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

- Carbon Monoxide (CO): Carbon monoxide is a colorless, odorless, tasteless and toxic gas resulting from the incomplete combustion of fossil fuels. CO interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects. CO is a criteria air pollutant.

- Oxides of Sulfur (SO_x): Typically strong smelling, colorless gases that are formed by the combustion of fossil fuels. SO_2 and other sulfur oxides contribute to the problem of acid deposition. SO_2 is a criteria pollutant.

- Nitrogen Oxides (Oxides of Nitrogen, or NO_x): Nitrogen oxides (NO_x) consist of nitric oxide (NO), nitrogen dioxide (NO_2) and nitrous oxide (N_2O) and are formed when nitrogen (N_2) combines with oxygen (O_2). Their lifespan in the atmosphere ranges from one to seven days for nitric oxide and nitrogen dioxide, to 170 years for nitrous oxide. The lifespan of these pollutants refers to the amount of time they are stable in the atmosphere and can react with other pollutants; once the particles become unstable they are "removed" from the atmosphere through processes of rain, snow, and deposition to the ground. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant, and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility.

- Ozone (O_3): A strong smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy. Ozone exists in the upper atmosphere ozone layer as well as at the earth's surface. Ozone at the earth's surface causes numerous adverse health affects and is a criteria air pollutant. It is a major component of smog.

- Particulate Matter less than 10 microns (PM_{10}): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of

the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the lungs where they may be deposited, resulting in adverse health effects. PM_{10} also causes visibility reduction and is a criteria air pollutant.

- Particulate Matter less than 2.5 microns ($PM_{2.5}$): A similar air pollutant consisting of tiny solid or liquid particles which are 2.5 microns or smaller (which is often referred to as fine particles). These particles are formed in the atmosphere from primary gaseous emissions that include sulfates formed from sulfur dioxide release from power plants and industrial facilities and nitrates that are formed from NOx release from power plants, automobiles and other types of combustion sources. The chemical composition of fine particles highly depends on location, time of year, and weather conditions.

- Reactive Organic Gases (ROGs): ROGs, also known as reactive organic compounds (ROCs) and volatile organic compounds (VOCs), consist of non-methane hydrocarbons and oxygenated hydrocarbons. Hydrocarbons are organic compounds that contain only hydrogen and carbon atoms. Non-methane hydrocarbons are hydrocarbons that do not contain methane.

REGULATORY SETTING

The U.S. Environmental Protection Agency (EPA) is responsible for setting and enforcing the National Ambient Air Quality Standards (NAAQS) for oxidants (O3), CO, NOx, SO2, PM10, and lead. The U.S. EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emissions sources outside state waters (Outer Continental Shelf). The U.S. EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of the CARB.

The Federal Clean Air Act (CAA) was first enacted in 1955 and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and 1990). As discussed above, the CAA establishes the Federal Air Quality Standards, the NAAQS, and specifies future dates for achieving compliance. The CAA also mandates that States submit and implement State

Implementation Plans (SIPs) for local areas not meeting these standards. These Plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA that identify specific emission reduction goals for areas not meeting the NAAQS require a demonstration of reasonable further progress toward attainment and incorporate additional sanctions for failure to attain or to meet interim milestones. The sections of the CAA most directly applicable to the development of the project site include Title I (Non-Attainment Provisions) and Title II (Mobile Source Provisions).

Title I provisions were established with the goal of attaining the NAAQS for the following criteria pollutants O_3, NO_2, SO_2, PM_{10}, CO, $PM_{2.5}$, and lead. The NAAQS were amended in July 1997 to include an additional standard for O_3 and to adopt a NAAQS for $PM_{2.5}$.

Mobile source emissions are regulated in accordance with Title II provisions. These provisions require the use of cleaner burning gasoline and other cleaner burning fuels such as methanol and natural gas. Automobile manufacturers are also required to reduce tailpipe emissions of hydrocarbons and nitrogen oxides (NO_x). NO_x is a collective term that includes all forms of nitrogen oxides (NO, NO_2, NO_3) which are emitted as byproducts of the combustion process.

The CARB, which became part of the California EPA in 1991, is responsible for ensuring implementation of the California Clean Air Act (AB2595), responding to the federal CAA, and for regulating emissions from consumer products and motor vehicles. The California CAA mandates achievement of the maximum degree of emissions reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date. The CARB established the CAAQS for all pollutants for which the Federal government has NAAQS and, in addition, establishes standards for sulfates, visibility, hydrogen sulfide, and vinyl chloride. However at this time, hydrogen sulfide and vinyl chloride are not measured at any monitoring stations in the Basin because they are not considered to be a regional air quality problem. It should also be noted that the CAAQS are generally more stringent than the NAAQS.

