Traffic Eng.

ENVIRONMENTAL AIR QUALITY ANALYSIS FOR THE PROPOSED ROUTE 68 (HOLMAN HIGHWAY) WIDENING PROJECT 05-MON-068-KP 6.1/7.1 (PM 3.8/4.4) IN THE CITY OF MONTEREY, MONTEREY COUNTY, CALIFORNIA EA 05-448000

FINAL REPORT

Prepared for:

Mark Thomas and Company, Inc.
90 Archer Street
San Jose, CA 95112

California Department of Transportation, District 5
50 Higuera Street
San Luis Obispo, CA 93441

City of Monterey
Public Works Department
City Hall
Monterey, CA 93940

Submitted by:

PAR ENVIRONMENTAL SERVICES, INC.
P.O. Box 160756
Sacramento, CA 95816

Prepared by:

TY LIN INTERNATIONAL/ CCS
Author: Wayne Shijo
10365 Old Placerville Road, Suite 200
Sacramento, CA 95842

June 2004
Revised July 2004

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California Department of Transportation, District 5
50 Higuera Street
San Luis Obispo, CA 93401

Prepared by:

T.Y. LIN INTERNATIONAL/CCS
10365 Old Placerville Road, Suite 200
Sacramento, CA 95842
916/366-6331

with

PAR ENVIRONMENTAL SERVICES, INC.
1906 21st Street
Sacramento, California 95816

June 2, 2004
Revised July 9, 2004

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EXECUTIVE SUMMARY

The City of Monterey proposes to widen and upgrade Route 68 (Holman Highway) from two lanes to three/four lanes in Monterey County from approximately 0.2 kilometers west of the Community Hospital of Monterey Peninsula (CHOMP) entrance to the State Route (SR) 1 and Route 68 junction. Improvements to SR 1 southbound off-ramp and on-ramp are also included in the project.

The proposed project is located in Monterey County within the Monterey Bay Unified Air Pollution Control District. This Air Quality Technical Report presents an evaluation of impacts of the proposed project on the air quality environment, and the conformity of the project with the state implementation plan (SIP) for air quality.

The project site is in an area designated as a state and federal attainment area (the area has attained the state and federal air quality standards) for carbon monoxide (CO). However, the project site is in a state non-attainment area (the area has not attained the air quality standard) for ozone, and is classified as a maintenance area for the federal ozone standards. This air basin is also a state non-attainment area for inhalable particulate matter smaller than 10 microns in diameter (designated PM10).

Implementation of the proposed project would result in the generation of short-term construction-related air pollutant emissions. Exhaust emissions from construction equipment would contain reactive organic gases (ROG), nitrogen oxides (NOx), CO, and PM10. PM10 emissions would also result from windblown dust (fugitive dust) generated during excavation, grading, and hauling activities. The generation of these emissions would be considered a significant impact. Mitigation measures are recommended to reduce construction-related emissions to a less-than-significant level.

Modeling was performed to predict CO concentrations for construction build year 2010 and cumulative (2030) conditions. Under peak traffic volume and worst-case meteorological conditions, the predicted CO concentrations, when combined with background CO levels, would not exceed federal and state CO standards with either existing or cumulative background conditions. Therefore, this project is determined to have a less-than significant local air quality impact.

Regional air quality impacts due to long-term operation of the project have not been quantitatively analyzed. However, the project would not generate new vehicle trips and would not result in a substantial geographic redistribution of vehicle travel. Therefore, the project is considered to have a less-than-significant impact on regional air quality.

The project is in conformance with the SIP for air quality.

SECTION 1

INTRODUCTION

1.1 Purpose of this Technical Report

This technical report is designed to assess the air quality impacts associated with widening and improvements to Route 68 (Holman Highway) from two lanes to three/four lanes in Monterey County from 0.2 kilometers west of the Community Hospital of Monterey Peninsula (CHOMP) entrance to the State Route (SR) 1 and Route 68 junction. Improvements to SR 1 southbound off-ramp and on-ramp are also included in the project. The project includes a non-build alternative, three build alternatives, and three variations of the build alternatives.

The purpose of this Air Quality Technical Report is to provide the Federal Highway Administration (FHWA), the California Department of Transportation (Caltrans), the City of Monterey, other interested agencies, and the public with information about the impacts of the Route 68 widening project on the air quality environment. The assessment describes the relevant existing air quality conditions within the project study area and the potential change the project would make on air quality. The assessment then discusses the significance of the identified impacts, and identifies mitigation measures that would reduce adverse impacts resulting from the project.

1.2 Purpose and Need of the Proposed Action

The purpose of the project is to relieve existing and future traffic congestion, improve traffic safety, improve traffic operations, minimize delay of emergency vehicle access to the hospital, and reduce the incentive for bypass traffic through the Skyline Forest neighborhood. It would also improve access to the Pebble Beach entrance, the CHOMP, and Beverly Manor Complex.

1.3 Need for the Proposed Action

The project is needed for the following reasons:

- The existing intersection of Route 68 and SR 1 southbound ramps has existing and projected future traffic congestion that would relieved by the project;
- the project would improve traffic safety;
- the project would minimize delay of emergency vehicle access;
- the project would reduce the incentive for bypass traffic through the Skyline Forest neighborhood; and
- the project would result in improved access to the Pebble Beach entrance, the CHOMP, and Beverly Manor Complex.

SECTION 2

DESCRIPTION OF THE PROPOSED PROJECT

2.1 Project Location

Route 68 is a two-lane undivided roadway constructed in the early 1940s. It serves as the primary transportation facility between SR 1 and the City of Pacific Grove, Pebble Beach and the CHOMP. In the mid 1950s, this portion of the roadway was upgraded with improved radii and superelevation. It was subsequently designated as part of Route 68 with a posted speed of 55 kilometers per hour (kph). Currently there are two 3.6 meter (m) (11.8 feet) lanes with shoulders ranging from 0.6 m (2.0 feet) to 1.2 m (3.9 feet).

In the 1980s, Monterey Peninsula cities formed the Holman Highway Task Force to address access problems to CHOMP and levels of service along Route 68. This Task Force oversaw the transportation improvements along Route 68 from its terminus at Pacific Grove and SR 1. Its goal, in part, was to enhance the quality of transportation services on Route 68. Many objectives were established, a few of which included installation of a new Spanish Bay Gate, construction of a westbound lane through the CHOMP intersection, and addition of an eastbound lane from the CHOMP entrance to the Route 1 interchange. While some work has been completed such as the Spanish Bay Gate and a westbound lane through the CHOMP intersection, other phases of work are incomplete and remain dormant.

The 1993 Regional Transportation Plan, adopted in 1994, recommended the widening of Route 68 to four lanes from 0.2 km (0.1 miles) west of the CHOMP intersection to south of the Route 68 overpass at SR 1. This project is now listed in the State Transportation Improvement Program (STIP).

The CHOMP and Beverly Manor are situated within the project limits. On the south side of Route 68 there are single family homes that overlook the highway and whose backyards set adjacent to the roadway. There are two driveway entrances (CHOMP and Beverly Manor) with left-turn channelization. The CHOMP entrance is signalized. The Beverly Manor entrance is unsignalized.

The Route 68/SR 1 interchange is characterized as a diamond off- and on-ramp with a signal system. Traffic congestion on Route 68 is high (over 2,300 vehicles per hour [vph] peak) during the weekday afternoon period beginning at about 3:00 p.m. and continuing to about 6:00 p.m. Rear-end accidents are common, suggesting excessive vehicle queuing at all approaches of Route 68 signalized intersection/SR 1 southbound ramps. Traffic forecasts representing the year 2020 show the PM peak hour traffic demand on Route 68 reaching 2,860 vehicles. Traffic is projected to increase by 24 percent.

Existing intersections at the Route 68/SR 1 southbound off-ramp, CHOMP, and Beverly Manor are currently at Level of Service (LOS) "D" throughout much of the afternoon period. With the increased traffic, these intersections will become LOS "F" in about five to seven years. With the Army closure of the gates into the Presidio of Monterey, residents of the Skyline Forest Neighborhood in Monterey have experienced an increase in traffic cutting through the neighborhood from Route 68 in order to bypass congestion in the project area. For this reason, a new traffic signal at Beverly Manor has been included as a variation to the alternatives that will require further analysis to evaluate if the new signal will induce bypass traffic through the neighborhood.

2.2 Project Description and Alternatives Considered

Project Description: The City of Monterey proposes to widen and upgrade Route 68 (Holman Highway) from two lanes to three/four lanes in Monterey County from approximately 0.2 kilometers (0.1 miles) west of the CHOMP entrance to the SR 1 and Route 68 junction. Improvements to SR 1 southbound off-ramp and on-ramp are also included in the project. If implemented, the project would relieve existing and future traffic congestion, improve traffic safety, improve traffic operations, minimize delay of emergency vehicle access to the hospital, and reduce the incentive for bypass traffic through the Skyline Forest neighborhood. It would also result in improved access to the Pebble Beach entrance, the CHOMP, and Beverly Manor Complex. The project consists of a no-build alternative; three build alternatives, and three variations of the build alternatives.

