5.4 AIR QUALITY

This section evaluates air quality associated with short- and long-term impacts resulting from buildout of the Downtown Lancaster Specific Plan (DLSP). Refer to Appendix D, Air Quality Data. Information in this section is based primarily on the *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines* (June 2007), prepared by the Antelope Valley Air Quality Management District, Air Quality Data (California Air Resources Board 2002 through 2006), the *Antelope Valley Air Quality Management District 2004 Ozone Attainment Plan* (April 2004), and the *Downtown Lancaster Specific Plan Traffic Impact Analysis* (April 2, 2008), prepared by RBF Consulting.

5.4.1 ENVIRONMENTAL SETTING

MOJAVE DESERT AIR BASIN

The State of California is divided geographically into 15 air basins. The City of Lancaster is located within the Mojave Desert Air Basin. The Mojave Desert Air Basin includes the desert portions of Los Angeles and San Bernardino Counties, the eastern desert portion of Kern County, and the northeastern desert portion of Riverside County.

CLIMATE

Lancaster is located in the Antelope Valley, which occupies the western portion of the Mojave Desert Air Basin. This portion of the Mojave Desert Air Basin does not receive the moisture-laden ocean breezes found in the South Coast Air Basin to the west. Instead, an orographic uplifting occurs where warm moist air from Pacific Ocean storms is lifted upward by the San Gabriel Mountains and Sierra Palona, causing heavier precipitation in the Los Angeles basin and less precipitation with greater temperature variation in the Mojave Desert Air Basin throughout the year.

Summers are relatively hot and winters are relatively cold in the desert. Average rainfall is low, with occasional thunderstorms occurring primarily in the summer. Larger storms occur from late fall to spring. Annual precipitation varies from four to nine inches. The temperature in Lancaster ranges from 2 to 117 degrees Fahrenheit (°F), with an average temperature of 62°F. Milder temperatures with infrequent storms or thundershowers occur in spring and fall.

WIND

One of the most important climatic factors is the direction and intensity of the prevailing winds. Winds in Lancaster occur from the west, west-southwest and southwest. Although a portion of Lancaster's winds come from the Los Angeles basin, a significant amount are due to the phenomenon known as the "orographic effect". The air is forced over the mountain range, losing moisture as it rises. When it descends, the air compresses and heats up. The speed of the wind is aided by the "desert heat lows" that routinely form over the eastern Mojave Desert area.

During the fall, the regional wind pattern reverses, causing warm, dry air to blow into the Los Angeles basin from the desert. These "Santa Ana" winds are usually light and variable in the desert areas; however, they cause severe damage after they accelerate through the mountain passes and enter the coastal basins. These winds occur along the San Bernardino and San Gabriel mountains in a southwesterly pattern into the Los Angeles Basin.

Prevailing winds are usually sufficient to dissipate locally produced air pollution. However, these winds often transport air pollutants from the Los Angeles basin and San Joaquin Valley into the desert basin.

TEMPERATURE INVERSIONS

The southern California region frequently experiences temperature inversions in which pollutants are trapped and accumulate close to the ground. The inversion, a layer of warm, dry air overlaying cool, moist marine air, is a normal condition in the southland. The cool, damp and hazy sea air capped by coastal clouds is heavier than the warm, clear air that acts as a lid through which the marine layer cannot rise. When the inversion layer is approximately 2,500 feet above sea level, the sea breezes carry the pollutants inland to escape over mountain slopes or through passes. At a height of 1,200 feet, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer. Smog in southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long period of time, allowing them to form secondary pollutants by reacting with sunlight.

The Antelope Valley rarely experiences the summer temperature inversions that frequently "cap" polluted air layers in the Los Angeles basin. However, inversions can form during cold nights with mild winds, but they usually dissipate during daytime heating. When these desert inversions form, they may trap pollutants near low-level emission sources such as freeways or parking lots.

LOCAL AMBIENT AIR QUALITY

The project area's local ambient air quality is monitored by the Antelope Valley Air Quality Management District (AVAQMD) and the California Air Resources Board. The California Air Resources Board monitors ambient air quality at approximately 250 air monitoring stations across the State. Air quality monitoring stations usually measure pollutant concentrations ten feet above-ground level; therefore, air quality is often referred to in terms of ground-level concentrations.

The Lancaster-Division Street Monitoring Station is located within the City of Lancaster, while the Trona-Athol/Telegraph monitoring station is the nearest station within the Mojave Desert Air Basin that monitors SO_X (located approximately 85 miles northeast of the project site). As the Trona-Athol/Telegraph station is 85 miles northeast of the project site, the data from that station are included primarily for informational purposes and were not utilized as background concentrations. Emissions have been provided for NO_X, SO_X, O_3, CO, PM_{10}, and $PM_{2.5}$ for Year 2002 through 2006; refer to Table 5.4-1, Local Air Quality Levels.

The following air quality information briefly describes the various types of pollutants monitored at the local stations.

OZONE

Ozone occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. The troposphere extends approximately 10 miles above ground level, where it meets the second layer, the stratosphere. The stratospheric (the "good" ozone layer) extends upward from about 10 to 30 miles and protects life on earth from the sun's harmful ultraviolet rays (UV-B).

Table 5.4-1
Local Air Quality Levels

Pollutant	California Standard	Federal Primary Standard	Year	Maximum Concentration[1]	Days (Samples) State/Federal Standard was Exceeded
Ozone (O_3) for 1 hour	0.09 ppm	NA[5]	2002[2] 2003[2] 2004[2] 2005[2] 2006[2]	0.157 0.156 0.121 0.127 0.132	46/5 50/4 37/0 42/1 22/2
Ozone (O_3) for 8 hour	0.070	0.08 ppm	2002[2] 2003[2] 2004[2] 2005[2] 2006[2]	0.107 0.120 0.101 0.103 0.105	NA/38 NA/33 NA/24 NA/31 NA/16
Carbon Monoxide (CO)	9.0 ppm (8 hour)	9.0 ppm (8 hour)	2002[2] 2003[2] 2004[2] 2005[2] 2006[2]	2.24 1.88 1.72 1.54 1.60	0/0 0/0 0/0 0/0 0/0
Nitrogen Dioxide (NO_2)	0.18 ppm (1 hour)	0.053 ppm annual average	2002[2] 2003[2] 2004[2] 2005[2] 2006[2]	0.101 0.067 0.103 0.074 0.066	0/NA 0/NA 0/NA 0/NA 0/NA
Particulate Matter (PM_{10}) [4, 5]	50 ug/m³ (24 hours)	150 ug/m³ (24 hours)	2002[2] 2003[2] 2004[2] 2005[2] 2006[2]	73.0 57.0 56.0 53.0 63.0	NA/0 NA/0 NA/0 NA/0 0/4
Fine Particulate Matter ($PM_{2.5}$) [5]	12 µg/m³ Annual Arithmetic mean	35µg/m³ (24 hours)	2002[2] 2003[2] 2004[2] 2005[2] 2006[2]	24.0 25.0 18.0 28.0 18.0	NA/0 NA/0 NA/0 NA/0 NA/0
Sulfur Dioxide (SO_2)	0.25 ppm (1 hour)	0.14 ppm for 24 hours or 0.03 ppm annual arithmetic mean	2002[3] 2003[3] 2004[3] 2005[3] 2006[3]	0.007 0.003 0.005 0.004 0.004	0/0 0/0 0/0 0/0 0/0

Source: Aerometric Data Analysis and Measurement System (ADAM), summaries from 2002 to 2006, http://www.arb.ca.gov/adam.

ppm = parts per million; PM_{10} = particulate matter 10 microns in diameter or less; NM = not measured; µg/m³ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter 2.5 microns in diameter or less; NA = not applicable.

Notes:
1 Maximum concentrations are measured over the same period as the California standard.
2 Lancaster-Division Street monitoring station is located at 43301 Division Street, Lancaster, CA 93535.
3 Trona-Athol/Telegraph monitoring station is the closest SO_X monitoring station (85 miles northeast of the project site) to the project site in the Mojave Desert Air Basin.
4 PM_{10} exceedances are based on State thresholds established prior to amendments adopted on June 20, 2002.
5 PM_{10} and $PM_{2.5}$ exceedances are derived from the number of samples exceeded, not days.
6 The Federal standard was revoked in June 2005.

"Bad" ozone is a photochemical pollutant, and needs VOCs, NO_X, and sunlight to form; therefore, VOCs and NO_X are ozone precursors. VOCs and NO_X are emitted from various sources throughout the City. To reduce ozone concentrations, it is necessary to control the emissions of these ozone precursors. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. High ozone concentrations can form over large regions when emissions from motor vehicles and stationary sources are carried hundreds of miles from their origins.

While ozone in the upper atmosphere (stratosphere) protects the earth from harmful ultraviolet radiation, high concentrations of ground-level ozone (in the tropasphere) can adversely affect the human respiratory system and other tissues. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems (such as forests and foothill plant communities) and damages agricultural crops and some man-made materials (such as rubber, paint and plastics). Societal costs from ozone damage include increased healthcare costs, the loss of human and animal life, accelerated replacement of industrial equipment, and reduced crop yields.

The State ozone standard is 0.09 parts per million (ppm), averaged over one hour. The O_3 levels at the Lancaster-Division Street monitoring station ranged between 1.21 ppm in 2004 to 1.57 ppm in 2002. Between 2002 and 2006, the 1-hour State standard was exceeded 197 days while the 8-hour Federal standard was exceeded 142 times. The Federal standard for O_3 was revoked in 2005. The Mojave Desert Air Basin is designated as a nonattainment area for State O_3 standards.

CARBON MONOXIDE

Carbon monoxide (CO) is an odorless, colorless toxic gas that is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. In cities, automobile exhaust can cause as much as 95 percent of all CO emissions. At high concentrations, CO can reduce the oxygen-carrying capacity of the blood and cause headaches, dizziness, unconsciousness and death. The Lancaster portion of the Mojave Desert Air Basin is designated as an attainment area for State CO standards. State and Federal standards were not exceeded between 2002 and 2006. The Mojave Desert Air Basin is designated as an attainment area for State and Federal CO standards.

