

## 4.2 AIR QUALITY/GLOBAL CLIMATE CHANGE

This section addresses the proposed project's temporary and long-term impacts to air quality as well as its contribution to cumulative impacts related to global climate change.

### 4.2.1 Setting

**a. Climate and Meteorology.** The semi-permanent high-pressure system west of the Pacific coast strongly influences California's weather. It creates sunny skies throughout the summer and influences the pathway and occurrence of low-pressure weather systems that bring rainfall to the area during October through April. As a result, wintertime temperatures in Pasadena are generally mild, while summers are warm and dry. The dominant daily wind pattern in the basin is a daily sea breeze followed by a nightly land breeze. These wind patterns are occasionally broken during the winter by storms coming from the north and northwest and by episodic Santa Ana winds. Santa Ana winds are strong northerly to northeasterly winds that originate from high-pressure areas centered over the desert of the Great Basin. These winds are usually warm, very dry, and often full of dust. They are particularly strong in the mountain passes and at the mouths of canyons. The net effect of the dominant daily wind pattern in the Pasadena area is that daytime air pollutant emissions from coastal sources are carried inland and nighttime winds carry the inland pollution to the coastal areas. However, the weak nighttime wind conditions can allow for localized stagnation of pollutants inland.

Pasadena is located in a transitional climate zone which is influenced by both the ocean and warm continental air masses. It is also located in a thermal belt which means that cold air that occurs during winter nights drains off to lower elevations. Temperatures in the City range from an average annual minimum of 48° Fahrenheit (F) to an average annual maximum of 76° F with a mean annual temperature of 62° F. Precipitation is generally limited to a few storms during the winter season between November and April with annual average rainfall of about 12 to 13 inches per year.

**b. Air Pollution Regulation.** Air quality is regulated federally by the Environmental Protection Agency, statewide by the California Air Resources Board (CARB). Local control in air quality management is provided by the CARB through county-level Air Pollution Control Districts (APCDs). The CARB has established air quality standards and is responsible for the control of mobile emission sources, while the local APCDs are responsible for enforcing standards and regulating stationary sources. The CARB has established 14 air basins statewide. The non-desert portions of Los Angeles, San Bernardino, and Riverside Counties, together with all of Orange County, comprise the South Coast Air Basin (SCAB), which is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD), a multi-county APCD. The City of Pasadena is located in the SCAB.

Federal and state standards have been established for ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), particulates less than 10 and 2.5 microns in diameter (PM<sub>10</sub> and PM<sub>2.5</sub>), and lead (Pb) (refer to Table 4.2-1). California has also set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. The SCAQMD monitors air pollutant levels to assure that air quality standards are met and, in the event they



are not, to develop strategies to meet these standards. Depending on whether the standards are met or exceeded, the local air basin is classified as being in “attainment” or “nonattainment.”

**Table 4.2-1  
 Current Federal and State Ambient Air Quality Standards**

Pollutant	Federal Standard	California Standard
Ozone	0.08 ppm (8-hr avg)	0.09 ppm (1-hr avg) 0.07 ppm (8-hr avg)
Carbon Monoxide	9.0 ppm (8-hr avg) 35.0 ppm (1-hr avg)	9.0 ppm (8-hr avg) 20.0 ppm (1-hr avg)
Nitrogen Dioxide	0.053 ppm (annual avg)	0.25 ppm (1-hr avg)
Sulfur Dioxide	0.03 ppm (annual avg) 0.14 ppm (24-hr avg) 0.5 ppm (3-hr avg)	0.04 ppm (24-hr avg) 0.25 ppm (1-hr avg)
Lead	1.5 µg/m <sup>3</sup> (annual avg)	1.5 µg/m <sup>3</sup> (30-day avg)
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> (annual avg) 150 µg/m <sup>3</sup> (24-hr avg)	20 µg/m <sup>3</sup> (annual avg) 50 µg/m <sup>3</sup> (24-hr avg)
Particulate Matter (PM <sub>2.5</sub> )	15 µg/m <sup>3</sup> (annual avg) 65 µg/m <sup>3</sup> (24-hr avg)	12 µg/m <sup>3</sup> (annual avg)