Local air quality management districts, such as the SCAQMD, regulate air emissions from commercial and light industrial facilities. All air pollution control districts have been formally designated as attainment or non-attainment for each CAAQS.

Under the 1977 Federal Clean Air Act, areas that are not in compliance with national clean air standards are required to prepare air quality management plans that include specified emission reduction strategies in an effort to meet these goals.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

South Coast Air Quality Management District

The SCAQMD attains and maintains air quality conditions in the Basin through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the SCAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. The SCAQMD also inspects stationary sources of air pollution and responds to citizen complaints; monitors ambient air quality and meteorological conditions; and implements programs and regulations required by the CAA, CAAA, and the CCAA. Air quality plans applicable to the proposed project are discussed below.

Air Quality Management Plan

The SCAQMD, with input from the Southern California Association of Governments (SCAG), is responsible for preparing the air quality management plan (AQMP), which addresses federal and state CAA requirements. The AQMP details goals, policies, and programs for improving air quality in the Basin.

The Project site is located within the SCAB, which is characterized by relatively poor air quality. The SCAQMD has jurisdiction over an approximately 12,000 square-mile area consisting of the four-county Basin and the Los Angeles County and Riverside County portions of what use to be referred to as the Southeast Desert Air Basin. In these areas, the SCAQMD is principally responsible for air pollution control, and works directly with the Southern California Association of

Governments (SCAG), county transportation commissions, local governments, as well as state and federal agencies to reduce emissions from stationary, mobile, and indirect sources to meet state and federal ambient air quality standards.

Currently, these state and federal air quality standards are exceeded in most parts of the Basin. In response, the SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the state and federal ambient air quality standards. AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy.

The Final 2012 AQMP was adopted by the AQMD Governing Board on December 7, 2012. The 2012 AQMP incorporates the latest scientific and technological information and planning assumptions, including the 2012 Regional Transportation Plan/Sustainable Communities Strategy and updated emission inventory methodologies for various source categories.

Similar to the 2007 AQMP, the 2012 AQMP was based on assumptions provided by both CARB and SCAG in the latest available EMFAC model for the most recent motor vehicle and demographics information, respectively. The air quality levels projected in the 2012 AQMP are based on several assumptions. For example, the 2012 AQMP has assumed that development associated with general plans, specific plans, residential projects, and wastewater facilities will be constructed in accordance with population growth projections identified by SCAG in its 2012 RTP. The 2012 AQMP also has assumed that such development projects will implement strategies to reduce emissions generated during the construction and operational phases of development.

SCAQMD Rules and Regulations

All projects are subject to SCAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the proposed project may include, but are not limited to:

Rule 401 – Visible Emissions. A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines.

Rule 402 – Nuisance. A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property. The provisions of this rule do not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

Rule 403 – Fugitive Dust. This rule is intended to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions. Rule 403 applies to any activity or man-made condition capable of generating fugitive dust.

Rule 1113 – Architectural Coatings. No person shall apply or solicit the application of any architectural coating within the SCAQMD, with VOC content in excess of the values specified in a table incorporated in the Rule.

THRESHOLD FOR DETERMINING SIGNIFICANCE

The criteria used to determine the significance of potential project-related air quality impacts are taken from the Initial Study Checklist in Appendix G of the State CEQA Guidelines (14 California Code of Regulations §§15000, et seq.). Based on these thresholds, implementation of the General Plan would result in a significant impact related to air quality if it would do any of the following:

(1) Conflict with or obstruct implementation of the applicable air quality plan.

(2) Violate any air quality standard or contribute to an existing or projected air quality violation.

(3) 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, which exceed quantitative thresholds for ozone precursors).

(4) Expose sensitive receptors to substantial pollutant concentrations.

(5) Create objectionable odors affecting a substantial number of people.

Within the context of the above threshold considerations, based on the SCAQMD's CEQA Air Quality Handbook (1993), project impacts would be significant if they exceed the following California standards for localized CO concentrations:

- 1-hour CO standard of 20.0 parts per million (ppm)
- 8-hour CO standard of 9.0 ppm.

The SCAQMD has also developed regional significance thresholds for other regulated pollutants, as summarized at Table 5. The SCAQMD's CEQA Air Quality Significance Thresholds (March 2011) indicate that any projects in the SCAB with daily emissions that exceed any of the indicated thresholds should be considered as having an individually and cumulatively significant air quality impact.