NITROGEN DIOXIDE

Nitrogen oxides (NO_X) are a family of highly reactive gases that are a primary precursor to the formation of ground-level ozone, and react in the atmosphere to form acid rain. Nitrogen dioxide (NO_2), often used interchangeably with NO_X, is a reddish-brown gas that can cause breathing difficulties at high levels. Peak readings of NO_2 occur in areas that have a high concentration of combustion sources (e.g., motor vehicle engines, power plants, refineries, and other industrial operations).

NO_X can irritate and damage the lungs, and lower resistance to respiratory infections such as influenza. The health effects of short-term exposure are still unclear. However, continued or frequent exposure to NO_X concentrations that are typically much higher than those normally found in the ambient air may increase acute respiratory illnesses in children and increase the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO_2 may aggravate eyes and mucus membranes and cause pulmonary dysfunction.

State and Federal standards were not exceeded between 2002 and 2006. The Mojave Desert Air Basin is designated as an attainment area for State and Federal NO_2 standards.

PARTICULATE MATTER

Particulate matter pollution consists of very small liquid and solid particles floating in the air, and is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. Some particles are large or dark enough to be seen as soot or smoke; others are so small that they can be detected only with an electron microscope. PM_{10} particles are less than or equal to 10 microns in aerodynamic diameter; $PM_{2.5}$ particles are less than or equal to 2.5 microns in aerodynamic diameter, and are a subset (portion) of PM_{10}.

In the western United States, there are sources of PM_{10} in both urban and rural areas. PM_{10} and $PM_{2.5}$ are emitted from stationary and mobile sources, including diesel trucks and other motor vehicles, power plants, industrial processing, wood-burning stoves and fireplaces, wildfires, dust from roads, construction, landfills, agriculture, and fugitive windblown dust.

PM_{10} and $PM_{2.5}$ particles are small enough to be inhaled into, and lodge in, the deepest parts of the lung. Health problems begin as the body reacts to these foreign particles. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non-health-related effects include reduced visibility and soiling of buildings.

The State standard for PM_{10} is 50 micrograms per cubic meter ($\mu g/m^3$) averaged over 24 hours; this standard was exceeded four days in 2006. The Federal standard for PM_{10} is 150 $\mu g/m^3$ averaged over 24 hours. The Mojave Desert Air Basin is designated as a nonattainment area for State PM_{10} standards.

Based upon a desire to set clean air goals throughout the State, the California Air Resources Board created a new annual average standard for $PM_{2.5}$ at 12 $\mu g/m^3$. On June 20, 2002, the California Air Resources Board adopted amendments for statewide annual ambient particulate matter air quality standards. For $PM_{2.5}$, the State standard is 50 $\mu g/m^3$ and the Federal standard is 35 $\mu g/m^3$ over 24 hours. The Mojave Desert Air Basin is designated unclassified. At the Lancaster-Division Street monitoring station there were no exceedances between 2002 and 2006.

These standards were revised/established due to increasing concerns by the California Air Resources Board that previous standards were inadequate, as almost everyone in California is exposed to levels at or above the current State standards during some parts of the year, and the statewide potential for significant health impacts associated with particulate matter exposure was determined to be large and wide-ranging.

SULFUR DIOXIDE

Sulfur dioxide is a colorless, pungent gas belonging to the family of sulfur oxide gases (SO_X), formed primarily by combustion of sulfur-containing fossil fuels (primarily coal and oil) metal smelting and other industrial processes. Sulfur dioxide (SO_2) (often used interchangeably with

SO_X) did not exceed Federal or State standards between 2002 and 2006. The Mojave Desert Air Basin is designated as an attainment area for both State and Federal SO_2 standards.

The major health concerns associated with exposure to high concentrations of SO_X are effects on breathing, respiratory illness, diminishment of pulmonary defenses, and aggravation of existing cardiovascular disease. Major subgroups of the population that are most sensitive to SO_X are individuals with cardiovascular disease or chronic lung disease (such as bronchitis or emphysema), as well as children and the elderly. Emissions of SO_X also can damage the foliage of trees and agricultural crops. Together, SO_X and NO_X are the major precursors to acid rain, which is associated with the acidification of lakes and streams, and the accelerated corrosion of buildings and public monuments. Sulfur oxides can react to form sulfates, which significantly reduce visibility.

TOXIC AIR CONTAMINANTS

According to Section 39655 of the California Health and Safety Code, a toxic air contaminant is "an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health." In addition, 189 substances that have been listed as federal hazardous air pollutants pursuant to Section 7412 of Title 42 of the United States Code are toxic air contaminants under the State's air toxics program pursuant to Section 39657 (b) of the California Health and Safety Code.

Toxic air contaminants can cause various cancers, depending on the particular chemicals, their type and duration of exposure. Additionally, some of the toxic air contaminants may cause other health effects over the short or long term. The ten toxic air contaminants posing the greatest health risk in California are acetaldehyde, benzene, 1-3 butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchlorethylene, and diesel particulate matter.

REACTIVE ORGANIC GASES AND VOLATILE ORGANIC COMPOUNDS

Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including reactive organic gases (ROGs) and volatile organic compounds (VOCs). ROGs comprise all hydrocarbons except those exempted by the California Air Resources Board. Therefore, ROGs are a set of organic gases based on State rules and regulations. VOCs are similar to ROGs in that they comprise all organic gases except those exempted by Federal law. VOCs are therefore a set of organic gases based on Federal rules and regulations. Both ROGs and VOCs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. The major sources of hydrocarbons are combustion engine exhaust, oil refineries, and oil-fueled power plants; other common sources are petroleum fuels, solvents, dry cleaning solutions and paint (via evaporation).

The health effects of hydrocarbons result from the formation of ozone and its related health effects. High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons are considered toxic air contaminants ("air toxics"). There are no separate health standards for VOCs, although some VOCs are also toxic; an example is benzene, which is both a VOC and a carcinogen.

GLOBAL CLIMATE CHANGE GASES

The natural process through which heat is retained in the troposphere is called the "greenhouse effect."[1] The greenhouse effect traps heat in the troposphere through a three fold process as follows: Short wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long wave radiation; and greenhouse gases in the upper atmosphere absorb this long wave radiation and emit this long wave radiation into space and toward the Earth. This "trapping" of the long wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect.

Without the greenhouse effect, the Earth's average temperature would be approximately 18 degrees Celsius (°C) (0° Fahrenheit [°F]) instead of its present 14°C (57°F). The most abundant greenhouse gases (GHG) are water vapor and carbon dioxide. Many other trace gases have greater ability to absorb and re-radiate long wave radiation; however, these gases are not as plentiful. For this reason, and to gauge the potency of greenhouse gases, scientists have established a Global Warming Potential for each greenhouse gas based on its ability to absorb and re-radiate long wave radiation. The Global Warming Potential of a gas is determined using carbon dioxide as the reference gas with a Global Warming Potential of 1.

Greenhouse gases include, but are not limited to, the following:[2]

Water vapor (H_2O). Although water vapor has not received the scrutiny of other greenhouse gases, it is the primary contributor to the greenhouse effect. Natural processes, such as evaporation from oceans and rivers and transpiration from plants, contribute 90 percent and 10 percent of the water vapor in our atmosphere, respectively. The primary human related source of water vapor comes from fuel combustion in motor vehicles; however, this is not believed to contribute a significant amount (less than 1 percent) to atmospheric concentrations of water vapor. The Intergovernmental Panel on Climate Change has not determined a Global Warming Potential for water vapor.

Carbon dioxide (CO_2). Carbon dioxide is primarily generated by fossil fuel combustion in stationary and mobile sources. Due to the emergence of industrial facilities and mobile sources in the past 250 years, the concentration of carbon dioxide in the atmosphere has increased 35 percent.[3] Carbon dioxide is the most widely emitted greenhouse gas and is the reference gas (Global Warming Potential of 1) for determining Global Warming Potentials for other greenhouse gases. In 2004, 83.8 percent of California's greenhouse gas emissions were carbon dioxide.[4]

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[1] The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface to 10 to 12 kilometers.

[2] All Global Warming Potentials (GWP) are given as 100 year GWP. Unless noted otherwise, all Global Warming Potentials were obtained from the Intergovernmental Panel on Climate Change. Climate Change (Intergovernmental Panel on Climate Change, *Climate Change, The Science of Climate Change – Contribution of Working Group I to the Second Assessment Report of the IPCC*, 1996).

[3] United States Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 to 2004*, April 2006, http://www.epa.gov/climatechange/emissions/usinventoryreport.html.

[4] California Energy Commission, *Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004*, December 2006, http://www.energy.ca.gov/2006publications/CEC 600 2006 013/CEC 600 2006 013 SF.PDF.

Methane (CH_4). Methane is emitted from natural sources, incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. In the United States, the top three sources of methane come from landfills, natural gas systems, and enteric fermentation. Methane is the primary component of natural gas, which is used for space and water heating, steam production, and power generation. The Global Warming Potential of methane is 21.

Nitrous oxide (N_2O). Nitrous oxide is produced by both natural and human related sources. Primary human related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The Global Warming Potential of nitrous oxide is 310.

Hydrofluorocarbons (HFCs). HFCs are typically used as refrigerants for both stationary refrigeration and mobile air conditioning. The use of HFCs for cooling and foam blowing is growing as the continued phase out of chlorofluorocarbons (CFCs) and HCFCs gains momentum. The Global Warming Potential of HFCs range from 140 for HFC-152a to 6,300 for HFC-236fa.

Perfluorocarbons (PFCs). Perfluorocarbons are compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semi conductor manufacturing. Perfluorocarbons are potent greenhouse gases with a Global Warming Potential several thousand times that of carbon dioxide, depending on the specific PFC. Another area of concern regarding PFCs is their long atmospheric lifetime (up to 50,000 years).[5] The Global Warming Potential of PFCs range from 5,700 to 11,900.

