2.2.6 Air Quality

The analysis of the potential air quality impacts of the SR-74 Lower Ortega Widening project is based on the Air Quality Assessment (LSA, November 2008). The Air Quality Analysis is on file and available for review at the Department District 12 offices.

2.2.6.1 Regulatory Setting

The Clean Air Act as amended in 1990 is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act of 1988. These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). Standards have been established for six criteria pollutants that have been linked to potential health concerns; the criteria pollutants are: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), lead (Pb), and sulfur dioxide (SO_2).

Under the 1990 Clean Air Act Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve Federal actions to support programs or projects that are not first found to conform to State Implementation Plan for achieving the goals of the Clean Air Act requirements. Conformity with the Clean Air Act takes place on two levels—first, at the regional level and second, at the project level. The proposed project must conform at both levels to be approved.

Regional level conformity in California is concerned with how well the region is meeting the standards set for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM). California is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (RTP) are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as the Southern California Association of Governments [SCAG] for Orange County) and the appropriate federal agencies (such as the Federal Highway Administration), make the determination that the RTP is in conformity with the State Implementation Plan for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP must be modified until conformity is attained. If

the design and scope of the proposed transportation project are the same as described in the RTP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Regulations and Standards

Pursuant to the Federal CAA of 1970, the USEPA established NAAQS for several major pollutants, termed "criteria" pollutants. The six criteria pollutants are: O_3, CO, PM, NO_2, SO_2, and Pb. PM includes particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) and particulate matter less than 10 microns in diameter (PM_{10}). These pollutants are referred to as criteria pollutants because numerical criteria have been established for each pollutant, which define acceptable levels of exposure. Table 2.2.6-1 identifies the federal and State standards of these pollutants.

Table 2.2.6-1 National and California Air Quality Standards

Pollutant	Averaging Time	State Standard	Federal Standard	Health and Atmospheric Effects	Typical Sources
Ozone (O_3)[a]	1 hour 8 hours	0.09 ppm 0.070 ppm	N/A 0.075 ppm	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include a number of known toxic air contaminants.	Low-altitude ozone is almost entirely formed from reactive organic gases (ROG) and nitrogen oxides (NO_x) in the presence of sunlight and heat. Major sources include motor vehicles and other mobile sources, solvent evaporation, and industrial and other combustion processes. Biologically-produced ROG may also contribute.
Carbon Monoxide (CO)	1 hour 8 hours	20 ppm 9.0 ppm[c]	35 ppm 9 ppm	Asphyxiant. CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.
Respirable Particulate Matter (PM10)[a]	24 hours Annual	50 µg/m^3 20 µg/m^3	150 µg/m^3 N/A	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources (wind-blown dust, ocean spray).
Fine Particulate Matter (PM2.5)[a]	24 hours Annual	N/A 12 µg/m^3	35 µg/m^3 15 µg/m^3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through

Table 2.2.6-1 National and California Air Quality Standards

Pollutant	Averaging Time	State Standard	Federal Standard	Health and Atmospheric Effects	Typical Sources
				soiling. Most diesel exhaust particulate matter – considered a toxic air contaminant – is in the $PM_{2.5}$ size range. Many aerosol and solid compounds are part of $PM_{2.5}$.	atmospheric chemical (including photochemical) reactions involving other pollutants including NO_x, sulfur oxides (SO_x), ammonia, and ROG.
Nitrogen Dioxide (NO_2)	1 hour Annual	0.18 ppm N/A	N/A 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain.	Motor vehicles and other mobile sources; refineries; industrial operations.
Sulfur Dioxide (SO_2)	1 hour 3 hours 24 hours Annual	0.25 ppm N/A 0.04 ppm N/A	N/A N/A 0.14 ppm 0.030 ppm	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing.
Lead (Pb)[d]	Monthly Quarterly	1.5 µg/m^3 N/A	N/A 1.5 µg/m^3	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also considered a toxic air contaminant.	Primary: lead-based industrial process like batter production and smelters. Past: lead paint, leaded gasoline. Moderate to high levels of aerially deposited lead (ADL) from gasoline may still be present in soils along major roads, and can be a problem if large amounts of soil are disturbed.

Sources: California Air Resources Board Ambient Air Quality Standards chart, 05/17/2006 (http://www.arb.ca.gov/aqs/aaqs2.pdf)
Sonoma-Marin Area Rail Transit Draft Air Pollutant Standards and Effects table, November 2005, page 3-52.
U.S. EPA and California Air Resources Board air toxics websites, 05/17/2006

[a] Annual PM10 NAAQS revoked October 2006; was 50 µg/m3. 24-hr. PM2.5 NAAQS tightened October 2006; was 65 µg/m^3.