*ppm= parts per million*

*µg/m<sup>3</sup> = micrograms per cubic meter*

*Source: California Air Resources Board, [ww.arb.ca.gov/aqs/aaqs2.pdf](http://ww.arb.ca.gov/aqs/aaqs2.pdf), October 26, 2006.*

The South Coast Air basin is a federally designated nonattainment area for ozone and PM<sub>10</sub>. Current state nonattainment designations within this basin exist for ozone, PM<sub>10</sub>, and PM<sub>2.5</sub>.

**c. Possible Health Effects of Common Air Pollutants.** The potential adverse health effects of common air pollutants within the South Coast Air Basin are described below.

Ozone. Ozone is produced by a photochemical reaction (triggered by sunlight) between nitrogen oxides (NO<sub>x</sub>) and reactive organic gases (ROG). Nitrogen oxides are formed during the combustion of fuels, while reactive organic gases are formed during combustion and evaporation of organic solvents. Because ozone requires sunlight to form, it is formed primarily between the months of April and October. Ozone is a pungent, colorless toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions. Groups most sensitive to ozone include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors.

Carbon Monoxide. Carbon monoxide (CO) is a colorless, odorless, poisonous gas that is only found in high concentrations when very near its source. The major local source of CO is automobile traffic. Elevated concentrations are usually only found near areas of high traffic volumes. The adverse effect of CO on human health is a function of its affinity for hemoglobin



in the blood. At high concentrations, CO reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity, and impaired mental abilities.

Nitrogen Dioxide. Nitrogen dioxide (NO<sub>2</sub>) is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form NO<sub>2</sub>, creating the mixture of NO and NO<sub>2</sub> commonly called NO<sub>x</sub>. Nitrogen dioxide is an acute irritant. A relationship between NO<sub>2</sub> and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. Nitrogen dioxide absorbs blue light and causes a reddish brown cast to the atmosphere and reduced visibility. It can also contribute to the formation of PM<sub>10</sub> and acid rain.

Suspended Particulates. Atmospheric particulate matter is comprised of finely divided solids and liquids such as dust, soot, aerosols, fumes, and mists. The particulates that are of particular concern are PM<sub>10</sub> which measures no more than 10 microns in diameter, and PM<sub>2.5</sub>, a fine particulate measuring no more than 2.5 microns in diameter. The characteristics, sources, and potential health effects associated with the small particulates (those between 2.5 and 10 microns in diameter) and fine particulates (PM<sub>2.5</sub>) can be very different. Major man-made sources of PM<sub>10</sub> are agricultural operations, industrial processes, combustion of fossil fuels, construction, demolition operations, and entrainment of road dust into the atmosphere. Natural sources include wind blown dust, wildfire smoke, and sea spray salt. The finer, PM<sub>2.5</sub> particulates are generally associated with combustion processes as well as being formed in the atmosphere as a secondary pollutant through chemical reactions. Fine particulate matter is more likely to penetrate deeply into the lungs and poses a serious health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. More than half of the small and fine particulate matter that is inhaled into the lungs remains there, which can cause permanent lung damage. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance.

**d. Current Ambient Air Quality.** The SCAQMD monitors air pollutant concentrations throughout the basin at various monitoring stations. The SCAQMD has divided the basin among 38 separate monitoring stations. The nearest SCAQMD monitoring station is located on the Caltech campus at 752 S. Wilson Avenue. However, particulate matter less than 10 microns data is not available from the Pasadena monitoring station; therefore, data for this pollutant has been taken from the Los Angeles-North Main Street station, located at 1630 North Main Street, roughly 10 miles south and west of Pasadena. Table 4.2-2 summarizes exceedances of the federal and/or state standards for ozone, carbon monoxide, nitrogen dioxide and particulate matter less than 10 microns and less than 2.5 microns within the Pasadena, and nearby area.