Alternatives Considered:

A. **No Build Alternative:** This alternative would maintain the facility as is. There would continue to be deficient operations on Route 68, at the Route 68/SR 1 intersection, and on the southbound off-ramp where traffic is known to back up onto the mainline.

B. **Build Alternatives:** Common design features of all build alternatives are summarized below.

- Construction impact from widening Route 68 to either 3 or 4 lanes would be identical because the proposed retaining walls would be constructed at the ultimate 4-lane-widened location.
- Scenic Drive Overcrossing would be replaced with a new bridge.
- Access to Beverly Manor entrance would be maintained with potential for a new signal system.

- SR 1 southbound off- and on-ramps would require a retaining wall.
- The Pebble Beach entrance would be modified.
- Two retaining walls located along the north and south sides of Route 68 between Scenic Drive and Beverly Manor Entrance would receive aesthetic treatment.
- Traffic signals at Route 68/SR 1 and at Route 68/CHOMP intersections would be modified.

Build Alternative 1 – (*Three Lane Facility*) is characterized by the addition of one lane in the eastbound direction from 0.1 mile west of the CHOMP entrance to the Route 68/SR 1 ramp intersection. This added eastbound lane would terminate as a mandatory right-turn lane to the Pebble Beach entrance/SR 1 southbound on-ramp. The construction limit for this alternative would be identical to the ultimate 4-lane widened alternative. This alternative would not result in a 12-foot-wide pavement for the fourth (westbound) lane, but the retaining walls would be constructed at their ultimate locations to accommodate the four-lane future condition.

Build Alternative 2 – (*Three Lane Facility*) is characterized by the addition of one lane in the westbound direction from the Route 68/SR 1 ramp intersection to the CHOMP entrance. This added westbound lane would terminate as a mandatory right-turn lane to CHOMP. The construction limit for this alternative would be identical to the ultimate 4-lane widened alternative. This alternative would not result in a 12-foot-wide pavement for the fourth (eastbound) lane, but the retaining walls would be constructed at their ultimate locations to accommodate the four-lane future condition.

Build Alternative 3 – (*Four Lane Facility*) is characterized by the addition of two lanes (one additional lane in each direction) that would result in a full four-lane facility. Route 68 would be widened to a full four-lane facility from the intersection of Route 68/SR 1 ramp to just west of the CHOMP entrance. In the westbound direction, two lanes would be carried past the CHOMP entrance and then merged to the existing one-lane highway approximately 600 feet west of the CHOMP entrance. In the eastbound direction, the right lane would terminate as a mandatory right turn lane to the Pebble Beach entrance.

Build Alternative Variations – There are three design variations, or combination thereof, that could be incorporated as part of the project. These design options address the treatment of the Route 68/SR 1 intersection. Variation 1 and 2 would work with all build alternatives. Variation 3 would work with all build alternatives and Variation 1 and 2.

1) **Five Legged Intersection:** This variation is characterized as a five legged intersection option that would result in all traffic movements to

be brought together at one intersection. This intersection would be signalized.

2) **Roundabout:** This variation is characterized as a traffic circle that would result in constructing a one-way circular traffic flow at the intersection of Route 68/SR 1 ramps. Traffic would enter this circle in a free flowing movement with yield at the point of entry into the circle. The southbound right turn exit ramp movement would bypass the roundabout.

3) **Collector-Distributor Road:** This variation is characterized as an SR 1 Distributor/Collector option that would result in a new SR 1 exit lane dedicated solely to access the Pebble Beach Main Gate. The Distributor/Collector lane would originate at the SR 1 southbound auxiliary lane near the beginning of the exit ramp, and continue under the SR 1 Bridge at Route 68, and conform at the Pebble Beach Main Gate entrance. This design variation allows direct, unrestricted access to the Pebble Beach Main Gate entrance from the southbound SR 1 direction and reduces the volume of traffic traveling through the Route 68/SR 1 intersection.

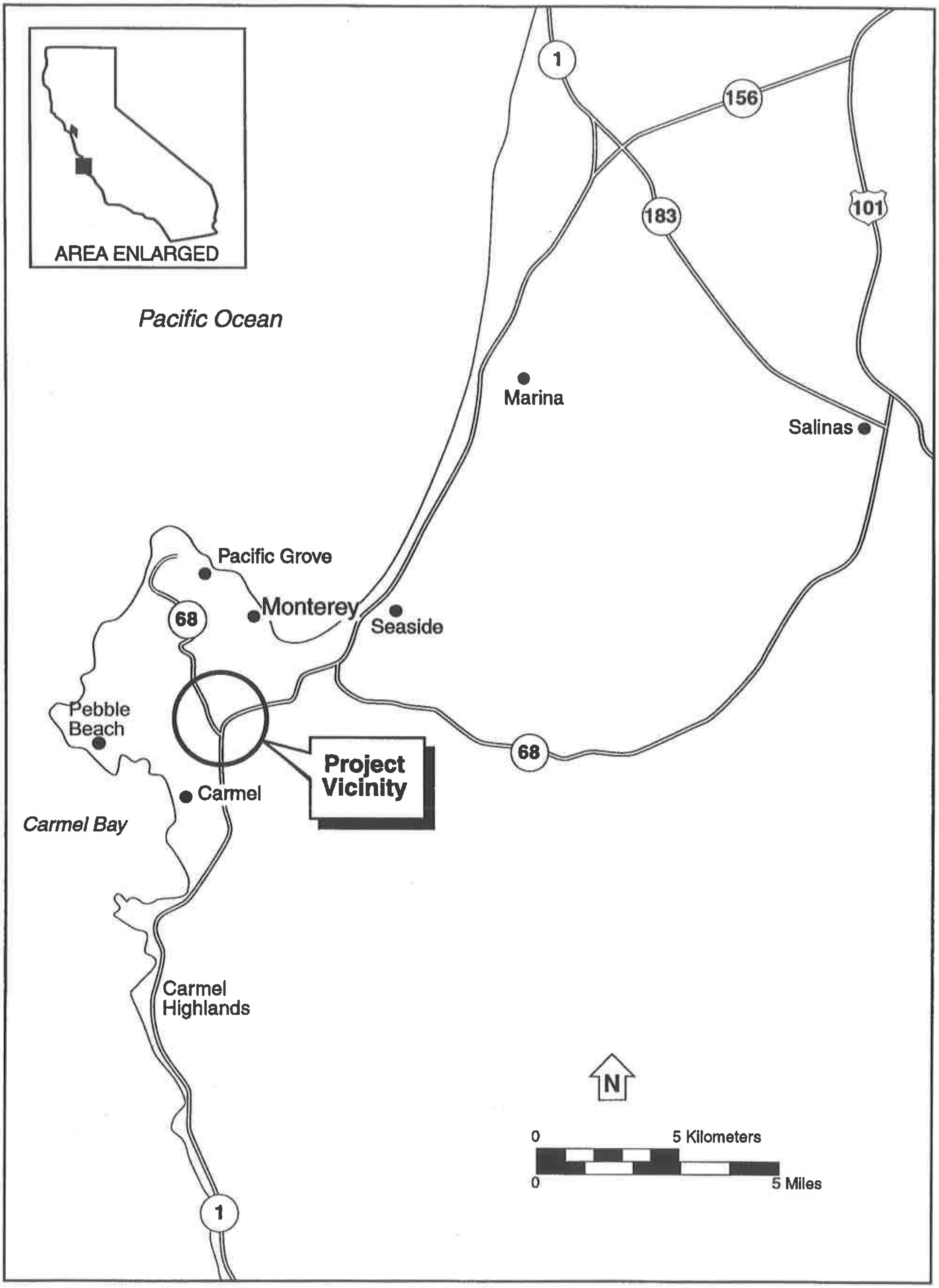

Figure 1. Project Vicinity
(Source: Southern California Atlas & Gazetteer, DeLorme Publishing company)

2.3 Funding

The project is proposed to be funded primarily development sources (Pebble Beach Company and CHOMP) and the City of Monterey as the lead agency (City and TAMC RIP Funds). The City of Monterey and the County of Monterey have $1,400,000 in TAMC RIP and City traffic Impact funds towards PA/ED and portion of final PS&E phase of this project. In addition, the City of Monterey has submitted funding requests from TAMC RIP Funds and other federal/state sources for construction. This project has been assigned the Project Development Processing Category 4B because it does not require substantial new right of way and does not substantially increase traffic capacity.

2.4 Project Schedule

Construction is scheduled to start in the spring of 2007 and to be completed by December 2009.

SECTION 3

AIR QUALITY STANDARDS AND EXISTING CONDITIONS

The following is a description of ambient air quality standards and existing air quality conditions in the vicinity of the project site.