[b] 12/22/2006 Federal court decision may affect applicability of Federal 1-hour ozone standard. Prior to 6/2005, the 1-hour standard was 0.12 ppm. Case is still in litigation.

[c] Rounding to an integer value is not allowed for the State 8-hour CO standard. A violation occurs at or above 9.05 ppm.

[d] The CARB has identified lead, vinyl chloride, and the particulate matter fraction of diesel exhaust as toxic air contaminants. Diesel exhaust particulate matter is part of PM_{10} and, in larger proportion, PM2.5. Both the CARB and U.S. EPA have identified various organic compounds that are precursors to ozone and $PM_{2.5}$ as toxic air contaminants. There is no threshold level of exposure for adverse health effect determined for toxic air contaminants, and control measures may apply at ambient concentrations below any criteria levels specified for these pollutants or the general categories of pollutants to which they belong.

ppm = parts per million
µg/m^3 = micrograms per cubic meter

The CARB administers the air quality policy in California. The CAAQS were established in 1969 pursuant to the Mulford-Carrell Act. These standards, included with the NAAQS in Table 2.2.6-1, are generally more stringent and apply to more pollutants than the NAAQS. In addition to the criteria pollutants, CAAQS have been established for visibility reducing particulates, hydrogen sulfide, and sulfates. The CCAA, which was approved in 1988, requires that each local air district prepare and

maintain an AQMP to achieve compliance with CAAQS. These AQMPs also serve as the basis for preparation of the SIP for the State of California.

2.2.6.2 Affected Environment

Climate

The project site is located in Orange County, an area within the South Coast Air Basin (Basin) that includes Orange County and the nondesert parts of Los Angeles, Riverside, and San Bernardino Counties. Air quality regulation in the Basin is administered by the South Coast Air Quality Management District (SCAQMD), a regional agency created for the Basin.

The Basin climate is determined by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern boundary, and high mountains surround the rest of the Basin. The region lies in the semipermanent high-pressure zone of the eastern Pacific. The resulting climate is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted. However, periods of extremely hot weather, winter storms, and Santa Ana wind conditions do occur.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s degrees Fahrenheit (EF). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site monitoring temperature is the Laguna Beach Station.[1] The annual average maximum temperature recorded at this station is 71.2EF, and the annual average minimum is 51.0EF. January is typically the coldest month in this area of the Basin.

The Basin experiences a persistent temperature inversion (increasing temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground and the lower air layer, the temperature of the lower air layer approaches the temperature of the base of the inversion (upper) layer until the inversion layer finally breaks, allowing vertical mixing with the lower layer. Inversion layers are important in determining O_3 formation. O_3 and its precursors will mix and react to produce higher concentrations under an inversion. The inversion will also simultaneously trap and hold directly emitted pollutants such as CO. PM_{10} is

[1] Western Regional Climatic Center. 2008. http://www. wrcc.dri.edu (accessed April 9, 2008).

both directly emitted and created indirectly in the atmosphere as a result of chemical reactions. Concentration levels are directly related to inversion layers due to the limitation of mixing space.

Regional Air Quality

The proposed project is located within the South Coast Air Basin (SCAB). The SCAB is characterized as having a "Mediterranean" climate (a semi-arid environment with mild winters, warm summers and moderate rainfall). The SCAB is a 6,600-square-mile area bound by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The SCAB includes all of Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino Counties, in addition to the San Gorgonio Pass area of Riverside County. Its terrain and geographical location determine the distinctive climate of the SCAB, as the SCAB is a coastal plain with connecting broad valleys and low hills.

The general region lies in the semi-permanent, high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the SCAB is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and/or dispersion of pollutants throughout the SCAB.

Local Air Quality

The project site is located within SCAQMD jurisdiction. The SCAQMD maintains ambient air quality monitoring stations throughout the Basin. The air quality monitoring stations closest to the site are the Mission Viejo-26081 Via Pera Station and the Costa Mesa-Mesa Verde Drive Station. Their air quality trends are representative of the ambient air quality in the project area. Pollutants monitored at the Mission Viejo-Via Pera Station are CO, O_3, $PM_{2.5}$, and PM_{10}. The pollutant monitored at the Costa Mesa station is NO_2.