TABLE 5

MAXIMUM DAILY EMISSIONS REGIONAL THRESHOLDS		
Pollutant	**Construction**	**Operational**
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day
SO_x	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day

The SCAQMD has also developed localized significance threshold methodology that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. Localized significance thresholds represent the maximum emissions from a project that would not cause or contribute to an exceedance of the most stringent applicable Federal or State ambient air quality standards and are developed based on the ambient concentrations of that pollutant for each source receptor area.

Localized significance thresholds are applicable to the project-specific level. Although the City of Bradbury is located in Source Receptor Area 9 (East San Gabriel Valley), the proposed General Plan Update represents a regional project. Therefore, localized significance thresholds would not be applicable to the proposed General Plan Update.

ANALYSIS OF ENVIRONMENTAL IMPACTS – AIR QUALITY

Analysis Methodology

Regional and local emissions of criteria air pollutants and precursors, and TACs during project construction and operations consistent with the General Plan were assessed in accordance with the methodologies described below.

Air quality impacts from future development allowed by the General Plan can be divided into two types, short-term impacts and long-term impacts. Short-term impacts are associated with construction activities, and long-term impacts are associated with the continued operation of developed land uses and the associated increase in vehicular trips.

On October 2, 2013, the SCAQMD in conjunction with the California Air Pollution Control Officers Association (CAPCOA) released the latest version of the California Emissions Estimator Model™ (CalEEMod™) v2013.2.2. The purpose of this model is to calculate construction-source and opertational-source criteria pollutant (NO_x, VOC, PM_{10}, $PM_{2.5}$, SO_x, and CO) and greenhouse gas (GHG) emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures. Accordingly, the latest version of CalEEMod™ has been used for this Project to determine construction and operational air quality emissions. Output from the model runs for both construction and operational activity are provided in Appendix A.

CalEEMod utilizes widely accepted methods for emission estimates combined with appropriate default data that can be used when site-specific information is not available. CalEEMod references sources such as the United States Environmental Protection Agency (USEPA) AP-42 emission factors (Compilation of Emission Factors), California Air Resources Board (CARB) on-road and off-road equipment emission models such as the EMission FACtor model (EMFAC)

and the Offroad Emissions Inventory Program model (OFFROAD), and studies commissioned by California agencies such as the California Energy Commission (CEC) and CalRecycle. With respect to the estimation of mass criteria pollutant emissions, CalEEMod is not only more current than URBEMIS2007, but it also corrects errors in that model and, in addition, utilizes new methods for estimating fugitive dust emissions from construction equipment that tie the emissions to actual equipment usage, and incorporates the latest methods for quantifying mitigation and project design features not available in URBEMIS 2007.

CONSTRUCTION CRITERIA POLLUTANT EMISSIONS

During construction activities associated with individual projects, emissions of emissions of CO, VOCs, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ will likely be released through the burning of fossil fuel in construction equipment, grading fugitive dust, asphalt paving, and the application of architectural coatings during painting activity. Because few details are known at this time regarding the construction resulting from implementation of the General Plan update, criteria pollutant emissions for construction activity have not been quantified in this evaluation. Construction related criteria pollutant emissions will instead be quantified in future air quality analyses to be conducted for individual CEQA projects. In addition, for projects that are estimated to exceed the construction emissions significance thresholds established by the SCAQMD (after mitigation), the preparation of an Environmental Impact Report (EIR) would be required (pursuant to CEQA) and an analysis of alternatives and other emissions reduction measures would take place.

It should be noted that construction projects within the City would also be required to comply with the applicable regulatory requirements established by the SCAQMD, including but not limited to Rule 1113 (Architectural Coatings), Rule 431.2 (Low Sulfur Fuel), Rule 403 (Fugitive Dust), and Rule 1186 / 1186.1 (Street Sweepers).

Because the General Plan identifies future land uses and does not contain specific development proposals, construction-related emissions are speculative and cannot be accurately determined at this stage of the planning process. Therefore, such impacts are too speculative to evaluate (see *CEQA* Guidelines Section 15145). To the extent that specific projects are known, those projects have already been or would be subjected to their own environmental analysis. Additionally, due to the variables that must be considered when examining construction impacts (e.g., development

rate, disturbance area per day, specific construction equipment and operating hours, etc.), it would be speculative to state conclusively that construction activity associated with the General Plan Update would cause a significant air quality impact.

OPERATIONAL POLLUTANT EMISSIONS

Operational activities associated with the proposed project will result in emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. Operational emissions would be expected from the following primary sources:

- Area Sources
- Building Energy Use
- Mobile Sources

Area Sources

The area source emissions included in this analysis result from landscaping equipment such as lawn mowers, consumer products and architectural coatings. Criteria pollutant emissions due to natural gas combustion in buildings, except for hearths, are also area sources but are excluded from this section since they are considered in the emissions associated with energy use category.