3.1 Air Pollutants and Ambient Standards

Both the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (ARB) have established ambient air quality standards for common pollutants. These ambient air quality standards indicate levels of contaminants that represent safe levels. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents.

The federal and state ambient air quality standards and a summary of associated health effects are presented in Table 1. The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and PM10.

Ozone. State and federal standards for ozone have been set for a 1-hour averaging time. The state 1-hour ozone standard is 0.09 parts per million (ppm), not to be exceeded. The federal 1-hour ozone standard is 0.12 ppm, not to be exceeded more than three times in any 3-year period. A new federal standard for ozone was issued by the federal government in July 1997. The new ozone standard has been set at a concentration of 0.08 ppm measured over 8 hours. Monterey County has been designated as an attainment area for the federal standards and as nonattainment-transitional for the state ozone standard.

Ozone is not emitted directly into the air but is formed by a photochemical reaction in the atmosphere. Ozone precursors, which include ROG and NO_x, react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem. Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials. Once formed, ozone remains in the atmosphere for one or two days. It is then eliminated through chemical reaction with plants and by rainout and washout.

Particulate Matter. State and federal standards for PM10 are based on micrograms per cubic meter ($\mu g/m^3$) for a 24-hour average and as an annual geometric mean. Federal

PM10 standards are 150 μg/m^3 for the 24-hour average and 50 μg/m^3 for the annual mean. State standards are 50 μg/m^3 for the 24-hour average and 30 for the μg/m^3 annual geometric mean.

New federal standards for particulate matter less than 2.5 microns in diameter (generally designated as PM2.5) were issued in July 1997 by the federal government. PM2.5 is sometimes referred to as "fine particulate matter". The new PM2.5 standards have been set at a concentration of 15 μg/m^3 for the annual average and 65 μg/m^3 for the 24-hour average. The federal standards for PM10 are being maintained so that relatively larger, courser particulate matter continues to be regulated. The ARB and local air quality management districts in California have developed a PM2.5 monitoring network. The new network will collect data for various purposes including PM2.5 attainment/nonattainment designations, development and tracking of implementation plans, and assistance in health studies and other research activities.

PM10 and PM2.5 can reach the lungs when inhaled, resulting in health concerns related to respiratory disease. Suspended particulate matter can also affect vision or contribute to eye irritation. PM10 can remain in the atmosphere for up to seven days before removal by gravitational settling, rainout and washout. Monterey County is currently nonattainment for the state PM10 state standards.

Carbon Monoxide. State and federal CO standards have been set for both 1-hour and 8-hour averaging times. The state 1-hour standard is 20 parts per million (ppm) by volume, and the federal 1-hour standard is 35 ppm. Both state and federal standards are 9 ppm for the 8-hour averaging period. CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream.

Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

High CO concentrations occur in areas of limited geographic size, sometimes referred to as hot spots. Since CO concentrations are strongly associated with motor vehicle emissions, high CO concentrations generally occur in the immediate vicinity of roadways with high traffic volumes and traffic congestion. Areas adjacent to heavily traveled and congested intersections are particularly susceptible to high CO concentrations.

Table 1. Ambient Air Quality Standards Applicable in California

Pollutant	Symbol	Average Time	Standard, as parts per million: California	Standard, as parts per million: National	Standard, as micrograms per cubic meter: California	Standard, as micrograms per cubic meter: National	Violation Criteria: California	Violation Criteria: National
Ozone	O_3	1 hour	0.09	0.12	180	235	If exceeded	If exceeded on more than 3 days in 3 years
		8 hours	N/A	0.08	N/A	N/A	N/A	If exceeded on more than 3 days in 3 years
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
Nitrogen dioxide	NO_2	Annual average 1 hour	N/A	0.053	N/A	100	N/A	If exceeded
			0.25	N/A	470	N/A	If exceeded	N/A
Sulfur dioxide	SO_2	Annual average	N/A	0.03	N/A	80	N/A	If exceeded
		24 hours	0.05	0.14	131	365	If exceeded	If exceeded on more than 1 day per year
		1 hour	0.25	N/A	665	N/A	N/A	N/A
Hydrogen sulfide	H_2S	1 hour	0.03	N/A	42	N/A	If equaled or exceeded	N/A
Vinyl chloride	C_2H_3Cl	24 hours	0.010	N/A	26	N/A	If equaled or exceeded	N/A
Inhalable particulate matter	PM10	Annual geometric mean	N/A	N/A	30	N/A	If exceeded	N/A
		Annual arithmetic mean	N/A	N/A	N/A	50	N/A	If exceeded
		24 hours	N/A	N/A	50	150	N/A	If exceeded on more than 1 day per year
Fine particulate matter	PM2.5	Annual arithmetic mean	N/A	N/A	N/A	15	N/A	If exceeded
		24 hours	N/A	N/A	N/A	65	N/A	If exceeded on more than 1 day per year
Sulfate particles	SO_4	24 hours	N/A	N/A	25	N/A	If equaled or exceeded	N/A
Lead particles	Pb	Calendar quarter	N/A	N/A	N/A	1.5	N/A	If exceeded no more than 1 day per year
		30 days	N/A	N/A	1.5	60	If equaled or exceeded	N/A

Notes: All standards are based on measurements at 25 C and 1 atmosphere pressure.
National standards shown are the primary (health effects) standards.
N/A = not applicable.

3.2 Air Quality Monitoring

Table 2 presents air quality monitoring data for three pollutants: CO, ozone, and PM10. The data presented in Table 2 are for the latest three years in which data are available for the full year. The monitoring stations shown in the table are those closest to the project site for each of the three pollutants. Recent monitoring has not been conducted for other criteria air pollutants, such as sulfur dioxide, or nitrogen dioxide, because these pollutants are generally not a concern in Monterey County.

The area in the vicinity of the project site is considered a nonattainment area for the state PM10 standards because concentrations of this pollutant sometimes exceed the standards. Table 2 shows that neither the state nor federal ozone, CO, or PM10 standards were exceeded during the three year period at the monitoring stations closest to the project site.

Table 2 – Air Monitoring Results

Pollutant	State Standard	Federal Standard	2001	2002	2003
Ozone (O_3) – Carmel Valley – Ford Road	ppm	ppm			
Highest 1-hour average, ppm	0.09	0.12	0.085	0.080	0.082
Highest 8-hour average, ppm	No state standard	0.08	0.079	0.073	0.074
Days > State 1-hour standard			0	0	0
Days > Federal 1-hour standard			0	0	0
Days > Federal 8-hour standard			0	0	0
Ozone (O_3) – Monterey – Silver Cloud Court					
Highest 1-hour average, ppm	0.09	0.12	0.084	0.082	0.092
Highest 8-hour average, ppm	No state standard	0.08	0.069	0.067	0.081
Days > State 1-hour standard			0	0	0
Days > Federal 1-hour standard			0	0	0
Days > Federal 8-hour standard			0	0	0
Particulate Matter (PM10) – Carmel Valley – Ford Road	$\mu g/m^3$	$\mu g/m^3$			
Highest 24-hour average, $\mu g/m^3$	50	150	30	33	35
Second Highest 24-Hour average, $\mu g/m^3$			29	32	31
Days > State standard (measured)			0	0	0
Days > Federal standard (measured)			0	0	0
Carbon Monoxide (CO) – Salinas	ppm	ppm			
Highest 8-hour average, ppm	9.0	9	1.64	1.38	1.09
Days >State or Federal 8-hr standards			0	0	0

NOTE: The number of days that at least one measurement was greater than the level of the state or national standard is not necessarily the number of violations of the standard for the year since the hourly and eight hour standards can be violated more than once per day.

ppm = parts per million

$\mu g/m^3$ = micrograms per cubic meter

Source: (California Air Resources Board, 2003a). Monitoring data are from the California Air Resources Board website: http://www.arb.ca.gov/adam/adam.htm

3.3 Regulatory Setting

The proposed project is located in Monterey Unified Air Pollution Control District (MBUAPCD). The MBUAPCD has jurisdiction over air quality issues throughout Monterey, Santa Cruz, and San Benito counties. It administers air quality regulations developed at the federal, state, and local levels. Federal, state, and local air quality regulations applicable to the proposed project are described below.

Federal Clean Air Act. The federal Clean Air Act, enacted in 1970 and amended twice thereafter (most recently in 1990), establishes the framework for modern air pollution control. The act directs EPA to establish ambient standards for six pollutants: ozone, carbon monoxide (CO), lead, nitrogen dioxide, particulate matter, and sulfur dioxide. The standards are divided into primary and secondary standards; the former are set to protect human health with an adequate margin of safety and the latter to protect environmental values, such as plant and animal life.

The Clean Air Act requires states to submit a state implementation plan (SIP) for areas in nonattainment for federal air quality standards. The SIP, which is reviewed and approved by EPA, must demonstrate how the federal standards will be achieved. Failing to submit a plan or secure approval could lead to denial of federal funding and permitting authority. In cases where the SIP is submitted by the state but fails to demonstrate achievement of the standards, EPA is directed to prepare a federal implementation plan.