Sulfur hexafluoride (SF_6). Sulfur hexafluoride is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. Sulfur hexafluoride is the most potent greenhouse gas that has been evaluated by the Intergovernmental Panel on Climate Change with a Global Warming Potential of 23,900. However, its global warming contribution is not as high as the Global Warming Potential would indicate due to its low mixing ratio compared to carbon dioxide (4 parts per trillion [ppt] in 1990 versus 365 ppm).[6]

In addition to the six major greenhouse gases discussed above (excluding water vapor), many other compounds have the potential to contribute to the greenhouse effect. Some of these substances were previously identified as stratospheric ozone depletors; therefore, their gradual phase out is currently in effect. The following is a listing of these compounds:

Hydrochlorofluorocarbons (HCFCs). HCFCs are solvents, similar in use and chemical composition to CFCs. The main uses of HCFCs are for refrigerant products and air conditioning systems. As part of the Montreal Protocol, all developed countries that adhere to the Montreal Protocol are subject to a consumption cap and gradual phase out of HCFCs. The United States is scheduled to achieve a 100 percent reduction to the cap by 2030. The Global Warming Potentials of HCFCs range from 93 for HCFC-123 to 2,000 for HCFC-142b.[7]

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[5] Energy Information Administration, *Other Gases: Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride*, October 29, 2001, http://www.eia.doe.gov/oiaf/1605/gg00rpt/other_gases.html.
[6] United States Environmental Protection Agency, *High GWP Gases and Climate Change*, October 19, 2006, http://www.epa.gov/highgwp/scientific.html#sf6.
[7] United States Environmental Protection Agency, *Protection of Stratospheric Ozone: Listing of Global Warming Potential for Ozone Depleting Substances*, November 7, 2006, http://www.epa.gov/fedrgstr/EPA AIR/1996/January/Day 19/pr 372.html.

1,1,1 trichloroethane. 1,1,1 trichloroethane or methyl chloroform is a solvent and degreasing agent commonly used by manufacturers. The Global Warming Potential of methyl chloroform is 110 times that of carbon dioxide.[8]

Chlorofluorocarbons (CFCs). CFCs are used as refrigerants, cleaning solvents, and aerosols spray propellants. CFCs were also part of the Environmental Protection Agency's Final Rule (57 FR 3374) for the phase out of ozone depleting substances. Currently, CFCs have been replaced by HFCs in cooling systems and a variety of alternatives for cleaning solvents. Nevertheless, CFCs remain suspended in the atmosphere contributing to the greenhouse effect. CFCs are potent GHGs with Global Warming Potentials ranging from 4,600 for CFC 11 to 14,000 for CFC 13.[9]

Ozone. Ozone occurs naturally in the stratosphere where it is largely responsible for filtering harmful ultraviolet (UV) radiation. In the troposphere, ozone acts as a greenhouse gas by absorbing and re-radiating the infrared energy emitted by the Earth. As a result of the industrial revolution and rising NO_x and VOC emissions, the concentrations of ozone in the troposphere have increased. Due to the short life span of ozone in the troposphere, its concentration and contribution as a greenhouse is not well established. However, the greenhouse effect of tropospheric ozone is considered small, as the radiative forcing of ozone is 25 percent of that of carbon dioxide.[10]

SENSITIVE RECEPTORS

Sensitive populations are more susceptible to the effects of air pollution than are the general population. Sensitive populations (sensitive receptors) that are in proximity to localized sources of toxics and CO are of particular concern. Land uses that are considered sensitive receptors are residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent center, and retirement homes. The DLSP area consists of 140 acres that includes a number of sensitive receptors. Additionally, the project area is directly adjacent to residential neighborhoods, schools and healthcare facilities.

5.4.2 REGULATORY SETTING

Regulatory oversight for air quality in the Mojave Desert Air Basin rests with the AVAQMD at the regional level, the California Air Resources Board at the State level, and the Environmental Protection Agency Region IX office at the Federal level.

U.S. ENVIRONMENTAL PROTECTION AGENCY

The principal air quality regulatory mechanism at the Federal level is the Clean Air Act and, in particular, the 1990 amendments to the Federal Clean Air Act and the National Ambient Air Quality Standards that it establishes. These standards identify levels of air quality for "criteria" pollutants that are considered the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect the public health and welfare.

[8] Ibid.
[9] United States Environmental Protection Agency, *Class I Ozone Depleting Substances*, March 7, 2006, http://www.epa.gov/ozone/ods.html.
[10] Intergovernmental Panel on Climate Change, Climate Change 2007: The Physical Science Basis, Summary for Policymakers, February 2007.

The criteria pollutants are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2 is a form of NO_X), sulfur oxides (SO_2 is a form of SO_X), particulate matter less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively) and lead (Pb); refer to Table 5.4-2, National and California Ambient Air Quality Standards. The Environmental Protection Agency also has regulatory and enforcement jurisdiction over emission sources beyond State waters (outer continental shelf) and those that are under the exclusive authority of the Federal government, such as aircraft, locomotives and interstate trucking.

CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board, a department of the California Environmental Protection Agency, oversees air quality planning and control throughout California. Its responsibility lies with ensuring implementation of the 1989 amendments to the California Clean Air Act, responding to the Federal Clean Air Act requirements and regulating emissions from motor vehicles sold in California. It also sets fuel specifications to further reduce vehicular emissions.

The amendments to the California Clean Air Act establish California Ambient Air Quality Standards and a legal mandate to achieve these standards by the earliest practicable date. These standards apply to the same criteria pollutants as the Federal Clean Air Act and also include sulfate, visibility, hydrogen sulfide, and vinyl chloride; refer to Table 5.4-2.

ANTELOPE VALLEY AIR QUALITY MANAGEMENT DISTRICT

Air districts have the primary responsibility to control air pollution from all sources other than those directly emitted from motor vehicles, which are the responsibility of the California Air Resources Board and the Environmental Protection Agency. Air districts adopt and enforce rules and regulations to achieve State and Federal ambient air quality standards and enforce applicable State and Federal law.

Initially, the desert portion of Los Angeles County, within the Mojave Desert Air Basin, was under the jurisdiction of the South Coast Air Quality Management District. However, on July 1, 1997, this area was established as the Antelope Valley Air Pollution Control District (now known as the Antelope Valley Air Quality Management District). On January 1, 2002, the Antelope Valley Air Quality Management District became a successor district to South Coast Air Quality Management District.

The AVAQMD was previously included in the South Coast Air Quality Management District 1994 Air Quality Management Plans as well as the 1997 Air Quality Management Plan revision. The Air Quality Management Plan set forth a comprehensive program that would lead the area into compliance with all Federal and State air quality standards. The AVAQMD adopted its own 2004 Ozone Attainment Plan on April 20, 2004. The document demonstrates that the AVAQMD would meet the primary Federal and State ozone planning milestones, attainment of the ozone National Ambient Air Quality Standards and California Ambient Air Quality Standards, by the end of 2007. The Environmental Protection Agency has not yet approved the AVAQMD 2004 Ozone Attainment Plan. The AVAQMD 2004 Ozone Attainment Plan addresses the 1994 and 1997 South Coast Air Quality Management District Air Quality Management Plan; however, the 2004 plan replaces all previously submitted plans.

Table 5.4-2
National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California[1]		Federal[2]	
		Standard[3]	Attainment Status	Standards[4]	Attainment Status
Ozone (O_3)	1 Hour	0.09 ppm (180 $\mu g/m^3$)	**Severe Nonattainment**	NA[5]	NA[5]
	8 Hours	0.07 ppm (137 $\mu g/m^3$)	Unclassified	0.08 ppm (157 $\mu g/m^3$)	**Severe Nonattainment**
Particulate Matter (PM_{10})	24 Hours	50 $\mu g/m^3$	**Nonattainment**	150 $\mu g/m^3$	**Serious Nonattainment**
	Annual Arithmetic Mean	20 $\mu g/m^3$	**Nonattainment**	50 $\mu g/m^3$	**Serious Nonattainment**
Fine Particulate Matter ($PM_{2.5}$)	24 Hours	No Separate State Standard		35 $\mu g/m^3$	**Nonattainment**
	Annual Arithmetic Mean	12 $\mu g/m^3$	**Nonattainment**	15 $\mu g/m^3$	**Nonattainment**
Carbon Monoxide (CO)	8 Hours	9.0 ppm (10 $\mu g/m^3$)	Attainment	9 ppm (10 $\mu g/m^3$)	Attainment
	1 Hour	20 ppm (23 $\mu g/m^3$)	Attainment	35 ppm (40 $\mu g/m^3$)	Attainment
Nitrogen Dioxide[6] (NO_2)	Annual Arithmetic Mean	0.030 ppm (56 $\mu g/m^3$)	NA	0.053 ppm (100 $\mu g/m^3$)	Attainment
	1 Hour	0.18 ppm (338 $\mu g/m^3$)	Attainment	N/A	NA
Lead (Pb)	30 days average	1.5 $\mu g/m^3$	Attainment	N/A	NA
	Calendar Quarter	N/A	NA	1.5 $\mu g/m^3$	Attainment
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	N/A	NA	0.030 ppm (80 $\mu g/m^3$)	Attainment
	24 Hours	0.04 ppm (105 $\mu g/m^3$)	Attainment	0.14 ppm (365 $\mu g/m^3$)	Attainment
	3 Hours	N/A	NA	N/A	Attainment
	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Attainment	N/A	NA
Visibility-Reducing Particles	8 Hours (10 a.m. to 6 p.m., PST)	Extinction coefficient = 0.23 km@<70% RH	Unclassified	**No Federal Standards**	
Sulfates	24 Hour	25 $\mu g/m^3$	Attainment		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/ m^3$)	Unclassified		

$\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million; km = kilometer(s); RH = relative humidity; PST = Pacific Standard Time; N/A = Not Applicable.

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, suspended particulate matter-PM_{10} and visibility-reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations. In 1990, California Air Resources Board identified vinyl chloride as a toxic air contaminant, but determined that there was not sufficient available scientific evidence to support the identification of a threshold exposure level. This action allows the implementation of health-protective control measures at levels below the 0.010 ppm ambient concentration specified in the 1978 standard.
2. National standards (other than ozone, particulate matter and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The Environmental Protection Agency also may designate an area as *attainment/unclassifiable*, if: (1) it has monitored air quality data that show that the area has not violated the ozone standard over a three-year period; or (2) there is not enough information to determine the air quality in the area. For PM_{10}, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over the three years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
3. Concentration is expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
5. The Federal 1- hour ozone standard was revoked on June 15, 2005.
6. The NO_2 ambient air quality standard was amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. These changes become effective after regulatory changes are submitted and approved by the Office of Administrative Law, expected later this year.