Building Energy Use

Combustion emissions would be generated by the use of natural gas to power heating, and HVAC systems in the development. The emissions associated with natural gas use were calculated based on assumptions from the CalEEMod model.

Mobile Sources

Project mobile (vehicular) impacts are dependent primarily on overall daily vehicle trip generation for the proposed project. The CalEEmod model defaults for trips and trip lengths were utilized.

Vehicles traveling on paved roads would be a source of fugitive emissions due to the generation of road dust. The emissions estimates for travel on paved roads were calculated using the CalEEMod model.

Operations Emissions Summary

The project-related operations emissions summary, along with a comparison of SCAQMD regional significance thresholds, is presented at Table 6. Additionally, detailed model output files and associated calculations are provided in Appendix "A". The project related emissions levels for operational emissions will not exceed the regional criteria pollutant thresholds established by the SCAQMD and a less than significant impact will occur.

TABLE 6

SUMMARY OF OPERATIONAL EMISSIONS (SUMMER)
(POUNDS PER DAY) (WITHOUT MITIGATION)

Operational Activities	**VOC**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Area Source Emissions [a]	29.49	0.74	56.79	0.08	7.45	7.45
Energy Emissions [b]	0.09	0.73	0.31	4.66e-3	0.06	0.06
Mobile Emissions [c]	2.88	8.05	33.36	0.11	7.23	2.02
Maximum Daily Emissions	**32.46**	**9.51**	**90.46**	**0.19**	**14.74**	**9.53**
SCAQMD Regional Threshold	55	55	550	150	150	55
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

SUMMARY OF OPERATIONAL EMISSIONS (WINTER)
(POUNDS PER DAY) (WITHOUT MITIGATION)

Operational Activities	**VOC**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Area Source Emissions [a]	29.49	0.74	56.79	0.08	7.45	7.45
Energy Emissions [b]	0.09	0.73	0.31	4.66e-3	0.06	0.06
Mobile Emissions [c]	2.96	8.45	32.83	0.10	7.23	2.02
Maximum Daily Emissions	**32.54**	**9.92**	**89.92**	**0.18**	**14.74**	**9.53**
SCAQMD Regional Threshold	55	55	550	150	150	55
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Note: Please refer to Appendix "A" for the CalEEMod output files and additional supporting information for the estimated emissions.

[a] Includes emissions of natural gas, landscape maintenance equipment, and architectural coatings emissions

[b] Includes emissions from natural gas combustion.

[c] Includes emissions of vehicle emissions and fugitive dust related to vehicular travel

SCAQMD AIR QUALITY MANAGEMENT PLAN IMPACTS

Emissions of criteria air pollutants and ozone precursors (ROG and NOX) associated with new growth under the General Plan are treated as new to the region. (This is a conservative [worst-case] assumption because many "new vehicle trips" may actually be moved from one part of the region to another partly as a result of the General Plan.)

In preparation of the AQMP, the SCAQMD and SCAG rely on population growth projections in the region to forecast, inventory, and allocate regional emissions from land use and development-related sources. The 2012 AQMP relied on demographic growth forecasts developed by SCAG for the 2012 Regional Transportation Plan (RTP). For purposes of analyzing consistency with the AQMP, it may be assumed that if the General Plan would accommodate population growth substantially greater than anticipated in the AQMP, then the proposed project would conflict with the AQMP. According to the most recent SCAG projections for the adopted 2012 RTP, the City of Bradbury is estimated to include 300 households (in 2008), the projected number of households is expected to be 400 households in 2020 and 2035. Thus, the General Plan would not conflict with the growth assumptions assumed in the AQMP and a less than significant impact will occur.

IMPACTS TO SENSITIVE RECEPTORS

With implementation of the General Plan, new or modified sources of TACs would not be placed near existing sensitive receptors, and new sensitive receptors would not be developed near existing sources of TACs. Emissions of TACs during construction of development envisioned under the General Plan (e.g., emissions from heavy-duty diesel equipment) and from operational sources under the General Plan (e.g., emissions from area, stationary and mobile source) and the resulting levels of TAC exposure of sensitive receptors will be less than significant.

Local CO Impacts

CO concentration is a direct function of motor vehicle activity (e.g., idling time and traffic flow conditions), particularly during peak commute hours, and meteorological conditions. Under specific meteorological conditions (e.g., stable conditions that result in poor dispersion), CO concentrations may reach unhealthy levels with respect to local sensitive land-uses such as residential areas, schools, and hospitals. As a result, the SCAQMD recommends analysis of CO emissions at a local as well as a regional level.