California Clean Air Act. Responsibility for achieving California's air quality standards, which are in most cases more stringent than the federal standards, is placed on ARB and local air pollution control districts. State standards are to be achieved through district-level air quality management plans that are incorporated into the SIP.

The California Clean Air Act requires local and regional air pollution control districts that are not attaining one or more of the state ambient air quality standards for ozone, CO, sulfur dioxide, or nitrogen dioxide to expeditiously adopt plans specifically designed to attain the standards. Each plan must be designed to achieve an annual 5% reduction in district wide emissions of each nonattainment pollutant or its precursors.

ARB has identified diesel exhaust as a toxic air contaminant under the state's air toxics identification program. ARB is currently developing an emission-source control program for the statewide heavy-duty truck fleet.

Local Air Quality Management. The air quality management agencies of primary importance in Monterey County include EPA, ARB, and MBUAPCD. EPA has established federal ambient air quality standards for which ARB and the MBUAPCD have primary implementation authority. ARB and the MBUAPCD also are responsible for ensuring that state ambient air quality standards are met.

3.4 Meteorology and Climate

The project is located between Monterey and Carmel, in Monterey County, in the North Central Coast Air Basin (NCCAB). The NCCAB is comprised of Monterey, Santa Cruz, and San Benito Counties. The basin lies along the central coast of California covering an area of 5,159 square miles. The northwest sector of the basin is dominated by the Santa Cruz Mountains. The Diablo Range marks the northeastern boundary, and together with the southern extent of the Santa Cruz Mountains, forms the Santa Clara Valley, which extends into the northeastern tip of the Basin. Farther south, the Santa Clara Valley evolves into the San Benito Valley which runs northwest-southeast and has the Gabilan Range as its western boundary. To the west of the Gabilan Range is the Salinas Valley which extends from Salinas at the northwest end to King City at the southeast end. The western side of the Salinas Valley is formed by the Sierra de Salinas, which also forms the eastern side of the smaller Carmel Valley. The coastal Santa Lucia Range defines the western side of the valley.

The semi-permanent high pressure cell in the eastern Pacific is the basin controlling factor in the climate of the air basin. In the summer, the high pressure cell is dominant and causes persistent west and northwest winds over the entire California coast. Air descends in the Pacific High forming a stable temperature inversion of hot air over a cool coastal layer of air. The onshore currents pass over cool ocean waters to bring fog and relatively cool air into the coastal valleys. The warmer air aloft acts as a lid to inhibit vertical air movements.

The general northwest-southeast orientation of mountainous ridges tends to restrict and channel the summer onshore air currents. Surface heating in the interior portion of the Salinas and San Benito Valleys creates a weak low pressure which intensifies the onshore air flow during the afternoon and evening.

In the fall, the surface winds become weak, and the marine layer grows shallow, dissipating altogether on some days. The air flow is occasionally reversed in a weak offshore movement, and the relatively stationary air mass is held in place by the Pacific High pressure cell, which allows pollutant to build up over a period of days. It is most often during this season that the north or east winds develop to transport pollutants from either the San Francisco Bay area or the Central Valley into the NCCAB.

During the winter, the Pacific High migrates southward and has less influence over the air basin. Air frequently flows in a southeasterly direction out of the Salinas and San Benito Valleys, especially during night and morning hours. Northwest winds are nevertheless still dominant in winter, but easterly flow is more frequent. The general absence of deep, persistent inversions and the occasional storm systems usually result in good air quality for the basin as a whole in winter and early spring.

Monterey Bay is a 25 mile wide inlet allowing marine air at low levels to penetrate the interior. The Salinas Valley is a steep-sloped coastal valley which opens out on Monterey Bay and extends southeastward with mountain ranges of two to three thousand feet elevation on either side of the valley. The broad area of the valley floor near the mouth is some 25 miles wide, narrowing to about six miles at Soledad, 40 miles inland and to three miles at King City, which is about 60 miles from the coast. At Salinas, near the northern end of the Valley, west and northwest winds occur about one-half the time during the entire year. Although the summer coastal stratus rarely extends beyond Soledad, which is about 40 miles from the ocean, the extended sea breeze consisting of warmer and dried air current frequently reaches far down the Salinas Valley.

3.5 Sensitive Land Uses

For the purposes of this air quality analysis, sensitive land uses are defined as locations where people reside or where the presence of pollutant emissions could adversely affect the use of the land. The area bordering the project site includes residences, medical offices, the Beverly Manor Convalescent home, and the CHOMP.

SECTION 4

CONSTRUCTION IMPACTS

4.1 Significance Thresholds

Implementation of the proposed project would result in construction and operational activity, which would generate air emissions. The MBUAPCD has identified significance thresholds for construction and operational emissions (MBUAPCD, 2002). The MBUAPCD's thresholds for construction are listed in Table 3 and for operational emissions in Table 4.

Table 3 – Construction Emission Thresholds

Threshold Level	PM10 (pounds/day)	ROG (pounds/day)	NOx (pounds/day)
Direct Emissions	82	*	*
District approved dispersion modeling can be used to refute (or validate) this determination of significance if direct emissions would not cause an exceedance of state PM10 ambient air quality standards. Construction sites with earthmoving (grading and excavation) exceeding 2.2 acres per day would be considered to generate emissions in excess of 82 pounds PM10 per day. *The MBUAPCD has not established construction related emission thresholds for ozone precursors (ROG and NOx) because these emissions have already been included in the emission inventories of State- and federally-required air plans.			

4.2 Impacts

During construction of the proposed project, emissions would be produced by a variety of sources. They include criteria pollutant emissions produced by construction equipment and fugitive dust generated by wind and the operation of construction equipment over exposed earth.

The quantity of pollutants emitted during construction activities varies greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, and weather conditions.

The Road Construction Emissions Model, Version 5.1, was used to estimate project construction emissions using information about the project (SMAQMD, 2003). This model uses information about the project type and schedule to estimate increases of ROG, NOx, and PM10 emissions generated during construction. The emission estimates assume that the total project acreage of 10 acres would be disturbed on the worst case day.

As shown in Table 4, unmitigated construction activities would result in a significant increase in PM10 that exceeds the MBUAPCD's emission thresholds.

Table 4 – Construction Emissions (unmitigated)

PM10 (pounds/day)
105
Notes: Emissions estimated with the Road Construction Emissions Model, Version 5.1. Model results included in Appendix.

4.3 Minimization Measures

The MBUAPCD has developed a list of feasible dust control measures designed to minimize construction dust. (MBUAPCD, 2002). The following measures include all construction measures that are applicable to the project. Implementation of appropriate measures from the following list will reduce construction-related impacts to a less than significant level.

Appropriate measures from the following list will be implemented at the Resident Engineer's discretion when daily watering of disturbed soil areas is ineffective at keeping dust from blowing off the site. In addition to these measures, the Contractor shall use California ARB approved on-road diesel fuel in diesel construction vehicles when the fuel is locally available. Use of this fuel will help reduce ozone precursors (ROG & NOx).

- Water all active construction areas at least twice daily. Watering frequency should be based on the type of construction, soil, and wind exposure.
- Prohibit all grading activities during periods of high wind (over 15 mph).
- Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that unused for four consecutive days.)
- Apply non-toxic binders (e.g. latex acrylic copolymer) to exposed areas after cut and fill areas and hydroseed area.
- Haul trucks shall maintain at least two feet of freeboard.
- Cover all trucks hauling dirt, sand, or loose materials.
- Plant trees or windbreaks on the windward perimeter of construction projects if adjacent to open land.
- Plant vegetative ground cover in disturbed areas as soon as possible.
- Cover inactive storage piles.

- Sweep streets if visible soil material is carried out from the construction site.
- Post a publicly visible sign which specifies the telephone number and person to contact regarding dust complaints. This person shall respond to complaints and take corrective action within 48 hours. The phone number of the MBUAPCD shall be visible to ensure compliance with Rule 402 (Nuisance).

SECTION 5

LOCAL CARBON MONOXIDE IMPACT ANALYSIS

5.1 Introduction

Intersections operating at level of service (LOS) E or F have the potential to cause elevated CO concentrations that can violate the state and federal CO ambient standards (Garza, V.J., et. al. 1997). This is because idling vehicles have high CO emission rates. The combination of idling vehicles at congested intersections along with meteorological conditions that limit pollutant dispersion can result in excessive CO concentrations.

Several of the improvements associated with the proposed project are designed to improve traffic flow along SR68 and SR1 and adjacent streets and, consequently, should improve CO concentrations at congested intersections.

CALINE 4 modeling was conducted for sensitive receptors near the SR 68/SR 1 intersection and for receptors along that portion of SR68 proposed for widening.