Air quality trends identified from data collected at both air quality monitoring stations between 2005 and 2007 are listed in Table 2.2.6-2 and are discussed below. The ambient air quality data in Table 2.2.6-2 show that NO_2, $PM_{2.5}$ and CO levels are below the relevant State and federal standards. The State one-hour O_3 standard was

Table 2.2.6-2 Ambient Air Quality Standards at the Mission Viejo and Costa Mesa Air Monitoring Stations

Pollutant	Standard	2005	2006	2007
CO				
Max 1-hr concentration (ppm)		2.2	1.9	2.9
No. days exceeded: State Federal	> 20 ppm/1-hr > 35 ppm/1-hr	0 0	0 0	0 0
Max 8-hr concentration (ppm)		1.6	1.6	2.2
No. days exceeded: State Federal	> 9.1 ppm/8-hr > 9.5 ppm/8-hr	0 0	0 0	0 0
O_3				
Max 1-hr concentration (ppm)		0.125	0.123	0.108
No. days exceeded: State	> 0.09 ppm/1-hr	3	13	5
O_3[1]				
Max 8-hr concentration (ppm)		0.085	0.105	0.090
No. days exceeded: Federal	> 0.08 ppm/8-hr	1	6	2
PM_{10}				
Max 24-hr concentration (ppm)		41.0	57.0	74.0
No. days exceeded: State Federal	> 50 µg/m^3 > 150 µg/m^3	0 0	1 0	3 0
$PM_{2.5}$[2]				
Max 24-hr concentration (ppm)		35.3	46.9	34.3
No. days exceeded: Federal	> 65 µg/m^3	0	0	0
NO_2				
Max 1-hr concentration (ppm): State	> 0.25 ppm/1-hr	0.085	0.101	0.074
No. days exceeded		0	0	0
Annual avg. concentration: Federal	0.053 ppm annual avg.	0.014	0.015	0.011
Exceeded?		No	No	No

Source: EPA and CARB 2005 to 2007.

[1] The exceedances of the federal O_3 standard are based on the old 0.080 ppm standard. In 2008, the EPA revised the standard to 0.075 ppm.

[2] The exceedances of the federal 24-hour $PM_{2.5}$ standard are based on the old 65 µg/m^3 standard. In 2006, the EPA revised the standard to 35 µg/m^3.

CO = carbon monoxide

NO_2 = Nitrogen Dioxide

O_3 = ozone

$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

PM_{10} = particulate matter less than 10 microns, but greater than 2.5 microns in diameter

ppm = parts per million

µg/m^3 = micrograms per cubic meter

exceeded 3 to 13 times per year in the last three years. The federal eight-hour O_3 standard was exceeded 1 to 6 times per year in the last three years. The State 24-hour PM_{10} standard was exceeded once in 2006 and three times in 2007 but has not exceeded the federal 24-hour standard since 1999.

2.2.6.3 Environmental Consequences

Temporary Impacts

No Build Alternative

The No Build Alternative would not result in the construction of any of the proposed improvements to SR-74 and therefore would not result in short-term impacts to air quality.

Build Alternatives 1 and 2

Construction activities produce combustion emissions from various sources, such as site grading, utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, and motor vehicles transporting the construction crew. Completion of the Build Alternatives is anticipated to occur within two years from the start of construction. Exhaust emissions during the construction envisioned on site will vary daily as construction activity levels change. The use of construction equipment on site will result in localized exhaust emissions. Caltrans Standard Specifications for construction (Sections 10 and 18 for dust control and Section 39-3.06 for the AC concrete plant) will be adhered to in order to reduce emissions as a result of construction equipment.

Additionally, the SCAQMD has established Rule 403 for reducing the fugitive dust emissions (PM_{10}). The Best Available Control Measures (BACM), as specified in the SCAQMD Rule 403, shall be incorporated into the project commitments. With the implementation of the standard construction measures (providing 50 percent effectiveness) such as frequent watering (e.g., minimum twice per day), fugitive dust emissions from construction activities are considered less than significant.

The project is located in Orange County, which is not among the counties listed as containing serpentine and ultramafic rock. Therefore, there would be no impacts from Naturally Occurring Asbestos during project construction.

Permanent Impacts

No Build Alternative

Traffic congestion would continue to increase and LOS operations of nearby roadways and intersections would deteriorate and traffic congestion would worsen.

Long-term mobile emissions generated by vehicle trips would be greater under the No Build Alternative due to reduced traffic flow in the project area. Additionally, the No Build Alternative would not facilitate the air quality attainment goals of the AQMP and RMP, as it does not implement planned roadway improvements that would reduce congestion and improve air quality emissions. Since the No Build Alternative would not improve air quality through a reduction in congestion, its air quality impacts are considered potentially significant.

Build Alternatives 1 and 2

Long-term Vehicle Emissions Impact

The purpose of the proposed project is to alleviate existing and future traffic congestion along SR-74 during peak hours. The proposed project would not generate new vehicular traffic trips since it would not construct new homes or businesses. However, there is a possibility that some traffic currently utilizing other routes would be attracted to use the improved facility, thus resulting in slight increases in vehicle miles traveled (VMT). Therefore, the potential impact of the proposed roadway widening project on regional vehicle emissions was calculated using traffic data for the SCAG region and emission rates from the EMFAC2007 emission model.

A supplemental traffic analysis prepared by Austin-Foust Associates, Inc. (July 18, 2008) estimated the impact that the proposed project would have on regional VMT and regional vehicle hours traveled (VHT).