As a part of the previously adopted 2003 SCAQMD AQMP, the SCAQMD modeled the four (4) highest volume intersections to determine the highest potential for a CO hotspot in the SCAB. The results of the SCAQMD's analysis are provided in Table 7 and illustrate that only one intersection for the 8-hour CO standard (Long Beach – Imperial) is exceeded.

Table 7. CO Modeling Results from the 2003 AQMP (ppm)

Intersection Location	Morning 1-hour	Afternoon 1-hour	Peak 1-hour	8-hour
Wilshire-Veteran	4.6	3.5	--	4.2
Sunset-Highland	4.0	4.5	--	3.9
La Cienega-Century	3.7	3.1	--	5.8
Long Beach-Imperial	3.0	3.1	1.2	9.3
Notes: ppm = parts per million. Federal 1-hour standard is 35 ppm and the federal 8- hour standard is 9.0 ppm.				

CO concentrations are expected to be lower for the project. When qualitatively comparing the locations in the attainment plan to the proposed project, several factors can be used to demonstrate that the project site can be expected to have lower CO concentrations than in the attainment plan. The factors considered are traffic demand, emission variables, site variables, and meteorological variables. Table 8 provides a summary of the traffic volumes contained in the SCAQMD's modeling. Future peak hour traffic volumes at intersections within the City would be less than those included in the AQMP modeling analysis. Based on this comparison, the proposed project is expected to result in lower CO concentrations than the intersections modeled in the attainment plan.

Because project implementation would not result in higher CO concentrations than those existing within the region at the time of attainment demonstration, a less than significant impact is expected for implementation of the proposed General Plan Update and no further analysis is needed. This approach is consistent with Caltrans CO Project-Level Protocol that is utilized in Caltrans Environmental Assessment Reports.

Table 8. Traffic Volumes Used in the 2003 AQMP				
Intersection Location	**Eastbound (AM/PM)**	**Westbound (AM/PM)**	**Southbound (AM/PM)**	**Northbound (AM/PM)**
Wilshire-Veteran	4,951/2,069	1,830/3,317	721/1,400	560/933
Sunset-Highland	1,417/1,764	1,342/1,540	2,304/1,832	1,551/2,238
La Cienega-Century	2,540/2,243	1,890/2,728	1,384/2,029	821/1,674
Long Beach-Imperial	1,217/2,020	1,760/1,400	479/944	756/1,150
Source: SCAQMD AQMP 2003.				

ODOR IMPACTS

As discussed previously, the human response to odors is extremely subjective, and sensitivity to odors varies greatly among the public. The screening-level distance identified by the SCAQMD under Rule 410 for transfer stations and material recovery facilities is 2,000 feet from sensitive receptors. The SCAQMD does not identify a screening-level distance for other major sources of odors near sensitive receptors. Minor sources of odors, such as exhaust from mobile sources and charbroilers associated with commercial uses, are not typically associated with numerous odor complaints but are known to have some temporary, less concentrated odorous emissions. Major and minor sources of odors are discussed separately below.

Major Sources of Odors

The SCAQMD has identified some common types of facilities that have been known to produce odors: agriculture (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting operations, refineries, landfills, rendering plants, dairies, rail yards, and fiberglass molding operations. This list is not meant to be entirely inclusive, but to act as general guidance. The General Plan does not propose the development of any major odor sources identified above. Therefore, land use conflicts between major odor sources and sensitive receptors are not expected to occur. As a result, this impact would be less than significant.

Minor Sources of Odors

Minor sources of odors associated with the General Plan would be associated with the construction of the proposed land uses. The predominant source of power for construction equipment is diesel engines. Exhaust odors from diesel engines, as well as emissions associated with asphalt paving and the application of architectural coatings may be considered offensive to some individuals.

Similarly, diesel-fueled locomotives traveling along the rail lines in the City and diesel-fueled trucks traveling on local roadways would produce associated diesel exhaust fumes. However, because odors associated with diesel fumes and other minor sources would be temporary and would disperse rapidly with distance from the source, construction-generated and mobile-source odors would not result in the frequent exposure of receptors to objectionable odor emissions. As a result, short-term construction-related and long-term mobile-source related odors would be less than significant.

AIR QUALITY IMPACTS CONCLUSION

- The project is in compliance with the SCAQMD's 2012 Air Quality Management Plan.
- The project-generated emissions do not have the potential to violate federal and state ambient air quality standards.
- The project's contribution to cumulative impacts is not cumulatively considerable.
- The project does not have the potential to expose sensitive receptors to substantial pollutant concentrations.
- Project-generated odors will not affect a substantial number of people.