5.2 CO Modeling Methodology

The air quality microscale model used for this air quality report, CALINE4, is a line source model developed by Caltrans (California Department of Transportation, 1989). CALINE4 can predict pollutant concentrations for receptors located within 500 meters (1,500 feet) of the roadway.

High concentrations of CO are typically a localized occurrence. High concentrations of CO due to on-road vehicles are associated with high traffic volumes and heavily-congested roadway facilities. The CO analysis conducted for this air quality report focused on the location considered to have the greatest potential for experiencing high CO concentrations.

Background CO concentrations used in this Air Quality Technical Report were based on the recommended background concentrations for 2010 as described in the MBUAPCD's CEQA Air Quality Guidelines (2002). Those concentrations were 3.7 for the 1-hour and 1.7 for the 8-hour average. These same background concentrations were also assumed for 2030. A persistence factor of 0.7 was used to convert 1-hour concentrations to 8-hour.

The CALINE4 modeling analysis conducted for this air quality report used PM peak hour traffic data from the traffic analysis conducted for the proposed project. The traffic data included peak hour volumes, intersection geometrics, and intersection operational characteristics.

5.3 Emission Factors

On-road motor vehicle emission rates, expressed in grams per vehicle mile, were used in the analysis of CO concentrations. The estimate of motor vehicle emission rates takes into account the combined effects of vehicle operating mode, types of vehicles, temperature, vehicle speed, year, and altitude. Motor vehicle emission rates used for this report were generated from the ARB emission factor model EMFAC2002 (Version 2.2). Emission rates used in this air quality report were based on the following data:

- the adjusted January mean minimum temperature is 40°F and
- the project location has a motor vehicle inspection and maintenance program.

The output files for EMFAC2002 (Version 2.2) for both 2010 and 2030 conditions are included in Appendix A.

5.4 Meteorology

Assumed meteorological conditions are important factors in estimating CO concentrations. The meteorological conditions assumed for this air quality report are from Monterey Bay Unified Air Pollution Control District's CEQA Air Quality Guidelines (2002). The following meteorological assumptions were used:

- Wind Speed (U) = 1 meter per second
- Wind Direction = Worst Case
- Atmospheric Stability Class = 7(G)
- Mixing Height = 1,000 meters
- Sigma Theta = 10 degrees
- Surface Roughness = 175 centimeters
- Temperature = 55 degrees Fahrenheit
- Altitude = 0 meters

5.5 Receptor Locations

The CALINE4 model estimates CO concentrations at specific locations. These locations are referred to as "receptors", and represent specific locations in the study area. For this air quality report, receptors were placed at the closest locations to each intersection. The receptor locations included the commercial buildings northwest of the Route 1/Route 68 intersection, Beverly Manor Convalescent home and the CHOMP (both north of Route 68), residences south of Route 68, and the California Department of Forestry, located southwest of the Route 1/Route 68 intersection.

5.6 Significance Thresholds

For this Air Quality Technical Report, project-related conditions that would result in CO concentrations exceeding state or national air quality standards are considered to have a significant impact.

5.7 Results

The CALINE4 CO modeling results are summarized in Table 5. The highest concentrations for all scenarios were found at the California Department of Forestry building. All estimated CO concentrations were found to be substantially less than the state and federal CO ambient standards. Consequently, the project would neither cause nor contribute to a violation of CO concentrations and the impacts on CO concentrations are less than significant.

Table 5 – CO Concentrations SR68 / SR1

	No Build 2010		No Build 2030		Alt. 1AC 2010		Alt. 1AC 2030		Alt. 1BC 2010		Alt. 1 BC 2030	
Receptor	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour
1. Extended Care	5.4	2.9	4.0	1.9	5.4	2.9	4.0	1.9	5.5	3.0	4.0	1.9
2. CHOMP	4.7	2.4	3.9	1.8	4.7	2.4	3.9	1.8	4.7	2.4	3.9	1.8
3. CHOMP	4.6	2.3	3.9	1.8	4.6	2.3	3.9	1.8	4.6	2.3	3.9	1.8
4. CHOMP	4.5	2.3	3.9	1.8	4.5	2.3	3.9	1.8	4.5	2.3	3.9	1.8
5. CHOMP	4.5	2.3	3.9	1.8	4.5	2.3	3.9	1.8	4.6	2.3	3.9	1.8
6. Residential Unit	5.5	3.0	4.0	1.9	5.5	3.0	4.0	1.9	5.5	3.0	4.0	1.9
7. Residential Unit	5.5	3.0	4.0	1.9	5.5	3.0	4.0	1.9	5.5	3.0	4.0	1.9
8. Residential Unit	5.3	2.8	4.0	1.9	5.3	2.8	4.0	1.9	5.4	2.9	4.0	1.9
9. Residential Unit	5.4	3.9	4.0	1.9	5.4	3.9	4.0	1.9	5.4	2.9	4.0	1.9
10. Residential Unit	5.1	2.7	4.0	1.9	5.2	2.8	4.0	1.9	5.2	2.8	4.0	1.9
11. Residential Unit	5.0	2.6	3.9	1.8	5.0	2.6	3.9	1.8	5.0	2.6	3.9	1.8
12. Extended Care	5.0	2.6	4.0	1.9	5.1	2.7	4.0	1.9	5.1	2.7	3.9	1.8
13. Carmel Hill Professional Center	5.1	2.7	4.0	1.9	5.1	2.7	4.0	1.9	5.2	2.8	4.0	1.9
14. California Dept. Forestry	5.7	3.1	4.1	2.0	5.7	3.1	4.1	2.0	5.7	3.1	4.1	2.0
California Ambient Standards	20.0	9.0	20.0	9.0	20.0	9.0	20.0	9.0	20.0	9.0	20.0	9.0

Notes: One-hour CO concentrations estimated used CALINE4 model.

EMFAC2002 model used to generate fleet average emission rates.

One-hour 2010 and 2030 conditions both assume a background CO concentration of 3.7 ppm for the 1-hour average and 1.7 ppm for the 8-hour average.

One-hour concentrations converted to 8-hour using a persistence factor of 0.7.

CALINE4 modeling results are shown in Appendix A.

SECTION 6

CONFORMITY WITH THE STATE IMPLEMENTATION PLAN

The federal Clean Air Act requires that transportation plans, programs, and projects approved by a Metropolitan Planning Organization (MPO) conform to the SIP. The MPO for the proposed project is the Association of Monterey Bay Area Governments (AMBAG). Demonstrating a project's conformity with the SIP involves inclusion of the project in the Regional Transportation Plan (RTP) or Transportation Improvement Program. Demonstrating a project's conformity with the SIP also involves determining that the project would not result in a violation of the CO air quality standard.

The AMBAG Board of Directors adopted the FY 2002/03 to FY 2004/05 AMBAG Metropolitan Transportation Improvement Program (MTIP) at their August 14, 2002 meeting. Federal approval was received October 4, 2002. Projects in the FY 2002/03 to FY 2004/05 AMBAG Metropolitan Transportation Improvement Program (MTIP) can be viewed and printed from AMBAG's website (http://www.ambag.org/transportation2.html).

The SR68/Highway 1 interchange improvement project was included in AMBAG's 2001 Regional Transportation Plan. AMBAG's transportation conformity determination shows that the transportation projects planned for Monterey County in the latest MTIP will have air quality impacts consistent with those contained in the state implementation plans (SIPs) for achieving the National Ambient Air Quality Standards (NAAQS), and that emissions will not exceed the SIP targets for emissions from mobile sources.

The AMBAG SIP conformity determination document does not contain a detailed enough description of the project to make a distinction between project alternatives. However, for air quality purposes, the 1AC and 1BC build alternatives are functionally equivalent. Consequently, both project build alternatives are assumed to be in conformance with the SIP.

In addition, as described in Section 5.0 of this air quality report, the project would not result in a violation of the CO air quality standard. Therefore, the project is considered to be in conformance with the SIP for CO hot spot purposes.

SECTION 7

REGIONAL AIR QUALITY IMPACTS

Transportation projects have the potential to affect air quality on a regional level. The regional air quality pollutant most likely to be affected by transportation projects is ozone. Because ozone is formed over time by a chemical reaction involving precursor emissions, its concentration is distributed regionally.

The SR68/Highway 1 interchange improvement project is expected to result in a reduction in vehicle delay and increase in average vehicle speed. However, the project is not expected to result in a substantial redistribution of vehicle travel, nor is the project expected to result in a change in the number of vehicle trips (Fehr & Peers, 2003). Therefore, the project-related change in ozone precursor emissions is not quantified for this Air Quality Technical Report.

The project build alternatives are expected to have the same effect on regional travel. Therefore, the project alternatives would be unlikely to affect regional ozone precursor emissions.

Since the project would not generate additional vehicle trips and would not substantially redistribute vehicle travel, the project is not expected to result in a substantial net change in vehicle travel and, thus, is not expected to have a substantial effect on regional ozone precursor emission levels. Therefore, the proposed project is considered to have a less than significant impact on regional air quality.