Source: California Air Resources Board and Environmental Protection Agency, February 22, 2007.

STATE AIR TOXICS PROGRAM

In addition to the criteria pollutants discussed above, toxic air contaminants are another group of pollutants of concern in southern California. There are hundreds of different types of toxic air contaminants, with varying degrees of toxicity. Sources of toxic air contaminants include industrial processes such as petroleum refining and chrome plating, commercial operations such as gasoline stations and dry cleaners, and motor vehicle engine exhaust. Public exposure to toxic air contaminants can result from emissions from normal operations, as well as accidental releases of hazardous materials during upset (spill) conditions. Health effects of toxic air contaminants include cancer, birth defects, neurological damage and death.

California regulates toxic air contaminants through its air toxics program, mandated in Chapter 3.5 (Toxic Air Contaminants) of the Health and Safety Code (H&SC Section 39660 et. seq.) and Part 6 (Air Toxics "Hot Spots" Information and Assessment) (H&SC Section 44300 et. seq.). The California Air Resources Board, working in conjunction with the State Office of Environmental Health Hazard Assessment (OEHHA), identifies toxic air contaminants. Air toxic control measures may then be adopted to reduce ambient concentrations of the identified toxic air contaminant to below a specific threshold, based on its effects on health, or to the lowest concentration achievable through use of best- available control technology for toxics. The program is administered by the California Air Resources Board. Air quality control agencies, including the AVAQMD, must incorporate air toxic control measures into their regulatory programs or adopt equally stringent control measures as rules within six months of adoption by the California Air Resources Board.

The Air Toxics "Hot Spots" Information and Assessment Act, codified in the Health and Safety Code, requires operators of specified facilities in the AVAQMD to submit to the AVAQMD comprehensive emissions inventory plans and reports by specified dates (H&SC Section 39660 et. seq. and Section 44300 et. seq.). The AVAQMD reviews the reports and then places the facilities into high-, intermediate-, and low-priority categories, based on the potency, toxicity, quantity, and volume of hazardous emissions and on the proximity of potential sensitive receptors to the facility. Facilities designated as high priority (Category A) must prepare a health risk assessment. If the health risk assessment finds a significant risk, the surrounding population must be notified. The emissions inventory data are to be updated every two years.

The California Air Resources Board in 1998 identified diesel engine particulate matter as a toxic air contaminant. Mobile sources (including trucks, buses, automobiles, trains, ships and farm equipment) are by far the largest source of diesel emissions. Studies show that diesel particulate matter concentrations are much higher near heavily traveled highways and intersections. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Many of these toxic compounds adhere to the particles, and because diesel particles are very small, they penetrate deeply into the lungs. Diesel engine particulate matter is a human carcinogen. The cancer risk from exposure to diesel exhaust may be much higher than the risk associated with any other toxic air pollutant routinely measured in the region.

Before California listed particulate matter from diesel engine exhaust as a toxic air contaminant, it had already adopted various regulations that would reduce diesel emissions. These regulations include new standards for diesel engine fuel; exhaust emission standards for new diesel trucks, buses, autos, and utility equipment; and inspection and maintenance requirements for health duty vehicles. Since listing diesel exhaust as a toxic air contaminant, the California Air Resources Board has been evaluating what additional regulatory action is needed to reduce public exposure. The California Air Resources Board does not anticipate banning diesel fuel or engines; however, it may consider additional requirements for diesel fuel and engines, as well as other measures to reduce public exposure.

GLOBAL CLIMATE CHANGE REGULATORY PROGRAMS

Kyoto Protocol. The original Kyoto Protocol was negotiated in December 1997 and came into effect on February 16, 2005. As of December 2006, 169 countries have ratified the agreement with the exception of the United States and Australia. Participating nations are separated into Annex 1 (i.e., industrialized countries) and Non-Annex 1 (i.e., developing countries) countries that have different requirements for greenhouse gas reductions. The goal of the Protocol is to achieve overall emissions reduction targets for six greenhouse gases by the period of 2008 to 2012. The six greenhouse gases regulated under the Protocol are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons and perfluorocarbons. Each nation has an emissions reduction target for which they must reduce greenhouse gas emissions a certain percentage below 1990 levels (e.g., eight percent reduction for the European Union, six percent reduction for Japan). The average reduction target for nations participating in the Kyoto Protocol is approximately five percent below 1990 levels. Although the United States has not ratified the Protocol, it has established an 18 percent reduction in greenhouse gas emissions intensity by 2012. Greenhouse gas intensity is the ratio of greenhouse gas emissions to economic output (i.e., gross domestic product).

AB 1493. In a response to the transportation sector accounting for more than half of California's carbon dioxide (CO_2) emissions, Assembly Bill 1493 (AB 1493, Pavley) was enacted on July 22, 2002. AB 1493 required the California Air Resources Board to set greenhouse gas emission standards for passenger vehicles, light duty trucks, and other vehicles determined to be vehicles whose primary use is noncommercial personal transportation in the State. The bill required that the California Air Resources Board set the greenhouse gas emission standards for motor vehicles manufactured in 2009 and all subsequent model years. In setting these standards, the California Air Resources Board must consider cost effectiveness, technological feasibility, economic impacts, and provide maximum flexibility to manufacturers. The California Air Resources Board adopted the standards in September 2004. These standards are intended to reduce emissions of carbon dioxide and other greenhouse gases (e.g., nitrous oxide, methane). The new standards would phase in during the 2009 through 2016 model years. When fully phased in, the near term (2009 to 2012) standards will result in about a 22 percent reduction in greenhouse gas emissions compared to the emissions from the 2002 fleet, while the midterm (2013 to 2016) standards will result in a reduction of about 30 percent. Some currently used technologies that achieve greenhouse gas reductions include small engines with superchargers, continuously variable transmissions, and hybrid electric drive.

Executive Order S-3-05. In June 2005, Governor Schwarzenegger established California's greenhouse gas emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: Greenhouse gas emissions should be reduced to 2000 levels by 2010; greenhouse gas emissions should be reduced to 1990 levels by 2020; and greenhouse gas emissions should be reduced to 80 percent below 1990 levels by 2050. The Secretary of the California Environmental Protection Agency (the Secretary) is required to coordinate efforts of various agencies in order to collectively and efficiently reduce greenhouse gases. Some of the agencies involved in the greenhouse gas reduction plan include Secretary of the Business, Transportation and Housing Agency, Secretary of the Department of Food and Agriculture, Secretary of the Resources Agency, Chairperson of the California Air Resources Board, Chairperson of the Energy Commission, and the President of the Public Utilities Commission. The Secretary is required to submit a biannual progress report to the Governor and State Legislature disclosing the progress made toward greenhouse gas emission reduction targets. In addition, another biannual report must be submitted illustrating the impacts of global warming on California's water supply, public health, agriculture, the coastline and forestry and report possible mitigation and adaptation plans to combat these impacts.

Assembly Bill 32. The Legislature enacted Assembly Bill 32 (AB 32, Nunez), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed on September 27, 2006 to further the goals of Executive Order S-3-05. AB 32 represents the first enforceable statewide program to limit greenhouse gas emissions from all major industries with penalties for noncompliance. The California Air Resources Board has been assigned to carry out and develop the programs and requirements necessary to achieve the goals of AB 32. The foremost objective of the California Air Resources Board is to adopt regulations that require the reporting and verification of statewide greenhouse gas emissions. This program will be used to monitor and enforce compliance with the established standards. The first greenhouse gas emissions limit is equivalent to the 1990 levels, which are to be achieved by 2020. The California Air Resources Board is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost effective greenhouse gas emission reductions. AB 32 allows the California Air Resources Board to adopt market based compliance mechanisms to meet the specified requirements. Finally, the California Air Resources Board is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market based compliance mechanism adopted. In order to advise the California Air Resources Board, it must convene an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee. By January 2008, the first deadline for AB 32, a statewide cap for 2020 emissions based on 1990 levels must be adopted. The following year (January 2009), the California Air Resources Board must adopt mandatory reporting rules for significant sources of greenhouse gases and also a plan indicating how reductions in significant greenhouse gas sources will be achieved through regulations, market mechanisms, and other actions.

Executive Order S-1-07. On January 18, 2007, California further solidified its dedication to reducing greenhouse gases by setting a new Low Carbon Fuel Standard for transportation fuels sold within the State. Executive Order S-1-07 sets a declining standard for greenhouse gas emissions measured in carbon dioxide equivalent gram per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020. The Low Carbon Fuel Standard applies to refiners, blenders, producers and importers of transportation fuels and will use market-based mechanisms to allow these providers to choose how they reduce emissions during the "fuel cycle" using the most economically feasible methods. The Executive Order requires the Secretary of the California Environmental Protection Agency to coordinate with actions of the California Energy Commission, the California Air Resources Board, the University of California and other agencies to develop a protocol to measure the "life cycle carbon intensity" of transportation fuels. The California Air Resources Board is anticipated to complete its review of the Low Carbon Fuel Standard protocols no later than June 2007 and implement the regulatory process for the new standard by December 2008.

5.4.3 IMPACT THRESHOLDS AND SIGNIFICANCE CRITERIA

According to Appendix G of the State CEQA Guidelines, air quality impacts resulting from implementation of the proposed project could be considered significant if they would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; and/or
- Create objectionable odors affecting a substantial number of people.

During preparation of the Initial Study, impacts associated with the last bullet were found to be less than significant. Please refer to Section 8.0, Effects Found Not to be Significant, for a detailed explanation.

STANDARDS-BASED THRESHOLDS

AVAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines establish thresholds for pollutant emissions generated both during and following construction.

