0	.0	.0	.2	.7
7. SE1	* 277.	* 2.4	* .0	.2	.0	.0	.0	.2	1.2	.3
8. SE8	* 280.	* 1.9	* .0	.2	.0	.0	.0	.1	1.1	.2

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
 JUNE 1989 VERSION
 PAGE 3
 JOB: ElkGrove Blvd & E Stockton Blvd Y2010
 RUN: Hour 1 (WORST CASE ANGLE)
 POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	* I	J	K	L	M	N	O	P	Q
1. NW1	* .0	.9	.2	.0	.0	.0	.0	.0	.0
2. NW8	* .0	.8	.2	.0	.0	.0	.0	.0	.0
3. NE1	* .0	.8	.2	.0	.0	.0	.0	.0	.0
4. NE8	* .0	.6	.2	.0	.0	.0	.0	.0	.0
5. SW1	* .0	.0	.3	.0	.0	.0	.0	.0	.0
6. SW8	* .3	.0	.0	.0	.0	.0	.0	.0	.0
7. SE1	* .0	.0	.3	.0	.0	.0	.2	.0	.0
8. SE8	* .0	.0	.2	.0	.0	.0	.1	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
 JUNE 1989 VERSION
 PAGE 1
 JOB: ElkGrove Blvd & E Stockton Blvd Y2030
 RUN: Hour 1 (WORST CASE ANGLE)
 POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 11. (M)
 BRG= WORST CASE VD= .0 CM/S
 CLAS= 7 (G) VS= .0 CM/S
 MIXH= 1000. M AMB= .0 PPM
 SIGTH= 5. DEGREES TEMP= 15.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	* X1	Y1	X2	Y2	* TYPE	EF	H	W
	LINK COORDINATES (M)					VPH (G/MI)	(M)	(M)
A. EStcktnSBAp	* 1075	2800	1041	2436	* AG	550	1.1	.0 14.4
B. EStcktnSBDep	* 1041	2436	1002	2283	* AG	1740	1.1	.0 14.4
C. EStcktnSBAp2	* 1002	2283	957	2234	* AG	1740	1.4	.0 10.0
D. EStcktnSBdp2	* 957	2234	924	2106	* AG	1740	1.1	.0 10.0
E. ElkGroveEBA	* 403	2419	623	2423	* AG	2950	1.1	.0 13.4
F. ElkGroveEBD1	* 623	2423	925	2436	* AG	2950	1.1	.0 13.4
G. ElkGroveEBA2	* 918	2436	1037	2422	* AG	2950	1.4	.0 13.4
H. ElkGroveEBD2	* 1037	2422	1331	2425	* AG	1700	1.1	.0 13.4
I. ElkGroveWBD1	* 1331	2436	1049	2434	* AG	1720	1.1	.0 13.4
J. ElkGroveWBD2	* 1049	2434	917	2452	* AG	2100	1.1	.0 13.4
K. ElkGroveWBD3	* 917	2452	606	2440	* AG	2100	1.4	.0 13.4
L. ElkGroveWBD4	* 606	2440	403	2433	* AG	2100	1.1	.0 13.4
M. EStckNBAP	* 933	2105	964	2231	* AG	870	1.1	.0 10.0
N. EStckNBAP2	* 964	2231	1010	2280	* AG	870	1.1	.0 10.0
O. EStckNBAP3	* 1010	2280	1046	2422	* AG	870	1.2	.0 10.0
P. EStckNBAP4	* 1046	2422	1049	2436	* AG	870	1.4	.0 10.0
Q. EStckNBDpt	* 1049	2436	1086	2805	* AG	510	1.1	.0 10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
 JUNE 1989 VERSION