As shown in table 4.2-2, state thresholds for ozone were exceeded in Pasadena during the past three years, while federal thresholds were only exceeded during 2006 and 2007. The state threshold for PM<sub>10</sub> was exceeded three times in 2006, five times in 2007, and twice in 2008 in nearby Los Angeles. The federal threshold for PM<sub>2.5</sub> was exceeded three times in 2006 and nine times in 2007, but there was insufficient data collected to determine the number of exceedance

in 2008. There were no state or federal exceedances of carbon monoxide or nitrogen dioxide in the last three years, and no exceedances of federal PM<sub>10</sub> standards.

**Table 4.2-2  
 Ambient Air Quality Data**

<b>Pollutant</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<sup>a</sup> Ozone, ppm - Worst Hour	0.151	0.149	0.122
Number of days of State exceedances (>0.09 ppm)	26	13	16
Number of days of Federal exceedances (>0.12 ppm)	5	3	0
<sup>a</sup> Carbon Monoxide, ppm - Worst 8 Hours	2.80	2.28	2.21
Number of days of State/Federal exceedances (>9.0 ppm)	0	0	0
<sup>a</sup> Nitrogen Dioxide, ppm - Worst Hour	0.120	0.092	0.105
Number of days of State exceedances (>0.18 ppm)	0	0	0
<sup>b</sup> Particulate Matter <10 microns, µg/m <sup>3</sup> Worst 24 Hours	59.0	78	66.0
Number of samples of State exceedances (>50 µg/m <sup>3</sup> )	3	5	2
Number of samples of Federal exceedances (>150 µg/m <sup>3</sup> )	0	0	0
<sup>a</sup> Particulate Matter <2.5 microns, µg/m <sup>3</sup> Worst 24 Hours	45.8	68.8	66.0
Number of samples of Federal exceedances (>65 µg/m <sup>3</sup> )	3	9	n/a

<sup>a</sup> Pasadena-S Wilson Avenue Station

<sup>b</sup> Los Angeles-North Main Street Monitoring Station

Source: CARB, 2006, 2007, & 2008 Annual Air Quality Data Summaries available at <http://www.arb.ca.gov>

**d. Sensitive Receptors in the Project Area.** Certain population groups are considered more sensitive to air pollution than others. Sensitive population groups include children, the elderly, the acutely ill and the chronically ill, especially those with cardio-respiratory diseases. Residential uses are also considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. For the purposes of air quality analysis, the closest sensitive receptors to the project site include multi-family residential uses at the intersection of Union Street and North Euclid Avenue, about 350 feet south of the limits of work.

Other receptors in the vicinity of the site include the Day One Program office across North Euclid Avenue about 75 feet to the west. The Day One Program office hosts youth programs; however, these programs are intermittent and the facility is not occupied during the work day by children (Rincon Consultants, Inc. site visit, 2009). In addition, there was a daycare use on site that relocated in 2009; however, this use would return once the project is complete; therefore, construction activity would not affect these children. There are also hotel rooms at the Westin Hotel, adjacent the eastern boundary of the site; however, the hotel has an indoor fresh air supply, so temporary air quality effects are not likely to adversely affect hotel patrons. Lastly, there are also several other exterior publicly accessible spaces in the vicinity of the site, including the courtyard at City Hall, located about 200 feet southwest of the limits of work, and



the Plaza Las Fuentes Courtyard, located adjacent the eastern boundary of the site. These exterior spaces are not considered sensitive because they are traveling paths, or sitting areas where one might eat lunch or take a break. Therefore, the use of these spaces encompasses a relatively short period of time for individuals and temporary air pollutant emissions generated during construction would not be expected to adversely affect these individuals due to limited exposure.