REFERENCES

California Air Resources Board. 2003. Diesel Risk Reduction Plan (http://www.arb.ca.gov/diesel/documents/rrpapp.htm). Sacramento, CA.

California Department of Transportation. 1998. Air Quality Technical Analysis Notes. Sacramento, CA.

Fehr & Peers. 2003. Technical Memorandum: Route 68 (Holman Highway) 2010 & 2030 Traffic Forecasts (October 6, 2003).

Garza, V.J., P. Graney, and D. Sperling. 1997. Transportation Project-Level Carbon Monoxide Protocol. University of California, Davis. Prepared for the California Department of Transportation.

Monterey Bay Unified Air Pollution Control District. 2002. CEQA Air Quality Guidelines. Adopted October 1995, Revised February 1997, August 1998, December 1999, September 2000, and September 2002.

Sacramento Metropolitan Air Quality Management District. 2003. Road Construction Emissions Model 5.1, Sacramento, CA. http://www.airquality.org/ceqa/index.shtml

Appendix A

SR68/Highway 1 Interchange Improvements Road Construction Emissions Model Results

Road Construction Emissions Model, Version 5.1

Road Construction Emissions Model, Version 5.1

Emission Estimates for ->SR68					Exhaust	Fugitive Dust
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)
Grubbing/Land Clearing	16	81	98	105	5	100
Grading/Excavation	13	67	83	105	5	100
Drainage/Utilities/Sub-Grade	13	67	73	104	4	100
Paving	8	38	61	3	3	0
Maximum (pounds/day)	16	81	98	105	5	100
Total (tons/construction project)	2	8	11	12	1	11

Notes: Project Start Year -> 2006

Project Length (months) -> 12

Total Project Area (acres) -> 20

Maximum Area Disturbed/Day (acres) -> 10

Total Soil Imported/Exported (yd^3/day)-> 0

PM10 estimates shown above assume no control of fugitive dust. With the mitigation measures specified, PM10 can be reduced by 50% from watering and associated dust control measures.

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

EMFAC2002 Results

```
Title     : Monterey County Avg 2010 Winter Default Title
Version   : Emfac2002 V2.2 Apr 23 2003
Run Date  : 05/24/04 17:27:08
Scen Year: 2010 -- Model Years: 1965 to 2010
Season    : Winter
Area      : Monterey County
****************************************************************************************
     Year:2010 -- Model Years 1965 to 2010 Inclusive --  Winter
     Emfac2002 Emission Factors: V2.2 Apr 23 2003


     Pollutant Name: Carbon Monoxide          Temperature:  40F  Relative
Humidity:  50%
```

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
1	7.536	13.470	11.732	22.363	113.003	44.208	11.899
2	7.536	13.470	11.732	22.363	113.003	44.208	11.899
3	7.397	13.172	11.491	22.363	113.003	44.208	11.712
4	7.134	12.611	11.039	22.363	113.003	44.208	11.358
5	6.888	12.091	10.621	22.363	113.003	44.208	11.029
10	5.869	9.988	8.562	15.061	74.821	36.552	8.783
15	5.114	8.498	7.156	10.684	52.375	31.726	7.278
20	4.537	7.411	6.165	7.982	38.758	28.891	6.231
25	4.087	6.604	5.449	6.279	30.319	27.597	5.484
30	3.733	6.002	4.929	5.201	25.070	27.661	4.945
35	3.455	5.560	4.557	4.537	21.911	29.118	4.563
40	3.241	5.253	4.308	4.167	20.241	32.227	4.308
45	3.086	5.071	4.171	4.032	19.764	37.543	4.169
50	2.991	5.017	4.150	4.109	20.395	46.085	4.150
55	2.963	5.114	4.266	4.412	22.245	59.654	4.275
60	3.019	5.407	4.560	4.994	25.643	81.461	4.588
65	3.190	5.980	5.113	5.960	31.241	117.362	5.181

Title   : Monterey County Avg 2030 Winter Default Title
Version   : Emfac2002 V2.2 Apr 23 2003
Run Date : 06/01/04 10:07:34
Scen Year: 2030 -- Model Years: 1985 to 2030
Season   : Winter
Area   : Monterey County
****
****

Year:2030 -- Model Years 1985 to 2030 Inclusive -- Winter
Emfac2002 Emission Factors: V2.2 Apr 23 2003

County Average   Monterey Count   County
Average

Pollutant Name: Carbon Monoxide   Temperature: 40F Relative
Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
1	1.113	1.945	2.595	6.137	24.396	28.463	2.050
2	1.113	1.945	2.595	6.137	24.396	28.463	2.050
3	1.102	1.923	2.570	6.137	24.396	28.463	2.035
4	1.081	1.882	2.521	6.137	24.396	28.463	2.006
5	1.060	1.842	2.474	6.137	24.396	28.463	1.978
10	0.963	1.659	2.183	4.199	16.079	24.041	1.658
15	0.878	1.503	1.951	3.014	11.210	21.135	1.431
20	0.804	1.368	1.761	2.268	8.267	19.302	1.262
25	0.738	1.251	1.602	1.790	6.447	18.306	1.132
30	0.680	1.150	1.467	1.481	5.317	18.047	1.030
35	0.628	1.061	1.351	1.286	4.638	18.539	0.949
40	0.582	0.984	1.252	1.170	4.277	19.912	0.885
45	0.541	0.916	1.167	1.116	4.170	22.451	0.837
50	0.505	0.857	1.093	1.117	4.299	26.680	0.804
55	0.472	0.806	1.031	1.173	4.685	33.529	0.789
60	0.444	0.761	0.980	1.293	5.399	44.655	0.795
65	0.418	0.723	0.939	1.496	6.578	63.087	0.833

CO Modeling Results

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

          JOB: 2010 No Project
          RUN: Hour 1            (WORST CASE ANGLE)
    POLLUTANT: Carbon Monoxide
```

I. SITE VARIABLES