INTRODUCTION TO GLOBAL CLIMATE CHANGE

Global Climate Change (GCC) is defined as the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. GCC is currently one of the most controversial environmental issues in the United States, and much debate exists within the scientific community about whether or not GCC is occurring naturally or as a result of human activity. Some data suggests that GCC has occurred in the past over the course of thousands or millions of years. These historical changes to the Earth's climate have occurred naturally without human influence, as in the case of an ice age. However, many scientists believe that the climate shift taking place since the industrial revolution (1900) is occurring at a quicker rate and magnitude than in the past. Scientific evidence suggests that GCC is the result of increased concentrations of greenhouse gases in the earth's atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases. Many scientists believe that this increased rate of climate change is the result of greenhouse gases resulting from human activity and industrialization over the past 200 years.

An individual project like that considered here cannot generate enough greenhouse gas emissions to effect a discernible change in global climate. However, the proposed Project may participate in the potential for GCC by its incremental contribution of greenhouse gasses combined with the cumulative increase of all other sources of greenhouse gases, which when taken together constitute potential influences on GCC. Because these changes may have serious environmental consequences, Section 3.0 will evaluate the potential for the proposed Project to have a significant effect upon the environment as a result of its potential contribution to the greenhouse effect.

GREENHOUSE GAS EMISSIONS INVENTORIES

Global

Worldwide anthropogenic (man-made) GHG emissions are tracked by the Intergovernmental Panel on Climate Change for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Man-made GHG emissions data for Annex I nations are available through 2009. Man-made GHG emissions data for Non-Annex I nations are available through

2007. For the Year 2009 the sum of these emissions totaled approximately 40,084 MMTCO2e.[1] Emissions from the top five countries and the European Union accounted for approximately 65 percent of the total global GHG emissions, according to the most recently available data (see Table 9, Top GHG Producer Countries and the European Union). The GHG emissions in more recent years may differ from the inventories presented in Table 9; however, the data is representative of currently available inventory data.

United States

As noted in Table 9, the United States, as a single country, was the number two producer of GHG emissions in 2009. The primary greenhouse gas emitted by human activities in the United States was CO2, representing approximately 83 percent of total greenhouse gas emissions.[2] Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 78 percent of the GHG emissions.[3]

TABLE 9

TOP GHG PRODUCER COUNTRIES AND THE EUROPEAN UNION[4]

Emitting Countries	GHG Emissions (MMT CO2e)
China	6,703
United States	6,608
European Union (27 member countries)	8,338
Russian Federation	2,159
India	1,410
Japan	1,209
Total	**26,427**

State of California

[1] The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2005 data, the UNFCCC data for the most recent year were used. United Nations Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF," http://unfccc.int/ghg_emissions_data/ghg_data_from_unfccc/time_series_annex_i/items/3841.php and "Flexible GHG Data Queries" with selections for total GHG emissions excluding LULUCF/LUCF, all years, and non-Annex I countries, http://unfccc.int/di/FlexibleQueries/Event.do?event= showProjection. n.d.

[2] US Environmental Protection Agency, "Inventory of US Greenhouse Gas Emissions and Sinks 1990--2009," http://www.epa.gov/climatechange/emissions/usgginventory.html. 2011.

[3] *ibid*

[4] World Resources Institute, " Climate Analysis Indicator Tool (CAIT) Excludes emissions and removals from land use, land-use change and forestry (LULUCF) Emissions Inventory," http://cait.wri.org

CARB compiles GHG inventories for the State of California. Based upon the 2008 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2008 greenhouse gas emissions inventory, California emitted 474 MMTCO2e ***including*** emissions resulting from imported electrical power in 2008.[5] Based on the CARB inventory data and GHG inventories compiled by the World Resources Institute[6], California's total statewide GHG emissions rank second in the United States (Texas is number one) with emissions of 417 MMTCO2e ***excluding*** emissions related to imported power. From a per capita standpoint, California had the 46th lowest emissions. This is attributed to the success of its energy-efficiency and renewable energy programs and commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise. Another factor that has reduced California's fuel use and GHG emissions is its mild climate compared to that of many other states. Further, per capita emissions in California have slightly decreased from 2000 to 2009 (by 9.7 percent), but the overall 9 percent increase in population during the same period offset this emission reduction.