CRITERIA POLLUTANTS

For purposes of this air quality analysis, actions that violate Federal standards for criteria pollutants (i.e., primary standards designed to safeguard the health of people considered to be sensitive receptors, and outdoor and secondary standards designed to safeguard human welfare) are considered significant impacts. Additionally, actions that violate State standards developed by the California Air Resources Board or criteria developed by the AVAQMD, including thresholds for criteria pollutants, are considered significant impacts. Table 5.4-3, Construction and Operational Air Emissions Thresholds, provides the thresholds set forth by the AVAQMD.

Table 5.4-3
Construction and Operational Air Emissions Thresholds

Criteria Pollutant	Annual Thresholds (Tons)	Daily Thresholds (pounds)
Carbon Monoxide (CO)	100	548
Nitrogen Oxides (NO_X)	25	137
Volatile Organic Compounds (VOCs)	25	137
Sulfur Oxides (SO_X)	25	137
Particulate Matter <10 microns (PM_{10})	15	82
Particulate Matter <2.5 microns ($PM_{2.5}$)	15	82

Source: Antelope Valley Air Quality Management District, California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, June 2007.

A project must incorporate mitigation sufficient to reduce its impact to a less than significant level. A project that cannot be mitigated to a level that is less than significant is required to incorporate all feasible mitigation. It should be noted that the emission thresholds are given as a daily value and an annual value, so that a multi-phased project (such as a project with a construction phase and a separate operational phase) with phases shorter than one year can be compared to the daily value. As previously stated, the Mojave Desert Air Basin is designated non-attainment for State and Federal standards for O_3 and nonattainment for Federal standards only for PM_{10}.

In addition, the significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and Federal CO standards. If the project causes an exceedance of either the State one-hour or eight-hour CO concentrations, the project would be considered to have a significant local impact. If ambient levels already exceed a State or Federal standard, then project emissions would be considered significant if they increase one-hour CO concentrations by 1.0 ppm or more, or eight-hour CO concentrations by 0.45 ppm or more; refer to Table 5.4-4, Federal and State Carbon Monoxide Standards.

Table 5.4-4
Federal and State Carbon Monoxide Standards

Jurisdiction	Averaging Time	Carbon Monoxide (CO) Standard (parts per million)
Federal	1 Hour	35
	8 Hours	9
State	1 Hour	20
	8 Hours	9
Source: Antelope Valley Air Quality Management District, California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, June 2007.		

CONFORMITY IMPACTS

According to AVAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, a project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable AVAQMD rules and regulations, complies with all proposed control measures that are not adopted from applicable plans, and is consistent with the growth forecasts in the applicable plan(s). Per the AVAQMD, conformity with growth forecasts can be established by demonstrating that the project is consistent with the land use plan that was used to generate the growth forecast (i.e., City of Lancaster General Plan).

CUMULATIVE THRESHOLDS

Any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. If a project impact is individually less than significant, the impacts of the surrounding past, present, and future projects must be taken into account. The thresholds of significance for cumulative impacts are the same as those for the project-related impacts used in this analysis.

Based on these standards, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended to avoid or reduce potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant and unavoidable impact.

5.4.4 IMPACTS AND MITIGATION MEASURES

SHORT-TERM CONSTRUCTION IMPACTS

- Short-term construction activities associated with the proposed project would result in air pollutant emission impacts or expose sensitive receptors to substantial pollutant concentrations.

It is anticipated that development of the DLSP would occur over several years. For analysis purposes, a buildout year of 2030 is used. At this stage in the planning process, construction activities for the proposed project are not available. However, based on the DLSP, Table 5.4-5, Development Plan Buildout Summary, lists the anticipated developments that would occur. Since detailed information concerning construction of the proposed project is not yet available, a qualitative analysis was provided. The qualitative analysis was based on previous consultation with the AVAQMD.[11]

Table 5.4-5
Development Plan Buildout Summary

District	Retail/Service (s.f.)	Office/Civic/Public (s.f.)	Residential (du)
Cedar Avenue Arts	115,606	73,047	176
Civic Village	115,606	292,187	970
Commerce	138,727	170,442	441
Gateway	69,364	48,698	264
Neighborhood Office	23,121	73,047	264
Boulevard	254,333	146,093	599
Transit	208,091	170,442	811
Total	**924,848**	**973,956**	**3,525**
Note: Assumes 2030 buildout with 25 percent adjustment for future condition, includes existing development plus future.			

Fugitive Dust

Federal, State, and local development standards and requirements designed to minimize air quality emissions would be implemented through standard development procedures. These measures typically include the following:

- Water exposed soils at least twice daily and maintain equipment and vehicle engines in good condition and in proper tune;

[11] Telephone conversation, Alan DeSalvio of the Antelope Valley Air Quality Management District, September 10, 2007.

- Wash-off trucks leaving development sites;
- Replace ground cover on construction sites if it is determined that the site will be undisturbed for lengthy periods;
- Reduce speeds on unpaved roads to less than 15 miles per hour;
- Halt all grading and excavation operations when wind speeds exceed 25 miles per hour;
- Properly maintain diesel-powered on-site mobile equipment;
- Install particulate filters on off-road construction equipment;
- Sweep streets at the end of the day if substantial visible soil material is carried over to the adjacent streets; and
- Cover all trucks hauling dirt, sand, soil or other loose material to and from the site.

Fugitive dust is a major concern for areas in the Mojave Desert Air Basin. Implementation of the project would include considerable construction activities, which could potentially result in exceedances of AVAQMD standards. Since the proposed project is currently in the programmatic stage, it is not possible to quantify impacts associated with fugitive dust. Therefore, based on the size of the proposed project and in consultation with the AVAQMD, it is anticipated that impacts regarding fugitive dust would be significant and unavoidable. All future projects within the DLSP area would be required to adhere to the feasible mitigation measures to minimize fugitive dust emissions. Feasible mitigation measures include those listed in Mitigation Measures AQ-1 and AQ-2. Implementation of the mitigation measures would reduce fugitive dust impacts; however, impacts would remain significant and unavoidable.

Construction Equipment and Worker Vehicle Exhaust

Exhaust emissions from construction activities include emissions associated with the transport of machinery and supplies to and from the project area, emissions produced on-site as the equipment is used, and emissions from trucks transporting materials to/from the project area. Emitted pollutants would include CO, VOCs, NO_X, SO_X, PM_{10}, and $PM_{2.5}$. Standard AVAQMD regulations would be adhered to, such as maintaining all construction equipment in proper tune and shutting down equipment when not in use for extended periods of time as specified in Mitigation Measure AQ-3. However, it is anticipated that construction equipment exhaust would cause exceedances of the AVAQMD's pollutant thresholds, resulting in a significant impact.

Reactive Organic Gas and Volatile Organic Compound Emissions

In addition to gaseous and particulate emissions, the application of asphalt and surface coatings creates ROG emissions, which are ozone precursors. Future development within the project area would be required to adhere to the AVAQMD Rule 1113, Architectural Coatings, which provides stipulations on painting and coating activities; refer to Mitigation Measure AQ-4.

Odors

Potential sources that may emit odors during construction activities include the use of architectural coatings and solvents. AVAQMD Rule 1113 limits the amount of volatile organic compounds from architectural coatings and solvents. Construction activities or materials would not create objectionable odors with compliance with AVAQMD rules. Therefore, impacts would be less than significant and no mitigation measures would be required.

Structural Asbestos

Project construction activities may include the demolition of buildings that were constructed prior to 1980. These structures may contain friable asbestos, which has been identified as a hazardous airborne contaminant. Regulations are already in place, which require demolition activities to minimize asbestos released into the air. Primarily, this is accomplished through the asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP). The Environmental Protection Agency, through the California Air Resources Board, and the AVAQMD enforces the National Emission Standards for Hazardous Air Pollutants.

The asbestos National Emission Standards for Hazardous Air Pollutants specifies work practices to be followed during demolition of all structures that contain, or may contain asbestos (AVAQMD Regulation X, National Emissions Standards for Hazardous Air Pollutants). These work practices have been designed to effectively reduce airborne asbestos to safe levels. The proposed project would be subject to the asbestos National Emission Standards for Hazardous Air Pollutants, and thus would be required to comply with these specified work practices. Additionally, demolition activities would be subject to AVAQMD Rule 1403, Asbestos Emissions From Demolition/Renovation Activities, and Regulation X, National Emissions Standards for Hazardous Air Pollutants; refer to Mitigation Measure AQ-5. Consequently, airborne asbestos would not be generated in unhealthy amounts during demolition.

Naturally Occurring Asbestos

Chrysotile and amphibole asbestos (such as tremolite) occur naturally in certain geologic settings in California, most commonly in association with ultramafic rocks and along associated faults. Asbestos is a known carcinogen and inhalation of asbestos may result in the development of lung cancer or mesothelioma. The asbestos contents of many manufactured products have been regulated in the U.S. for a number of years. For example, the California Air Resources Board has regulated the amount of asbestos in crushed serpentinite used in surfacing applications, such as for gravel on unpaved roads, since 1990. In 1998, new concerns were raised about possible health hazards from activities that disturb rocks and soil containing asbestos and may result in the generation of asbestos laden dust. These concerns recently lead the California Air Resources Board to revise their asbestos limit for crushed serpentinite and ultramafic rock in surfacing applications from five percent to less than 0.25 percent, and to adopt a new rule requiring best practices dust control measures for activities that disturb rock and soil containing naturally occurring asbestos.

The San Andreas rift zone passes through the Antelope Valley, and extends from the Gulf of Mexico through the western portion of State of California to a point at Cape Mendocino. Additionally, the Littlerock fault runs parallel to the San Andres and is considered a subsidiary fault. Soil conditions in the project area consist of silty sands (SM), clayey sands (SC) and silts (ML). Soils are classified as SD, per Uniform Building Code Tables 16Q and 16R. Additionally, per the California Division of Mines and Geology, Alluvium (QAL) underlies the project area. Therefore, the potential for Naturally Occurring Asbestos to be present within the project limits is considered to be low, as sand and silts underlie most of the area.