```
     U=    1.0 M/S              Z0= 175. CM            ALT=      0. (M)
   BRG= WORST CASE              VD=    .0 CM/S
  CLAS=      7 (G)              VS=    .0 CM/S
  MIXH= 1000. M                AMB=    .0 PPM
 SIGTH=    10. DEGREES        TEMP=    .0 DEGREE (C)
```

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Link A	*	277	530	329	303	*	AG	900	12.0	.0	32.0
B. Link B	*	329	303	421	211	*	AG	1000	12.0	.0	32.0
C. Link C	*	421	211	513	113	*	AG	1200	12.0	.0	32.0
D. Link D	*	287	530	339	303	*	AG	1300	12.0	.0	32.0
E. Link E	*	339	303	431	211	*	AG	1300	12.0	.0	32.0
F. Link F	*	431	211	523	113	*	AG	1400	12.0	.0	32.0
G. Link G	*	508	30	449	47	*	AG	1000	12.0	.0	30.0
H. Link H	*	449	47	404	152	*	AG	1000	12.0	.0	68.0
I. Link I	*	865	319	528	116	*	AG	1050	12.0	.0	68.0
J. Link J	*	865	319	606	117	*	AG	6500	12.0	.0	68.0
K. Link K	*	606	117	527	-40	*	AG	6500	12.0	.0	68.0
L. Link L	*	527	-40	500	-99	*	AG	6500	12.0	.0	60.0
M. Link M	*	611	7	528	116	*	AG	1200	12.0	.0	68.0
N. Link N	*	513	113	527	-40	*	AG	600	12.0	.0	68.0
O. Link O	*	508	30	513	113	*	AG	1000	12.0	.0	68.0

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

JOB: 2010 No Project
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	387	292	1.8
2. Recpt 2	340	437	1.8
3. Recpt 3	332	479	1.8
4. Recpt 4	450	429	1.8
5. Recpt 5	471	406	1.8
6. Recpt 6	274	404	1.8
7. Recpt 7	270	435	1.8
8. Recpt 8	257	470	1.8
9. Recpt 9	254	502	1.8
10. Recpt 10	237	521	1.8
11. Recpt 11	214	560	1.8
12. Recpt 12	383	321	1.8
13. Recpt 13	513	206	1.8
14. Recpt 14	434	-27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	153.	1.7	.0	.1	.3	.0	.4	.2	.0	.0
2. Recpt 2	157.	1.0	.0	.0	.1	.0	.1	.1	.0	.0
3. Recpt 3	158.	.9	.0	.0	.1	.0	.0	.1	.0	.0
4. Recpt 4	169.	.8	.0	.0	.0	.0	.0	.1	.0	.0
5. Recpt 5	172.	.8	.0	.0	.0	.0	.0	.1	.0	.0
6. Recpt 6	142.	1.8	.3	.2	.1	.3	.2	.1	.0	.0
7. Recpt 7	146.	1.8	.4	.1	.1	.4	.2	.1	.0	.0
8. Recpt 8	147.	1.6	.3	.1	.0	.3	.1	.0	.0	.0
9. Recpt 9	149.	1.7	.4	.0	.0	.4	.1	.0	.0	.0
10. Recpt 10	148.	1.4	.3	.0	.0	.3	.1	.0	.0	.0
11. Recpt 11	148.	1.3	.2	.0	.0	.3	.0	.0	.0	.0
12. Recpt 12	156.	1.3	.0	.0	.2	.0	.2	.2	.0	.0
13. Recpt 13	174.	1.4	.0	.0	.0	.0	.0	.2	.0	.0
14. Recpt 14	52.	2.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: 2010 No Project
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

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

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O
1. Recpt 1	.0	.0	.3	.0	.0	.0	.0
2. Recpt 2	.0	.0	.2	.1	.0	.0	.0
3. Recpt 3	.0	.0	.2	.1	.0	.0	.0
4. Recpt 4	.0	.0	.3	.1	.0	.0	.0
5. Recpt 5	.0	.0	.3	.1	.0	.0	.0
6. Recpt 6	.0	.0	.3	.0	.0	.0	.0
7. Recpt 7	.0	.0	.3	.0	.0	.0	.0
8. Recpt 8	.0	.0	.3	.0	.0	.0	.0
9. Recpt 9	.0	.0	.3	.0	.0	.0	.0
10. Recpt 10	.0	.0	.3	.0	.0	.0	.0
11. Recpt 11	.0	.0	.2	.0	.0	.0	.0
12. Recpt 12	.0	.0	.3	.1	.0	.0	.0
13. Recpt 13	.0	.0	.5	.2	.1	.1	.1
14. Recpt 14	.2	.8	.7	.0	.1	.0	.0

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

JOB: 2030 No Project
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S
BRG= WORST CASE
CLAS= 7 (G)
MIXH= 1000. M
SIGTH= 10. DEGREES

Z0= 175. CM
VD= .0 CM/S
VS= .0 CM/S
AMB= .0 PPM
TEMP= .0 DEGREE (C)

ALT= 0. (M)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Link A	277	530	329	303	AG	965	2.1	.0	32.0
B. Link B	329	303	421	211	AG	1088	2.1	.0	32.0
C. Link C	421	211	513	113	AG	1151	2.1	.0	32.0
D. Link D	287	530	339	303	AG	1416	2.1	.0	32.0
E. Link E	339	303	431	211	AG	1459	2.1	.0	32.0
F. Link F	431	211	523	113	AG	1442	2.1	.0	32.0
G. Link G	508	30	449	47	AG	961	2.1	.0	30.0
H. Link H	449	47	404	152	AG	961	2.1	.0	68.0
I. Link I	865	319	528	116	AG	1192	2.1	.0	68.0
J. Link J	865	319	606	117	AG	6500	2.1	.0	68.0
K. Link K	606	117	527	-40	AG	6500	2.1	.0	68.0
L. Link L	527	-40	500	-99	AG	6500	2.1	.0	60.0
M. Link M	611	7	528	116	AG	1746	2.1	.0	68.0
N. Link N	513	113	527	-40	AG	1359	2.1	.0	68.0
O. Link O	508	30	513	113	AG	961	2.1	.0	68.0

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

JOB: 2030 No Project
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	387	292	1.8
2. Recpt 2	340	437	1.8
3. Recpt 3	332	479	1.8
4. Recpt 4	450	429	1.8
5. Recpt 5	471	406	1.8
6. Recpt 6	274	404	1.8
7. Recpt 7	270	435	1.8
8. Recpt 8	257	470	1.8
9. Recpt 9	254	502	1.8
10. Recpt 10	237	521	1.8
11. Recpt 11	214	560	1.8
12. Recpt 12	383	321	1.8
13. Recpt 13	513	206	1.8
14. Recpt 14	434	-27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	152.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	157.	.2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	158.	.2	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	169.	.2	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	172.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	142.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	146.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	147.	.3	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	149.	.3	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	148.	.3	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	148.	.2	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	155.	.3	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	174.	.3	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	51.	.4	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: 2030 No Project
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

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

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	.0	.1	.1	.0	.0	.0	.0

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

JOB: 2010 1AC
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 175. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= .0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Link A	*	277	530	329	303	*	AG	900	12.0	.0	32.0
B. Link B	*	329	303	421	211	*	AG	1000	12.0	.0	32.0
C. Link C	*	421	211	513	113	*	AG	1200	12.0	.0	48.0
D. Link D	*	287	530	339	303	*	AG	1300	12.0	.0	48.0
E. Link E	*	339	303	431	211	*	AG	1300	12.0	.0	48.0
F. Link F	*	431	211	523	113	*	AG	1400	12.0	.0	48.0
G. Link G	*	508	30	449	47	*	AG	1000	12.0	.0	30.0
H. Link H	*	449	47	404	152	*	AG	1000	12.0	.0	68.0
I. Link I	*	865	319	528	116	*	AG	1050	12.0	.0	68.0
J. Link J	*	865	319	606	117	*	AG	6500	12.0	.0	68.0
K. Link K	*	606	117	527	-40	*	AG	6500	12.0	.0	68.0
L. Link L	*	527	-40	500	-99	*	AG	6500	12.0	.0	60.0
M. Link M	*	611	7	528	116	*	AG	1200	12.0	.0	68.0
N. Link N	*	513	113	527	-40	*	AG	600	12.0	.0	68.0
O. Link O	*	508	30	513	113	*	AG	1000	12.0	.0	68.0

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

JOB: 2010 1AC
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	387	292	1.8
2. Recpt 2	340	437	1.8
3. Recpt 3	332	479	1.8
4. Recpt 4	450	429	1.8
5. Recpt 5	471	406	1.8
6. Recpt 6	274	404	1.8
7. Recpt 7	270	435	1.8
8. Recpt 8	257	470	1.8
9. Recpt 9	254	502	1.8
10. Recpt 10	237	521	1.8
11. Recpt 11	214	560	1.8
12. Recpt 12	383	321	1.8
13. Recpt 13	513	206	1.8
14. Recpt 14	434	-27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	151.	1.7	.0	.1	.3	.0	.4	.3	.0	.0
2. Recpt 2	158.	1.0	.0	.0	.1	.0	.1	.1	.0	.0
3. Recpt 3	158.	.9	.0	.0	.1	.0	.0	.1	.0	.0
4. Recpt 4	169.	.8	.0	.0	.0	.0	.0	.1	.0	.0
5. Recpt 5	172.	.8	.0	.0	.0	.0	.0	.1	.0	.0
6. Recpt 6	142.	1.8	.3	.2	.1	.3	.2	.1	.0	.0
7. Recpt 7	146.	1.8	.4	.1	.1	.4	.2	.1	.0	.0
8. Recpt 8	147.	1.6	.3	.1	.0	.4	.1	.0	.0	.0
9. Recpt 9	149.	1.7	.4	.0	.0	.4	.1	.0	.0	.0
10. Recpt 10	148.	1.5	.3	.0	.0	.3	.1	.0	.0	.0
11. Recpt 11	148.	1.3	.2	.0	.0	.3	.0	.0	.0	.0
12. Recpt 12	156.	1.4	.0	.0	.2	.0	.2	.2	.0	.0
13. Recpt 13	174.	1.4	.0	.0	.0	.0	.0	.2	.0	.0
14. Recpt 14	52.	2.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: 2010 1AC
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

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

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O
1. Recpt 1	.0	.0	.4	.0	.0	.0	.0
2. Recpt 2	.0	.0	.2	.1	.0	.0	.0
3. Recpt 3	.0	.0	.2	.1	.0	.0	.0
4. Recpt 4	.0	.0	.3	.1	.0	.0	.0
5. Recpt 5	.0	.0	.3	.1	.0	.0	.0
6. Recpt 6	.0	.0	.3	.0	.0	.0	.0
7. Recpt 7	.0	.0	.3	.0	.0	.0	.0
8. Recpt 8	.0	.0	.3	.0	.0	.0	.0
9. Recpt 9	.0	.0	.3	.0	.0	.0	.0
10. Recpt 10	.0	.0	.3	.0	.0	.0	.0
11. Recpt 11	.0	.0	.2	.0	.0	.0	.0
12. Recpt 12	.0	.0	.3	.1	.0	.0	.0
13. Recpt 13	.0	.0	.5	.2	.1	.1	.1
14. Recpt 14	.2	.8	.7	.0	.1	.0	.0

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