#### 4.2.2 Impact Analysis

**a. Methodology and Significance Thresholds.** The air quality analysis conforms to the methodologies recommended in the South Coast Air Quality Management District *CEQA Air Quality Handbook* (1993). Quantitative pollution emissions estimates for the proposed project were calculated using URBEMIS 2007 (Version 9.2.4), which was developed by the CARB to evaluate construction emissions, area emissions and operational emissions associated with new development. Construction emissions are based on the amount of demolition, grading and building construction that would occur due to project development. Area emissions include natural gas consumption, hearth fuel combustion, landscape fuel combustion, consumer products, and architectural coatings. Operational emissions are associated with motor vehicle trip generation resulting from the project. Trip generation estimates for the project were obtained from a traffic study conducted by Raju Associates, dated March 5, 2010 (See Tables 4.9-4 and 4.9-5 in Section 4.4, *Transportation/Parking*).

A significant adverse air quality impact may occur when a project individually or cumulatively interferes with progress toward the attainment of the ozone standard by releasing emissions that equal or exceed the established long-term (operation) or temporary (construction) quantitative thresholds for pollutants, or causes an exceedance of a state or federal ambient air quality standard for any criteria pollutant. Table 4.2-3 lists the project and cumulative significance thresholds recommended by the SCAQMD for project operations within the South Coast Air Basin.

**Table 4.2-3  
 SCAQMD Air Quality Significance Thresholds**

Pollutant	Construction	Operation
VOC/ROG	75 lbs/day	55 lbs/day
NO <sub>x</sub>	100 lbs/day	55 lbs/day
CO	550 lbs/day	550 lbs/day
SO <sub>x</sub>	150 lbs/day	150 lbs/day
PM <sub>10</sub>	150 lbs/day	150 lbs/day
PM <sub>2.5</sub>	55 lbs/day	55 lbs/day

Source: SCAQMD, 2006, <http://www.aqmd.gov/ceqa/hdbk.html>



The SCAQMD established localized significance thresholds (LSTs) in response to the Governing Board’s Environmental Justice Enhancement Initiative (1-4), which was prepared to update the SCAQMD’s CEQA Air Quality Handbook. The LSTs were devised in response to public concern regarding exposure of individuals to criteria pollutants in local communities. The LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), project size, and distance to the sensitive receptor, etc. However, the LSTs only apply to emissions within a fixed stationary location, including idling emissions during both project construction and operation, and LSTs have been developed only for NO<sub>x</sub>, CO, and PM<sub>10</sub>. LSTs have been developed for emissions within areas up to five acres in size, with air pollutant modeling recommended for activity within larger areas. Table 4.2-4 includes LSTs for projects of two acres in size in Source Receptor Area 2 (SRA-8), which is designated by the SCAQMD as the West San Gabriel Valley area and includes the City of Pasadena.

**Table 4.2-4  
 SCAQMD LSTs for Construction in SRA-8**

Pollutant	Allowable emissions(lbs/day) as a function of receptor distance in feet from a two acre site boundary				
	82	164	328	656	1,640
	lbs/day				
Gradual conversion of NO <sub>x</sub> to NO <sub>2</sub>	98	95	104	124	175
CO	812	1,125	1,594	2,785	7,957
PM <sub>2.5</sub> (µg/m <sup>3</sup> ) Construction	4	5	9	21	82
PM <sub>10</sub> (µg/m <sup>3</sup> ) Construction	6	19	34	66	160

Source: <http://www.aqmd.gov/ceqa/handbook/LST/LST.html#Appendix%20C>; July 2005, With Links to: 1) SRA/City Table; and 2) [Appendix C - Mass Rate LST Look-up Tables](#) (revised October 21, 2009)

**b. Project Impacts and Mitigation Measures.**

**Impact AQ-1 Air pollutant emissions generated by construction of the proposed project would not exceed SCAQMD thresholds for NO<sub>x</sub>, CO, SO<sub>2</sub>, or PM<sub>10</sub> or PM<sub>2.5</sub> under either scenario. This is a Class III, less than significant impact.**

The majority of construction-related emissions result from grading, soil hauling and building, due to use of heavy equipment, soil transport trucks, and architectural coatings, respectively. The ozone precursor NO<sub>x</sub> is primarily a byproduct of diesel combustion. ROG is released primarily during the finishing phase of construction upon application of paints and varnishes. The URBEMIS computer program calculates construction emissions based on demolition, grading & excavation, building construction, and architectural coating.