South Coast Air Basin

An Environmental Impact Report for the SCAQMD's 2012 Air Quality Management Plan recently reported the GHG emissions in the South Coast Air Basin (SCAB) for calendar year 2008.[7] The emissions for each major source category were reported as follows: 43.1 MMT CO2e from fuel combustion, 4.78 MMT CO2e from waste disposal, 0.88 MMT CO2e from cleaning and surface coatings, 0.89 MMT CO2e from petroleum production and marketing, 0.10 MMT CO2e from industrial processes, and 13.1 MMT CO2e from miscellaneous processes. The SCAQMD Environmental Impact Report also reported that of these emissions, mobile sources generate 59.4 percent of the total GHG emissions in the Basin (47.0 percent from on-road vehicles and 12.5 percent from other mobile sources (aircraft, trains, ships and boats, and other sources (construction equipment, airport equipment, oil and gas drilling equipment))). The remaining 40.6 percent of the total Basin GHG emissions are from stationary and area sources. The largest

[5] California Air Resources Board, "California Greenhouse Gas 2000-2008 Inventory by Scoping Plan Category - Summary," http://www.arb.ca.gov/cc/inventory/data/data.htm. 2010.
[6] World Resources Institute, " Climate Analysis Indicator Tool (CAIT)-US – Yearly Emissions Inventory," http://cait.wri.org
[7] South Coast Air Quality Management District, Draft Program Environmental Impact Report for the 2012 Air Quality Management Plan, Available: http://www.aqmd.gov/ceqa/documents/2012/aqmd/draftEA/2012A149,087QMP/Chapter3/DPEIR_3_2_Air_Quality.pdf . Accessed October 2012.

stationary/area source is fuel combustion, which is 27.8 percent of the total Basin GHG emissions (68.6 percent of the GHG emissions from the stationary and area source category).

GLOBAL CLIMATE CHANGE DEFINED

Global Climate Change (GCC) refers to the change in average meteorological conditions on the earth with respect to temperature, wind patterns, precipitation and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO_2 (Carbon Dioxide), N_2O (Nitrous Oxide), CH_4 (Methane), hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the Earth's atmosphere, but prevent radioactive heat from escaping, thus warming the Earth's atmosphere. GCC can occur naturally as it has in the past with the previous ice ages. According to the California Air Resources Board (CARB), the climate change since the industrial revolution differs from previous climate changes in both rate and magnitude (CARB, 2004, Technical Support document for Staff Proposal Regarding Reduction of Greenhouse Gas Emissions from Motor Vehicles).

Gases that trap heat in the atmosphere are often referred to as greenhouse gases. Greenhouse gases are released into the atmosphere by both natural and anthropogenic (human) activity. Without the natural greenhouse gas effect, the Earth's average temperature would be approximately 61° Fahrenheit (F) cooler than it is currently. The cumulative accumulation of these gases in the earth's atmosphere is considered to be the cause for the observed increase in the earth's temperature.

Although California's rate of growth of greenhouse gas emissions is slowing, the state is still a substantial contributor to the U.S. emissions inventory total. In 2004, California is estimated to have produced 492 million gross metric tons of carbon dioxide equivalent (CO2e) greenhouse gas emissions. Despite a population increase of 16 percent between 1990 and 2004, California has significantly slowed the rate of growth of greenhouse gas emissions due to the implementation of energy efficiency programs as well as adoption of strict emission controls.[8]

[8] California Energy Commission, "Inventory of California Greenhouse Gas Emissions and Sinks," http://www.energy.ca.gov/2005publications/CEC-600-2005-025/CEC-600-2005-025.PDF. 2005.

GREENHOUSE GASES

For the purposes of this analysis, emissions of carbon dioxide, methane, and nitrous oxide were evaluated (see Table 3-4 later in this report) because these gasses are the primary contributors to GCC from development projects. Although other substances such as fluorinated gases also contribute to GCC, sources of fluorinated gases are not well defined and no accepted emissions factors or methodology exist to accurately calculate these gases.

Greenhouse gases have varying global warming potential (GWP) values; GWP values represent the potential of a gas to trap heat in the atmosphere. Carbon dioxide is utilized as the reference gas for GWP, and thus has a GWP of 1.

The atmospheric lifetime and GWP of selected greenhouse gases are summarized in the following Table. As shown in the table below, GWP range from 1 for carbon dioxide to 23,900 for sulfur hexafluoride.

Carbon Dioxide	50-200	1
Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CH4)	50,000	6,500
PFC: Hexafluoroethane (C2F6)	10,000	9,200
Sulfur Hexafluoride (SF6)	3,200	23,900
Source: EPA 2006 (URL: http://www.epa.gov/nonco2/econ-inv/table.html)		

Water Vapor: Water vapor (H_20) is the most abundant, important, and variable greenhouse gas in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. A climate feedback is an indirect, or secondary, change, either positive or negative, that occurs within the climate system in response to a forcing mechanism. The feedback loop in which water is involved is critically important to projecting future climate change.