The VMT and VHT data listed in Table 2.2.6-3, along with the EMFAC2007 emission rates, were used to calculate the CO, ROG, NOX, SOX, PM_{10}, and $PM_{2.5}$ emissions for the 2035 regional conditions. The results of the modeling are listed in Table 2.2.6-4. As shown in Table 2.2.6-4, the proposed project would increase the emissions within the region. However, the increases are very small and less than the SCAQMD's significant thresholds. Therefore, the proposed project would not contribute significantly to regional vehicle emissions.

As shown in Table 2.2.6-4, the proposed project would result in an increase in VMT and VHT in 2013 and 2035.

Table 2.2.6-3 Change in Regional VMT and VHT

Year	Regional VMT	Regional VHT
2013 Increase	1,430	240
2035 Increase	4,297	714
2035 Regional No Build	344,523,122	10,453,545
2035 Regional Build	344,527,419	10,454,259

Source: Austin-Foust Associates, Inc., July 2008.
VMT = vehicle miles traveled
VHT = vehicle hours traveled

Table 2.2.6-4 Change in Regional Vehicle Emissions (lb/day)

Pollutant	2035 Baseline Emissions	2035 With Project Emissions	Project Related Increase	SCAQMD Threshold (lb/day)
CO	626,518	626,542	24	550
ROG	30,413	30,415	2	55
NO_X	146,654	146,659	5	55
SO_X	3,348	3,349	1	150
PM_{10}	32,072	32,073	1	150
$PM_{2.5}$	19,919	19,920	1	55

Source: LSA Associates, Inc., November 2008.
CO = carbon monoxide
lb = pounds
NO_x = nitrogen oxide
O_3 = ozone
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 10 microns, but greater than 2.5 microns in diameter
ROG = reactive organic gases
SCAQMD = Southern California Air Quality Management District
SO_x = sulfur oxide

Regional Analysis

An AQMP describes air pollution control strategies to be taken by counties or regions classified as nonattainment areas. The AQMP's main purpose is to bring the area into compliance with the requirements of federal and State air quality standards. The AQMP uses the assumptions and projections by local planning agencies to determine control strategies for regional compliance status. Therefore, any projects causing a significant impact on air quality would impede the progress of the AQMP. As shown in Table 2.2.6.4, the increase in regional vehicle emissions would not exceed the SCAQMD's significance thresholds. Therefore, proposed project will not significantly contribute to or cause deterioration of

existing air quality. In addition, the project is included in the 2008 RTP and in the 2006 RTIP (Project ID: ORA120535). The RTP Program Environmental Impact Report states that all emissions are anticipated to be consistent with applicable AQMPs and SIPs and on-road emissions within regional conformity emission budgets. Therefore, the Build Alternatives are consistent with the SIP and the AQMP. Mitigation measures are not required for the long-term operation of the project. Hence, the proposed project is considered to be consistent with the City's General Plan and the SCAG forecast and is therefore consistent with the AQMP.

CO Hot-Spot Analysis

The Department document, *Transportation Project-Level Carbon Monoxide Protocol* (1997) (Protocol) was used to determine if a CO hot spot analysis would be required. The Protocol provides two conformity requirement decision flowcharts that are designed to assist the project sponsor(s) in evaluating the requirements that apply to specific projects. The area affected by the project is expected to experience a much lower CO concentration than the worst-case intersection in the 2003 AQMP. Results of the CO qualitative analysis in the *Air Quality Assessment Report* concluded that the project would not result in any CO hot spots and would not exacerbate existing hot spots. Therefore, potential CO impacts of the Build Alternatives are considered less than significant.

2.2.6.4 Avoidance, Minimization, and/or Mitigation Measures

The following minimization measure has been identified to minimize potential emissions of pollutants during construction activities:

In order to minimize construction-related emissions, all construction vehicles and construction equipment shall be required to be equipped with the State-mandated emission control devices pursuant to State emission regulations and standard construction practices. All disturbed areas, including storage piles that are not being actively used for construction purposes, shall be effectively stabilized for dust emissions using water, chemical stabilizers/suppressants, or vegetative ground cover, as appropriate. Short-term construction particulate matter less than 10 microns in diameter (PM_{10}) emissions shall be further reduced with the implementation of required dust suppression measures outlined within South Coast Air Quality Management District (SCAQMD) Rule 403 Caltrans Standard Specifications for construction [Section 10 and 18 (Dust Control) and Section 39-3.06 (AC Plants)] shall also be adhered to.

2.2.6.5 Level of Significance

The No Build Alternative would result in no temporary air quality impacts but would result in potentially significant permanent air quality impacts.

Permanent, temporary, direct and indirect air quality impacts of the Build Alternatives are considered less than significant.