The proposed development includes demolition of three existing structures and a surface parking lot, renovation of portions of the Regas House and the Rectory, construction of four separate buildings and construction of a subterranean garage with storage uses. The project also includes development of several landscaped garden areas.

There are two different scenarios for development of the northeast corner building (Building E) being evaluated in this EIR. Under Scenario 1, Building E would consist of an eight story building to house 45 residential units for senior citizens. Under Scenario 2, Building E would consist of a two story 13,000 sf youth recreation building. As described in Section 2.0, *Project Description*, Building E would not be developed until a later phase based on funding availability. However, for the purposes of this analysis, Building E was assumed within the 2011-2012 construction timeframe. Both scenarios were analyzed separately in URBEMIS, and the results are included in Appendix B.

Both construction scenarios assume demolition of 9,482 sf of existing use and excavation for the subterranean garage with soil export of 35,500 cubic yards (CY) of soil. Scenario 1 further assumes the subsequent construction of 51,600 sf of new church support uses and 45 residential units for senior citizens. Scenario 2 further assumes 64,600 sf of new church support uses including the youth recreation use within Building E.

The URBEMIS 2007, version 9.2.4 model was used to calculate emissions associated with the construction of the proposed project based on the proposed land use, length of construction, operation of construction equipment and other activities associated with the construction phase of the church campus. The particulate matter emissions (PM<sub>10</sub> and PM<sub>2.5</sub>) were characterized by using a spreadsheet as per the direction of SCAQMD staff. The URBEMIS program was used to characterize emissions of ROG, NO<sub>x</sub>, CO and SO<sub>2</sub>.

Estimates of construction related project emissions are shown in Table 4.2-5.

**Table 4.2-5  
 Estimated Maximum Daily Construction Emissions (lbs/day)**

	ROG	NO <sub>x</sub>	CO	SO <sub>2</sub>	Total PM <sub>10</sub>	Total PM <sub>2.5</sub>
<b>Scenario 1</b>	14	49	31	0	5	3
<b>Scenario 2</b>	14	48	28	0	5	3
<b>SCAQMD Thresholds</b>	75	100	550	150	150	55
<b>LST</b>	<i>n/a</i>	<b>104</b>	<b>1,594</b>	<i>n/a</i>	<b>34</b>	<b>9</b>
<b>Threshold Exceeded?</b>	No	No	No	No	No	No

*Notes: Maximum lbs/day is based on highest emissions of any phase and during either year (2011 or 2012). PM<sub>10</sub> and PM<sub>2.5</sub> values derived from LST spreadsheets, see Appendix B. ROG, NO<sub>x</sub>, CO & SO<sub>2</sub> from URBEMIS 2007, Version 9.2.4, see Appendix B for calculations.*

As indicated, emissions would not exceed SCAQMD construction thresholds or LSTs. Therefore, temporary construction-related impacts would not be significant.



**Mitigation Measures.** No mitigation is required as projected maximum daily emissions would be below SCAQMD thresholds (see Table 4.2-5)..

**Impact AQ-2 Demolition of existing structures under both scenarios could release asbestos into the environment; however, compliance with existing SCAQMD regulations would ensure that impacts would be Class III, less than significant.**

The project includes demolition of a 1,487 sf commercial building, Scott Hall (6,190 sf), and a trailer that is currently used for office and meeting space. In addition, the project includes renovations to portions of the Rectory and the Regas House. One or more of these structures could have asbestos containing materials (ACM). Asbestos could pose a health hazard if it is released into the air during demolition activities.