Overall Construction Emissions

As stated, the DLSP would be built over several years, with a buildout date of 2030. At this point, detailed construction assumptions have not yet been developed. Thus, per the AVAQMD guidance, a qualitative analysis was performed to disclose the anticipated impacts and mitigation measures. With implementation of recommended mitigation measures, a reduction in construction related criteria pollutants would occur. However, due to the unknown nature of future construction activities, the potential exists that ambient air quality standards for O_3, PM_{10}, and $PM_{2.5}$ may be exceeded. The Mojave Desert Air Basin is designated nonattainment for State and Federal standards for O_3, nonattainment for State standards only for PM_{10}, and unclassified for $PM_{2.5}$. Any increase in these pollutants would create a significant and unavoidable air quality impact. Thus, it is concluded that even with the implementation of the recommended mitigation measures, the proposed project would result in significant and unavoidable construction related air quality impacts.

LONG-TERM OPERATIONAL IMPACTS

- Development associated with the proposed project would result in significant air emissions impacts or expose sensitive receptors to substantial pollutant concentrations.

For purposes of this air quality emissions analysis, operational related air quality impacts were studied for 2030 buildout. Long-term air quality impacts would consist of mobile source emissions generated from project-related traffic and from stationary source emissions generated directly from natural gas. Emissions associated with each of these sources are discussed and calculated below.

Currently, the project area includes 252 residential units, approximately 475,879 square feet of retail/service uses and 640,020 square feet of office/civic/public uses. To accommodate development of the DLSP, removal of certain existing residential, retail/service, and office/civic/public uses may be required. Table 5.4-6, Proposed Development of the Downtown Lancaster Specific Plan, summarizes the maximum development potential for the project area.

Table 5.4-6
Proposed Development of the Downtown Lancaster Specific Plan

Existing/Proposed Uses	Retail/Service (s.f.)	Office/Civic/Public (s.f.)	Residential (du)
Existing Uses	475,879	640,020	252
Proposed Uses	924,848	973,956	3,525
Net Increase	**448,969**	**333,936**	**3,273**

Notes:
1. Refer to Section 3.0, Project Description, for a detailed description of land uses.
2. Assumes 2030 buildout with 25 percent adjustment for future condition, includes existing development plus future.

Based on the Traffic Impact Analysis, the proposed project would generate approximately 35,704 net new daily trips, which include approximately 2,485 A.M. peak hour trips and approximately 3,316 P.M. peak hour trips. The pollutant emissions for the proposed project account for the increased emissions over baseline existing conditions.

Mobile Source Emissions

Based on the Traffic Impact Analysis, the proposed project would generate 35,704 net daily trips above existing conditions. Mobile sources are emissions from motor vehicles, including tailpipe and evaporative emissions. Depending upon the pollutant being discussed, the potential air quality impact may be of either regional or local concern. For example, VOCs, NO_X, SO_X and PM_{10} are all pollutants of regional concern; (NO_X and VOCs react with sunlight to form O_3 [photochemical smog], and wind currents readily transport SO_X and PM_{10}). However, CO tends to be a localized pollutant, dispersing rapidly at the source.

Since the proposed project includes different land uses, the project's trips have been reduced using an internal trip capture reduction and a transportation impact factor. Trip reduction factors are based on proximity to transit centers/light rail stations and development density/intensity. An internal trip capture reduction is applicable when a project site has multiple destinations in which a patron visits more than one destination onsite during the same visit.

Project-generated vehicle emissions have been estimated using the URBEMIS 2007 computer model. This model predicts VOCs, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ emissions from motor vehicle traffic associated with new or modified land uses. Refer to Appendix D, Air Quality Data, for model input values used for this project. Project trip generation rates were based on the Downtown Lancaster Traffic Impact Analysis; refer to Section 5.3, Traffic, Circulation, and Parking, and Appendix C, Traffic Impact Study. Table 5.4-7, Year 2030 Project Operational Emissions, presents anticipated mobile source (vehicle) emissions.

Area Source Emissions

Area source emissions were estimated using a variety of sources including the URBEMIS 2007 model, along with generally accepted emission factors for certain stationary sources. While previous versions of URBEMIS 2007 were designed to estimate emissions only from motor vehicle trips, the current version can estimate emissions from gas heaters, furnaces and landscape maintenance equipment. The model accounts for specific meteorological conditions and topography that characterize each air basin in California. Electricity and natural gas are utilized by almost every residential development. As indicated in Table 5.4-7, except for VOC emissions, area source emissions alone would not exceed established AVAQMD thresholds.

TOTAL PROJECT OPERATIONAL EMISSIONS: AREA AND MOBILE SOURCES

The total project operational emissions are described in terms of area source and mobile source (vehicle) emissions. Transportation control measures and design features can be incorporated into the project to reduce emissions from mobile sources. Mitigation Measure AQ-6 has been recommended to reduce area source emissions and potential sources of ROG emissions. However, as indicated in Table 5.4-7, operational emissions would still exceed the AVAQMD thresholds in regards to PM_{10} and VOCs due to the net increase of 35,704 daily trips. Thus, the project would result in significant and unavoidable impacts for long-term operations under Year 2030 conditions.

Table 5.4-7
Year 2030 Project Operational Emissions

Emissions	Pollutant (pounds/day)[1]					
	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Existing						
• Area Source Emissions[2] • Mobile Source (Vehicle) Emissions	21.11 81.62	11.40 84.63	13.31 932.12	0.00 2.87	0.03 469.58	0.03 90.97
Total Emissions	102.73	96.03	945.43	2.87	469.61	91.00
Antelope Valley Air Quality Management District Threshold	*137*	*137*	*548*	*137*	*82*	*82*
Is Threshold Exceeded? (Significant Impact?)	***No***	***No***	***Yes***	***No***	***Yes***	***Yes***
Proposed Project						
• Area Source Emissions[2] • Mobile Source (Vehicle) Emissions	202.19 116.78	50.06 106.84	32.48 1,193.15	0.00 3.65	0.10 593.61	0.10 115.08
Total Emissions	318.97	156.90	1,225.63	3.65	593.71	115.18
Antelope Valley Air Quality Management District Threshold	*137*	*137*	*548*	*137*	*82*	*82*
Is Threshold Exceeded? (Significant Impact?)	***Yes***	***Yes***	***Yes***	***No***	***Yes***	***Yes***
Net Emissions						
Total Emissions	216.24	60.867	280.2	0.78	124.04	24.18
Antelope Valley Air Quality Management District Threshold	137	137	548	137	82	82
Is Threshold Exceeded? (Significant Impact?)	***Yes***	***No***	***No***	***No***	***Yes***	***No***

VOC = volatile organic compounds; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter <10 microns; $PM_{2.5}$ = particulate matter <2.5 microns.

Notes:
1. Based on URBEMIS 2007 modeling results, worst-case seasonal emissions for area and mobile emissions have been modeled.
2. Area Source emissions exclude the use of fireplaces and wood burning stoves.

LOCALIZED CARBON MONOXIDE HOTSPOTS

- Development associated with the proposed project would not result in carbon monoxide hotspots.

Carbon monoxide emissions are a function of vehicle idling time, meteorological conditions and traffic flow. Under certain extreme meteorological conditions, CO concentrations near a congested roadway or intersection may reach unhealthy levels (i.e., adversely affect residents, school children, hospital patients, the elderly, etc.).

To identify CO hotspots, the AVAQMD follows the South Coast Air Quality Management District criterion, which requires a CO microscale hotspot analysis when a project increases the volume-to-capacity ratio (also called the intersection capacity utilization) by 0.02 (two percent) for any intersection with an existing level of service (LOS) D or worse. Because traffic congestion is highest at intersections where vehicles queue and are subject to reduced speeds, these hot spots are typically produced at intersection locations.

The PM peak hour results in higher intersection capacity utilization (ICU) and was used in the modeling process. Future CO projections are modeled using the existing lane configurations and do not include the improvements discussed in the traffic analysis. The projected traffic volumes were then modeled using the CALINE4 dispersion model and the resultant values were added to an ambient concentration. The ambient concentration used in the modeling was the highest one-hour measurement from the past five years of data gathered at the Lancaster-Division Street monitoring station. Actual future ambient CO levels may be lower due to emissions control strategies that would be implemented between now and the project buildout date. As indicated in Table 5.4-8, Project Buildout Carbon Monoxide Concentrations, CO levels would be well below the State standard of 20 ppm for the 1-hour Standards and 9 ppm for the 8-hour standards. Therefore impacts associated with CO levels would be less than significant.

Table 5.4-8
Project Buildout Carbon Monoxide Concentrations

Intersection	1-Hour CO (ppm)		8-Hour CO (ppm)[3]	
	1-Hour Standard[2]	Future + Project	8-Hour Standard[3]	Future + Project
11th Street West and Lancaster Boulevard	20 ppm	3.4	9 ppm	2.38
10th Street West and Kildare Street	20 ppm	3.4	9 ppm	2.38
10th Street West and Lancaster Boulevard	20 ppm	3.5	9 ppm	2.45
Gadsen Avenue and Lancaster Boulevard	20 ppm	3.4	9 ppm	2.38
Fern Avenue and Lancaster Boulevard	20 ppm	3.4	9 ppm	2.38
Elm Avenue and Lancaster Boulevard	20 ppm	3.4	9 ppm	2.38
Cedar Avenue and Lancaster Boulevard	20 ppm	3.5	9 ppm	2.45
Beech Avenue and Lancaster Boulevard	20 ppm	3.4	9 ppm	2.38
Sierra Highway and Lancaster Boulevard	20 ppm	3.5	9 ppm	2.45
20th Street West and Avenue I	20 ppm	3.5	9 ppm	2.45
20th Street West and Avenue J	20 ppm	3.6	9 ppm	2.52
20th Street West and SR-14 Northbound Off Ramp	20 ppm	3.7	9 ppm	2.59
SR-14 on Ramp and Avenue J-8	20 ppm	3.6	9 ppm	2.52
20th Street West and Avenue J-8	20 ppm	3.6	9 ppm	2.52
15th Street West and Avenue J-8	20 ppm	3.5	9 ppm	2.45
10th Street West and Avenue J	20 ppm	3.7	9 ppm	2.59
10th Street West and Avenue J-8	20 ppm	3.7	9 ppm	2.59
Fern Avenue and Newgrove Street	20 ppm	3.3	9 ppm	2.31
Fern Avenue and Avenue J	20 ppm	3.6	9 ppm	2.52

Notes:
1. As measured at a distance of 10 feet from the corner of the intersection predicting the highest value. Presented 1-hour CO concentrations include a background concentration of 3.2 ppm. Eight-hour concentrations are based on a persistence of 0.7 of the 1-hour concentration.
2. The State 1-hour standard is 20 ppm. The Federal standard is 35 ppm. The most stringent standard is reflected in the Table.
3. The State 8-hour and Federal 8-hour standard is 9 ppm.