JOB: 2030 1AC
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 175. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= .0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Link A	*	277	530	329	303	*	AG	900	2.1	.0	32.0
B. Link B	*	329	303	421	211	*	AG	965	2.1	.0	32.0
C. Link C	*	421	211	513	113	*	AG	1088	2.1	.0	48.0
D. Link D	*	287	530	339	303	*	AG	1151	2.1	.0	48.0
E. Link E	*	339	303	431	211	*	AG	1416	2.1	.0	48.0
F. Link F	*	431	211	523	113	*	AG	1459	2.1	.0	48.0
G. Link G	*	508	30	449	47	*	AG	1442	2.1	.0	30.0
H. Link H	*	449	47	404	152	*	AG	961	2.1	.0	68.0
I. Link I	*	865	319	528	116	*	AG	961	2.1	.0	68.0
J. Link J	*	865	319	606	117	*	AG	6500	2.1	.0	68.0
K. Link K	*	606	117	527	-40	*	AG	6500	2.1	.0	68.0
L. Link L	*	527	-40	500	-99	*	AG	6500	2.1	.0	60.0
M. Link M	*	611	7	528	116	*	AG	1746	2.1	.0	68.0
N. Link N	*	513	113	527	-40	*	AG	1359	2.1	.0	68.0
O. Link O	*	508	30	513	113	*	AG	961	2.1	.0	68.0

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

JOB: 2030 1AC
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	387	292	1.8
2. Recpt 2	340	437	1.8
3. Recpt 3	332	479	1.8
4. Recpt 4	450	429	1.8
5. Recpt 5	471	406	1.8
6. Recpt 6	274	404	1.8
7. Recpt 7	270	435	1.8
8. Recpt 8	257	470	1.8
9. Recpt 9	254	502	1.8
10. Recpt 10	237	521	1.8
11. Recpt 11	214	560	1.8
12. Recpt 12	383	321	1.8
13. Recpt 13	513	206	1.8
14. Recpt 14	434	-27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	151.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	157.	.2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	158.	.2	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	169.	.2	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	172.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	142.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	146.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	147.	.3	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	149.	.3	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	148.	.3	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	148.	.2	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	155.	.3	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	174.	.3	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	51.	.4	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: 2030 1AC
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

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

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	.0	.1	.1	.0	.0	.0	.0

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

JOB: 2010 1bc roundabout
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 175. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= .0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Link A	277	530	329	303	AG	900	12.0	.0	48.0
B. Link B	329	303	421	211	AG	1000	12.0	.0	48.0
C. Link C	421	211	513	113	AG	1200	12.0	.0	48.0
D. Link D	287	530	339	303	AG	1300	12.0	.0	48.0
E. Link E	339	303	431	211	AG	1300	12.0	.0	48.0
F. Link F	431	211	523	113	AG	1400	12.0	.0	48.0
G. Link G	513	113	519	102	AG	1000	12.0	.0	12.0
H. Link H	519	102	534	107	AG	1000	12.0	.0	12.0
I. Link I	534	107	525	114	AG	37	12.0	.0	11.0
J. Link J	525	114	519	102	AG	671	12.0	.0	12.0
K. Link K	519	102	508	30	AG	988	12.0	.0	48.0
L. Link L	508	30	449	47	AG	900	12.0	.0	48.0
M. Link M	449	47	404	152	AG	900	12.0	.0	68.0
N. Link N	865	319	528	116	AG	900	12.0	.0	68.0
O. Link O	865	319	606	117	AG	6500	12.0	.0	68.0
P. Link P	606	117	527	-40	AG	6500	12.0	.0	48.0
Q. Link Q	527	-40	500	-99	AG	6500	12.0	.0	48.0
R. Link R	611	7	528	116	AG	1200	12.0	.0	48.0
S. Link S	530	104	527	-40	AG	500	12.0	.0	48.0

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

JOB: 2010 1bc roundabout
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	387	292	1.8
2. Recpt 2	340	437	1.8
3. Recpt 3	332	479	1.8
4. Recpt 4	450	429	1.8
5. Recpt 5	471	406	1.8
6. Recpt 6	274	404	1.8
7. Recpt 7	270	435	1.8
8. Recpt 8	257	470	1.8
9. Recpt 9	254	502	1.8
10. Recpt 10	237	521	1.8
11. Recpt 11	214	560	1.8
12. Recpt 12	383	321	1.8
13. Recpt 13	513	206	1.8
14. Recpt 14	434	-27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	150.	1.8	.0	.2	.3	.0	.4	.3	.0	.0
2. Recpt 2	157.	1.0	.0	.0	.1	.0	.1	.1	.0	.0
3. Recpt 3	158.	.9	.0	.0	.1	.0	.0	.1	.0	.0
4. Recpt 4	169.	.8	.0	.0	.0	.0	.0	.1	.0	.0
5. Recpt 5	171.	.9	.0	.0	.0	.0	.0	.1	.0	.0
6. Recpt 6	142.	1.8	.3	.2	.1	.3	.2	.1	.0	.0
7. Recpt 7	145.	1.8	.4	.1	.1	.4	.2	.1	.0	.0
8. Recpt 8	147.	1.7	.3	.1	.0	.4	.1	.0	.0	.0
9. Recpt 9	149.	1.7	.4	.0	.0	.4	.1	.0	.0	.0
10. Recpt 10	148.	1.5	.3	.0	.0	.3	.1	.0	.0	.0
11. Recpt 11	148.	1.3	.2	.0	.0	.3	.0	.0	.0	.0
12. Recpt 12	154.	1.4	.0	.0	.2	.0	.2	.2	.0	.0
13. Recpt 13	174.	1.5	.0	.0	.0	.0	.0	.2	.0	.0
14. Recpt 14	52.	2.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: 2010 1bc roundabout
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

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

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.2	.1	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.2	.1	.0	.0
4. Recpt 4	.0	.0	.0	.0	.0	.0	.0	.3	.1	.0	.0
5. Recpt 5	.0	.0	.0	.0	.0	.0	.0	.3	.1	.0	.0
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
11. Recpt 11	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
12. Recpt 12	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
13. Recpt 13	.0	.0	.1	.0	.0	.0	.0	.5	.2	.1	.1
14. Recpt 14	.0	.0	.0	.0	.0	.1	.8	.6	.0	.1	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
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JOB: 2030 1bc roundabout
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 175. CM	ALT=	0. (M)
BRG= WORST CASE	VD= .0 CM/S		
CLAS= 7 (G)	VS= .0 CM/S		
MIXH= 1000. M	AMB= .0 PPM		
SIGTH= 10. DEGREES	TEMP= .0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Link A	*	277	530	329	303	*	AG	965	2.1	.0	48.0
B. Link B	*	329	303	421	211	*	AG	1088	2.1	.0	48.0
C. Link C	*	421	211	513	113	*	AG	1200	2.1	.0	48.0
D. Link D	*	287	530	339	303	*	AG	1500	2.1	.0	48.0
E. Link E	*	339	303	431	211	*	AG	1483	2.1	.0	48.0
F. Link F	*	431	211	523	113	*	AG	1400	2.1	.0	48.0
G. Link G	*	513	113	519	102	*	AG	1568	2.1	.0	12.0
H. Link H	*	519	102	534	107	*	AG	1041	2.1	.0	12.0
I. Link I	*	534	107	525	114	*	AG	37	2.1	.0	11.0
J. Link J	*	525	114	519	102	*	AG	671	2.1	.0	12.0
K. Link K	*	519	102	508	30	*	AG	988	2.1	.0	48.0
L. Link L	*	508	30	449	47	*	AG	900	2.1	.0	48.0
M. Link M	*	449	47	404	152	*	AG	900	2.1	.0	68.0
N. Link N	*	865	319	528	116	*	AG	900	2.1	.0	68.0
O. Link O	*	865	319	606	117	*	AG	6500	2.1	.0	68.0
P. Link P	*	606	117	527	-40	*	AG	6500	2.1	.0	48.0
Q. Link Q	*	527	-40	500	-99	*	AG	6500	2.1	.0	48.0
R. Link R	*	611	7	528	116	*	AG	1800	2.1	.0	48.0
S. Link S	*	530	104	527	-40	*	AG	500	2.1	.0	48.0

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III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	387	292	1.8
2. Recpt 2	340	437	1.8
3. Recpt 3	332	479	1.8
4. Recpt 4	450	429	1.8
5. Recpt 5	471	406	1.8
6. Recpt 6	274	404	1.8
7. Recpt 7	270	435	1.8
8. Recpt 8	257	470	1.8
9. Recpt 9	254	502	1.8
10. Recpt 10	237	521	1.8
11. Recpt 11	214	560	1.8
12. Recpt 12	383	321	1.8
13. Recpt 13	513	206	1.8
14. Recpt 14	434	-27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	150.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	157.	.2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	158.	.2	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	168.	.2	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	170.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	142.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	145.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	146.	.3	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	149.	.3	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	147.	.3	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	148.	.2	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	154.	.2	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	174.	.3	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	52.	.4	.0	.0	.0	.0	.0	.0	.0	.0

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JOB: 2030 1bc roundabout
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	R	S
	*						CONC/LINK (PPM)					
1. Recpt 1	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	*	.0	.0	.0	.0	.0	.0	.1	.1	.0	.0	.0