Removal of any asbestos would require compliance with all pertinent existing rules and regulations, including SCAQMD Rule 1403 (Asbestos Demolition and Renovation Activities). This rule requires the applicant to notify the SCAQMD of the intent to perform demolition or renovation of any buildings that may contain asbestos prior to demolition and requires that asbestos containing material is removed prior any demolition that would break up, dislodge, or disturb the material.

Under SCAQMD Rule 1403, the requirements for demolition and renovation activities include asbestos surveying, notification, ACM removal procedures and time schedules, ACM handling and clean-up procedures, and storage, disposal, and landfilling requirements for asbestos-containing waste materials (ACWM). All operators are required to maintain records, including waste shipment records, and are required to use appropriate warning labels, signs, and markings. This rule, in whole or in part, is applicable to owners and operators of any demolition or renovation activity, and the associated disturbance of asbestos-containing material, any asbestos storage facility, or any active waste disposal site.

**Mitigation Measures.** Mitigation is not required as compliance with SCAQMD Rule 1403 would address impacts related to potential asbestos exposure.

**Impact AQ-3 Operation of the proposed project would generate air pollutant emissions, but emissions would not exceed SCAQMD operational significance thresholds under either scenario. Therefore, the project's operational impact to regional air quality would be Class III, less than significant.**

The net increase in long-term emissions associated with the proposed project includes those emissions associated with vehicle trips (mobile emissions) and the use of natural gas and landscaping maintenance equipment (area emissions) upon buildout of the project. The project was analyzed for operational emissions based on the net increase in development (minus the existing support uses that are proposed for demolition and replacement). Therefore, under



Scenario 1, the net increase in development would be 42,100 sf of church support uses and 45 residential units for seniors. Under Scenario 2, the net increase in development would be 55,100 sf of church support uses, including a youth recreation building.

The URBEMIS 2007 model was used to calculate emissions associated with the proposed project based on the land uses proposed for each scenario and the number of trips generated by the new development as assessed in the Traffic Study that was prepared for the project (see Appendix C, and Section 4.4, *Transportation and Circulation*). Estimates of project emissions are shown in Table 4.2-6. As indicated, overall emissions would not exceed SCAQMD thresholds for ROG, NO<sub>x</sub>, CO, PM<sub>10</sub> or PM<sub>2.5</sub>. Therefore, operational impacts to air quality would not be significant.

**Table 4.2-6  
 Area Source and Operational Emissions (lbs/day)**

<b>Emission Source</b>	<b>ROG</b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>
Scenario 1 Senior Residential	9	9	77	16	3
Scenario 2 Youth Recreation	8	11	97	18	3
<b>SCAQMD Thresholds</b>	<b>55</b>	<b>55</b>	<b>550</b>	<b>150</b>	<b>55</b>
<b>Threshold Exceeded?</b>	No	No	No	No	No

Source: URBEMIS 2007 version 9.4.4 (See appendix A)

**Mitigation Measures.** No mitigation is required as long-term emissions would not exceed SCAQMD thresholds.

**c. Cumulative Impacts.** The South Coast Air Basin is a non-attainment area for federal and state standards for ozone and PM<sub>10</sub>. Attainment and maintenance plans for the Federal CO threshold was approved by the US EPA on June 11, 2007. As indicated in Table 3-1, in Section 3.0, *Environmental Setting*, about 1.2 million sf of non-residential development and two thousand dwelling units are planned and pending in the site vicinity. Any growth within the Los Angeles metropolitan area contributes to existing exceedances of ambient air quality standards when taken as a whole with existing development in the region. However, every new development project is evaluated independently for its adverse effects to air quality. Emissions associated with this development, in combination with other development throughout the South Coast Air Basin, would incrementally contribute to the degradation of regional air quality. However, it is anticipated that each development contained in the cumulative project list (Table 3-1) would undergo evaluation for air quality impacts at the project level, thereby incorporating mitigation to reduce impacts to the greatest extent feasible. As discussed in Impact AQ-3, emissions associated with project operation would be well below SCAQMD thresholds. Thus, the project would not add a substantial incremental effect to the cumulative increase in air pollutant emissions and impacts are not considered cumulatively considerable.