Source: CALINE4 Dispersion Model.

CONFORMITY WITH AIR QUALITY MANAGEMENT PLAN

- Development associated with the proposed project would be inconsistent with regional plans including the AVAQMD 2004 Ozone Attainment Plan.

According to the AVAQMD, California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, a project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plans, and is consistent with the growth forecasts in the applicable plans. Conformity with growth forecasts can be established by demonstrating that the project is consistent with the land use plan that was used to generate the growth forecast.

Although the project would represent an incremental negative impact to air quality in the MDAB, of primary concern is that project-related impacts have been properly anticipated in the regional air quality planning process and reduced whenever feasible. Therefore, it is necessary to assess the project's consistency with the applicable attainment or management plan. The proposed project is covered under the AVAQMD 2004 Ozone Attainment Plan (Attainment Plan). The Attainment Plan bases its assumptions on growth forecasts contained in the City of Lancaster General Plan and is utilized by the AVAQMD in budgeting the MDAB emissions. Therefore, in order to analyze consistency with the Attainment Plan, a comparison study was performed to determine impacts associated with implementation of the DLSP over the existing City of Lancaster General Plan land designations.

The DLSP area is currently designated Commercial, Light Industrial, Public, Urban Residential and Medium Density Residential. Adoption of the DLSP would change the land use designation to Downtown Lancaster Specific Plan (DLSP). The planning process for the DLSP included three distinct phases to allow the design team to build a baseline understanding of Downtown Lancaster and surrounding neighborhoods. Based on the outcome of the planning process for the DLSP, it was determined that the project area could not support the existing General Plan buildout objectives for the area. Thus, the air quality analysis analyzed the anticipated net impacts over existing conditions rather than General Plan buildout, consistent with the analysis contained within Section 5.3, Traffic, Circulation, and Parking. Forecast year 2030 traffic volumes were derived by applying an annual growth rate of two percent per year to existing volumes as directed by City of Lancaster staff, which resulted in a net increase of 35,704 daily trips.

Table 5.4-9, Land Use Plan Buildout Summary, indicates the proposed project would increase the number of residential units by 3,274, increase retail/service uses by 448,969 square feet, and office/civic/public uses by 333,936 square feet. It should be noted that these increases are based upon the net increase between the existing development and the proposed build out of the DLSP. The General Plan land use categories present within the DLSP area are illustrated on Exhibit 5.1-2, General Plan Land Use, and summarized in Table 5.1-2, Existing General Plan Land Use Categories. As indicated in Table 5.1-2, the land use categories present within the DLSP area are: 5.43 acres of Residential uses, 86.47 acres of Commercial uses, 4.19 acres of Public uses and 3.76 acres of Light Industrial uses. Based on these existing land use categories, the maximum development potential of the DLSP area is 155 dwelling units, 3,766,514 square feet of Commercial uses, 182,408 square feet of Public uses and 81,797 square feet of Light Industrial uses. Thus, the project would increase the number of dwelling units and public uses beyond General Plan projections; however, commercial uses would be reduced.

Based on the net increase in daily trips, a quantitative emissions analysis was conducted using the URBEMIS 2007 model. Results of the air quality modeling are presented in Table 5.4-7, Year 2030 Project Operational Emissions. As indicated in Table 5.4-7, the proposed project would result in a significant and unavoidable impact for VOC and PM_{10} emissions. Therefore, implementation of the proposed DLSP would result in a significant regional increase of buildout emissions for the City of Lancaster. Therefore, impacts would be considered significant and unavoidable in regards to consistency with the latest Attainment Plan.

Table 5.4-9
Land Use Plan Buildout Summary

District[1]	Retail/Service (s.f.)		Office/Civic/Public (s.f.)		Residential (du)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Cedar Avenue Arts	72,094	115,606	45,436	73,047	1	176
Civic Village	8,295	115,606	293,207	292,187	212	970
Commerce	93,119	138,727	30,772	170,442	0	441
Gateway	42,069	69,364	29,877	48,698	2	264
Neighborhood Office	23,150	23,121	91,560	73,047	37	264
Boulevard	158,804	254,333	120,784	146,093	0	599
Transit	78,348	208,091	28,384	170,442	0	811
Total[2]	**475,879**	**924,848**	**640,020**	**973,956**	**252**	**3,525**
Net Change	**448,969**		**333,936**		**3,273**	

Notes:
1. Districts illustrated on Exhibit 3-3, Project Aerial Photograph.
2. Assumes 2030 buildout with 25 percent adjustment for future condition, includes existing development plus future.

CUMULATIVE IMPACTS

- Development associated with the proposed project and related cumulative projects would result in significant long-term air quality impacts or expose sensitive receptors to substantial pollutant concentrations.

According to the AVAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. If a project impact is individually less than significant, the impacts of the surrounding past, present and future projects must be taken into account. The thresholds of significance for cumulative impacts are the same as those for the project related impacts used in this analysis.

CUMULATIVE SHORT-TERM IMPACTS

With respect to the project's construction-period air quality emissions and cumulative Basin-wide conditions, the AVAQMD has developed strategies to reduce criteria pollutant emissions outlined in the 2004 Ozone Attainment Plan pursuant to Federal Clean Air Act mandates. As such, the proposed project would comply with all feasible mitigation measures. In addition, the proposed project would comply with adopted 2004 Ozone Attainment Plan emissions control measures.

Although compliance with AVAQMD rules and regulations would reduce construction related impacts, the project related construction emissions have been concluded to be significant and unavoidable. Thus, it can be reasonably inferred that the project related construction activities, in combination with those from other projects in the area, would deteriorate the local air quality and lead to cumulative construction related impact. Therefore, even with the implementation of Mitigation Measures AQ-1 through AQ-5, a significant and unavoidable cumulative construction air quality impact would result.

CUMULATIVE LONG-TERM IMPACTS

If a project related air quality impact is individually less than significant, the impacts of reasonably anticipated future activities, probable future projects, and past projects are included based on similar air quality impacts, transport considerations and geographic location. Implementation of the proposed project would result in an increase in emissions, which would contribute to region-wide emissions on a cumulative basis. As indicated in the Long-Term Analysis above, the proposed project would result in an exceedance of the AVAQMD's standards for VOC and PM_{10}. Therefore, per the AVAQMD *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines*, the proposed project would also result in a cumulative impact to air quality within the region. Impacts associated with cumulative operations would be significant and unavoidable.

GLOBAL CLIMATE CHANGE

California is a substantial contributor of global greenhouse gases, emitting over 400 million tons of carbon dioxide (CO_2) a year.[12] Climate studies indicate that California is likely to see an increase of three to four degrees Fahrenheit over the next century. Methane is also an important greenhouse gas that potentially contributes to global climate change. Greenhouse gases are global in their effect, which is to increase the earth's ability to absorb heat in the atmosphere. Because primary greenhouse gases have a long lifetime in the atmosphere, accumulate over time, and are generally well-mixed, their impact on the atmosphere is mostly independent of the point of emission.

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of greenhouse gases and other gases to the atmosphere from volcanic eruptions); and

[12] California Energy Commission, *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004,* 2006. http://www.energy.ca.gov/global_climate_change/inventory/documents/ index.html.

- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

The impact of anthropogenic activities on global climate change is readily apparent in the observational record. For example, surface temperature data shows that 11 of the 12 years from 1995 to 2006 rank among the 12 warmest since 1850, the beginning of the instrumental record for global surface temperature.[13] In addition, the atmospheric water vapor content has increased since at least the 1980s over land, sea and in the upper atmosphere, consistent with the capacity of warmer air to hold more water vapor; ocean temperatures are warmer to depths of 3,000 feet; and a marked decline has occurred in mountain glaciers and snow pack in both hemispheres, polar ice and ice sheets in both the artic and Antarctic regions.

Air trapped by ice has been extracted from core samples taken from polar ice sheets to determine the global atmospheric variation of carbon dioxide, methane and nitrous oxide from before the start of the industrialization, around 1750, to over 650,000 years ago. For that period, it was found that carbon dioxide concentrations ranged from 180 ppm to 300 ppm. For the period from around 1750 to the present, global carbon dioxide concentrations increased from a pre industrialization period concentration of 280 ppm to 379 ppm in 2005, with the 2005 value far exceeding the upper end of the pre industrial period range.

The primary effect of global climate change has been a rise in average global tropospheric temperature of 0.2° Celsius per decade, determined from meteorological measurements world wide between 1990 and 2005.[14] Climate change modeling using 2000 emission rates shows that further warming would occur, which would induce further changes in the global climate system during the current century.[15] Changes to the global climate system and ecosystems and to California would include, but would not be limited to:

- The loss of sea ice and mountain snow pack resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;[16]

- Rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps, the Greenland and Antarctic ice sheets;[17]

- Changes in weather that includes, widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic and aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;[18]

- Decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;[19]

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[13] Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis, Summary for Policymakers*, February 2007.
[14] Ibid.
[15] Ibid.
[16] Ibid.
[17] Ibid.
[18] Ibid.
[19] California Environmental Protection Agency*, Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature (Executive Summary)*, March 2006.

- Increase in the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas of Los Angeles and the San Joaquin Valley by the end of the 21st century;[20] and
- High potential for erosion of California's coastlines and sea water intrusion into the Delta and levee systems due to the rise in sea level.[21]

Table 5.4-10, Estimated Annual Carbon Dioxide Emissions Projections, estimates the CO_2 emissions of approximately 33,937 square feet of office and civic uses, 4,448,970 square feet of retail and service uses, and 3,274 dwelling units. These estimations are based on energy emissions from natural gas usage, as well as automobile emissions. As shown in Table 5.4-10, the proposed project would result in a net total of 22,305 tons of CO_2 per year during the operational phase over existing uses.