As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to 'hold' more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown as there are also dynamics that hold the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the Earth's surface and heat it up).
There are no human health effects from water vapor itself; however, when some pollutants come in contact with water vapor, they can dissolve and the water vapor can then act as a pollutant-carrying agent. The main source of water vapor is evaporation from the oceans (approximately 85 percent).[9] Other sources include: evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.

Carbon Dioxide: Carbon dioxide (CO_2) is an odorless and colorless GHG. Outdoor levels of carbon dioxide are not high enough to result in negative health effects. Carbon dioxide is emitted from natural and manmade sources. Natural sources include: the decomposition of dead organic matter; respiration of bacteria, plants, animals and fungus; evaporation from

[9] ibid.

oceans; and volcanic outgassing. Anthropogenic sources include: the burning of coal, oil, natural gas, and wood. Carbon dioxide is naturally removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and chemical weathering of carbonate rocks[10].

Since the industrial revolution began in the mid-1700s, the sort of human activity that increases GHG emissions has increased dramatically in scale and distribution. Data from the past 50 years suggests a corollary increase in levels and concentrations. As an example, prior to the industrial revolution, CO_2 concentrations were fairly stable at 280 parts per million (ppm). Today, they are around 370 ppm, an increase of more than 30 percent. Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources.[11]

Methane: Methane (CH_4) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10-12 years), compared to other GHGs. No health effects are known to occur from exposure to methane.

Methane has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning. [12]

Nitrous Oxide: Nitrous oxide (N_2O), also known as laughing gas, is a colorless greenhouse gas. Nitrous oxide can cause dizziness, euphoria, and sometimes slight hallucinations. In small

[10] On a warmer Earth, chemical weathering is promoted by more vigorous cycling of water through the atmosphere and higher temperatures. "More chemical weathering removes more CO2 from the atmosphere as carbonic acid reacts with silicate minerals, producing bicarbonate ion." *Carbon Cycle and Climate Change* – J Bret Bennington, Hofstra University. http://www.cengage.com/custom/enrichment_modules/data/Carbon_Cycle_0495738557_LowRes.pdf

[11] International Panel on Climate Change 2007, "Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report," http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm

[12] ibid.

doses, it is considered harmless. However, in some cases, heavy and extended use can cause Olney's Lesions (brain damage)[13].

Concentrations of nitrous oxide also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb).[14] Nitrous oxide is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant, i.e., in whipped cream bottles. It is also used in potato chip bags to keep chips fresh. It is used in rocket engines and in race cars. Nitrous oxide can be transported into the stratosphere, be deposited on the Earth's surface, and be converted to other compounds by chemical reaction

Chlorofluorocarbons: Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble and chemically unreactive in the troposphere (the level of air at the Earth's surface). CFCs are no longer being used; therefore, it is not likely that health effects would be experienced. Nonetheless, in confined indoor locations, working with CFC-113 or other CFCs is thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.

CFCs have no natural source, but were first synthesized in 1928. They were used for refrigerants, aerosol propellants and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

Hydrofluorocarbons: Hydrofluorocarbons (HFCs) are synthetic, man-made chemicals that are used as a substitute for CFCs. Out of all the greenhouse gases, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric

[13] U.S. Department of Labor. Occupational Safety and Health Guideline for Nitrous Oxide. http://www.osha.gov/SLTC/healthguidelines/nitrousoxide/recognition.html
[14] ibid.

abundances are (in order), HFC-23 (CHF_3), HFC-134a (CF_3CH_2F), and HFC-152a (CH_3CHF_2). Prior to 1990, the only significant emissions were of HFC-23. HFC-134a emissions are increasing due to its use as a refrigerant. The U.S. EPA estimates that concentrations of HFC-23 and HFC-134a are now about 10 parts per trillion (ppt) each; and that concentrations of HFC-152a are about 1 ppt.[15] No health effects are known to result from exposure to HFCs, which are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons: Perfluorocarbons (PFCs) have stable molecular structures and do not break down through chemical processes in the lower atmosphere. High-energy ultraviolet rays, which occur about 60 kilometers above Earth's surface, are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). The U.S. EPA estimates that concentrations of CF_4 in the atmosphere are over 70 ppt.[16]

No health effects are known to result from exposure to PFCs. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur Hexafluoride: Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas evaluated (23,900). The U.S. EPA indicates that concentrations in the 1990s were about 4 ppt.[17] In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

ENVIRONMENTAL EFFECTS OF CLIMATE CHANGE IN CALIFORNIA

The California Environmental Protection Agency (CalEPA) published a report titled "Scenarios of Climate Change in California: An Overview" (Climate Scenarios report) in February 2006

[15] U.S. EPA. High Global Warming Potential (GWP) Gases. http://www.epa.gov/highgwp/scientific.html
[16] ibid.
[17] ibid.