Table 5.4-10
Estimated Annual Carbon Dioxide Emissions Projections

Project	CO_2 (tons/year)
Existing Operational Emissions	
• Area Source	2,518.95
• Mobile Source	50,056.99
Total Existing Operational Emissions	***52,575.94***
Proposed Operational Emissions	
• Area Source	11,435.26
• Mobile Source	63,445.68
Total Proposed Operational Emissions	***74,880.94***
Net Operational Emissions	
Total Net Emissions	***22,305***
Note: The project is not expected to result in the emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), or sulfur hexafluoride (SF_6), the other gases identified as greenhouse gases in Assembly Bill 32.	

Identifying and quantifying greenhouse gas emissions using CO_2 emissions does not present a complete inventory of greenhouse gas emissions. The proposed project would be subject to any regulations developed under Assembly Bill 32 as determined by the California Air Resources Board. Currently, there is not an industry-wide accepted method to quantify greenhouse gases from development projects.

CONCLUSION

CEQA requires an agency to engage in forecasting "to the extent that an activity could reasonably be expected under the circumstances. An agency cannot be expected to predict the future course of governmental regulation or exactly what information scientific advances may ultimately reveal." (CEQA Guidelines Section 15144, Office of Planning Research commentary, citing the California Supreme Court decision in *Laurel Heights Improvement Association v. Regents of the University of California* [1988] 47 Cal. 3d 376).

[20] Ibid.
[21] Ibid.

CEQA does not require an agency to evaluate an impact that is "too speculative" provided that the agency identifies the impact, engages in a "thorough investigation" but is "unable to resolve an issue," and then discloses its conclusion that the impact is too speculative for evaluation. (CEQA Guidelines Section 15145, Office of Planning and Research commentary). Additionally, CEQA requires that impacts be evaluated at a level that is "specific enough to permit informed decision making and public participation" with the "production of information sufficient to understand the environmental impacts of the proposed project and to permit a reasonable choice of alternatives so far as environmental aspects are concerned." (CEQA Guidelines Section 15146, Office of Planning and Research commentary).

Table 5.4-11, Applicable Global Climate Change Strategies, provides a list of recommended measures and strategies to help reduce global climate impacts that was provided by California Air Resources Board and the Climate Action Team. The strategies listed in Table 5.4-11, would directly apply to the proposed project. Table 5.4-11 provides an analysis of the project's conformance with the greenhouse gas reduction strategies.

Table 5.4-11
Applicable Global Climate Change Strategies

Strategies for Reducing Greenhouse Gas Emission Reduction	Project Conformance
Achieve 50% Statewide Recycling Goal and Zero Waste – High Recycling - 1) Design locations for separate waste and recycling receptacles. 2) Utilize recycled components in the building design.	Pursuant to Assembly Bill 939, all development projects within the City of Lancaster (including the proposed project would be required to divert 50 percent of their solid waste stream.
Appliance Energy Efficiency Use. Use of energy efficient appliances (i.e., washer/dryers, refrigerators, stoves, etc.)	In October 2006, the State of California adopted Appliance Efficiency Regulations which include standards for both Federally-regulated appliances and non-Federally-regulated appliances. These regulations would apply to the proposed project.
Smart Land Use and Intelligent Transportation. Transportation Systems Encourage high-density residential and commercial mixed use.	The proposed project would include mixed-use and transit oriented developments that would be considered a smart land use and intelligent transportation system. A transit station would also be located within the project site.
Water Use Efficiency Features. To increase water use efficiency include use of both potable and non-potable water to the maximum extent practicable and use of low flow appliances (i.e., toilets, shower heads, washing machines, etc).	The proposed project would be required to comply with California Health and Safety Code (HSC) section 17921.3, which sets efficiency standards for bathroom fixtures. Additionally, California Code of Regulations, Title 20, Division 2, Chapter 4, Article 4, Section 1605.3 sets standards for washing machines and commercial pre-rinse spray valves.
Afforestation/Reforestation. Clustering residential development to preserve forest/woodland resources, increasing density, and preserving and restoring open space would comply with this strategy.	The proposed project would be an infill development located on already developed areas in the center of Downtown Lancaster. The proposed project would not remove open space areas. Additionally, the mix of uses would represent an increased density of dwelling units minimizing impacts on open spaces and reducing commuter traffic.
Achieve 50 percent Statewide Recycling Goal. In multi-family housing, separate recycling and waste receptacles should be planned.	The City of Lancaster is in full compliance of the mandated 50 percent Statewide recycling goal, and would continue to implement solid waste reduction measures.

1. California Environmental Protection Agency, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, March 2006.

Global Climate Change impacts are a result of cumulative emissions from human activities in the region, the State, and the world. A reduction in vehicle miles traveled results in a decrease in fuel consumption and a decrease in greenhouse gas emissions. The proposed project includes a mix of land uses to help reduce the overall vehicle miles traveled.

Based on an investigation of compliance with local air quality thresholds and resultant future long-term operational impacts, the proposed project would still have the potential to result in emissions associated with greenhouse gas emissions and global climate change. However, there is significant uncertainty involved in making predictions regarding the extent to which the project operations would affect greenhouse gas emissions and global climate change. Therefore, a conclusion on the significance of the environmental impact of climate change cannot be reached. Section 15145 of the CEQA Guidelines provides that, if after a thorough investigation a lead agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impacts.

MITIGATION MEASURES

SHORT-TERM CONSTRUCTION IMPACTS

AQ-1 During clearing, grading, earth-moving, or excavation operations, excessive fugitive dust emissions shall be controlled by regular watering or other dust preventive measures using the following procedures, as specified by the AVAQMD, including but not limited to AVAQMD Rule 401, Visible Emissions, and Rule 403, Fugitive Dust:

- On-site vehicle speed shall be limited to 15 miles per hour;
- All on-site construction roads with vehicle traffic shall be watered periodically;
- Streets adjacent to the project's reach shall be swept as needed to remove silt that may have accumulated from construction activities so as to prevent excessive amounts of dust;
- All material excavated or graded shall be sufficiently watered to prevent excessive amounts of dust. Watering shall occur at least twice daily with complete coverage, preferably in the late morning and after work is done for the day;
- All clearing, grading, earth-moving, or excavation activities shall cease during periods of high winds (i.e., greater than 35 miles per hour averaged over one hour) so as to prevent excessive amounts of dust;
- All material transported on-site or off-site shall be either sufficiently watered or securely covered to prevent excessive amounts of dust;
- The area disturbed by clearing, grading, earth-moving, or excavation operations shall be minimized so as to prevent excessive amounts of dust; and

- These control techniques shall be indicated on project grading plans. Compliance with this measure shall be subject to periodic site inspections by the City of Lancaster.

AQ-2 All trucks hauling excavated or graded material on-site shall comply with State Vehicle Code Section 23114, with special attention to Sections 23114(b)(F), (e)(2) and (e)(4), as amended, regarding the prevention of such material spilling onto public streets.

AQ-3 During construction activities, excessive construction equipment and vehicle exhaust emissions shall be controlled by implementing the following procedures, as specified by the Antelope Valley Air Quality Management District:

- Properly and routinely maintain all construction equipment, as recommended by manufacturer manuals, to control exhaust emissions;
- Shut down equipment when not in use for extended periods of time to reduce emissions associated with idling engines;
- Encourage ride sharing and use of transit transportation for construction employee commuting to the project sites;
- Use electric equipment for construction whenever possible in lieu of fossil fuel-fired equipment; and
- Curtail construction during periods of high ambient pollutant concentrations; this may include ceasing construction activity during the peak-hour of vehicular traffic on adjacent roadways.

AQ-4 The construction contractor shall adhere to Antelope Valley Air Quality Management District Rule 1113 (Architectural Coatings) to limit volatile organic compounds from architectural coatings. This rule specifies architectural coatings storage, clean up and labeling requirements.

AQ-5 All building demolition activities shall adhere to Antelope Valley Air Quality Management District Rule 1403 (Asbestos Emissions From Demolition/ Renovation Activities) and Regulation X (National Emissions Standards for Hazardous Air Pollutants). Additionally, the demolished material shall be transported off-site expeditiously after demolition of the structure.

LONG-TERM OPERATIONAL IMPACTS

AQ-6 Proposed development within the Downtown Lancaster Specific Plan area shall include, to the extent feasible, as a part of construction and building management contracts, the following measures:

- Use solar or low-emission water heaters in the residential buildings;

- Each appliance (i.e., washer/dryers, refrigerators, stoves, etc.) provided by the builder must be Energy Star qualified if an Energy Star designation is applicable for that appliance;
- Low flow appliances (i.e., toilets, dishwashers, shower heads, washing machines) shall be installed if provided by the builder/applicant; and
- Require that residential landscapers providing services at the common areas of a project site use electric or battery-powered equipment, or other internal combustion equipment that is either certified by the California Air Resources Board or is three years old or less at the time of use, to the extent that such equipment is reasonably available and competitively priced.

LOCALIZED CARBON MONOXIDE HOTSPOTS

No mitigation measures are required.

CONFORMITY WITH AIR QUALITY MANAGEMENT PLAN

No additional mitigation measures have been identified.

CUMULATIVE IMPACTS

Refer to Mitigation Measures AQ-1 through AQ-6. No additional mitigation measures are recommended.

5.4.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

As previously stated, current detailed construction plans for the proposed project are not available. However, based on the size of the project, the anticipated construction activities, and guidance from the AVAQMD, the proposed project would result in significant short-term air quality impacts. Despite the implementation of mitigation measures, construction related impacts would be significant and unavoidable. Therefore, the proposed project would be significant and unavoidable for both short-term construction and cumulative construction impacts.

Additionally, as discussed under the Long-Term Operational Impacts discussion, the proposed project would result in exceedances of Antelope Valley Air Quality Management District standards for VOCs and PM_{10}. Long-term impacts would further result in cumulative regional operational impacts. Therefore, the proposed project would be significant and unavoidable for long-term operational, plan consistency, and operational cumulative impacts.