**Greenhouse Gases.** Gases that absorb and re-emit infrared radiation in the atmosphere are called GHGs, in reference to the fact that greenhouses retain heat. Common GHGs include water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxides (N<sub>2</sub>O<sub>x</sub>), fluorinated gases, and ozone. GHG are emitted by both natural processes and human activities. Of these gases, CO<sub>2</sub> and CH<sub>4</sub> are emitted in the greatest quantities from human activities. Emissions of CO<sub>2</sub> are largely by-products of fossil fuel combustion, whereas CH<sub>4</sub> results from off-gassing associated with agricultural practices and landfills. Man-made GHGs, many of which have greater heat-absorption potential than CO<sub>2</sub>, include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF<sub>6</sub>) (Cal EPA, 2006). Different types of GHGs have varying global warming potential (GWP). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere. Because GHGs absorb different amounts of heat, a common reference gas (CO<sub>2</sub>) is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as “carbon dioxide equivalent” (CDE), and is the amount of a GHG emitted multiplied by its GWP<sup>1</sup>. CO<sub>2</sub> has a GWP of one. By contrast, CH<sub>4</sub> has a GWP of 21, meaning its global warming effect is 21 times greater than CO<sub>2</sub> on a molecule per molecule basis.

The accumulation of GHG in the atmosphere regulates the earth’s temperature. Without the natural heat trapping effect of GHG, Earth’s surface would be about 34° C cooler (CAT, 2006). However, it is believed that emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. The following discusses the primary GHGs of concern.

**Carbon Dioxide.** The global carbon cycle is made up of large carbon flows and reservoirs. Billions of tons of carbon in the form of CO<sub>2</sub> are absorbed by oceans and living biomass (i.e., sinks) and are emitted to the atmosphere annually through natural processes (i.e., sources). When in equilibrium, carbon fluxes among these various reservoirs are roughly balanced (USEPA, April 2008). CO<sub>2</sub> was the first GHG demonstrated to be increasing in atmospheric concentration, with the first conclusive measurements being made in the last half of the 20th Century. Concentrations of CO<sub>2</sub> in the atmosphere have risen approximately 35% since start of the industrial revolution. Per the IPCC (2007), the global atmospheric concentration of CO<sub>2</sub> has increased from a pre-industrial value of about 280 parts per million (ppm) to 379 ppm in 2005. The atmospheric concentration of CO<sub>2</sub> in 2005 exceeds the natural range over the last 650,000 years (180 to 300 ppm) as determined from ice cores. The average annual CO<sub>2</sub> concentration growth rate was larger during the last 10 years (1995–2005 average: 1.9 ppm per year) than it has been since the beginning of continuous direct atmospheric measurements (1960–2005 average: 1.4 ppm per year), although there is year-to-year variability in growth rates.

**Methane.** CH<sub>4</sub> is an effective absorber of radiation, though its atmospheric concentration is less than that of CO<sub>2</sub> and its lifetime in the atmosphere is limited to 10-12 years, compared to some other GHGs. It has a GWP approximately 21 times that of CO<sub>2</sub>. Over the last 250 years, the concentration of CH<sub>4</sub> in the atmosphere has increased by 148% (IPCC 2007). Anthropogenic

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<sup>1</sup> Carbon dioxide equivalent (CDE or CO<sub>2</sub>E) is a quantity that describes, for a given mixture and amount of GHGs, the amount of CO<sub>2</sub> (usually in metric tons; million metric tons [megatonne] = MMTCO<sub>2</sub>E = terragram [Tg] CO<sub>2</sub> Eq; 1,000 MMT = gigatonne) that would have the same global warming potential (GWP) when measured over a specified timescale (generally, 100 years).



sources of CH<sub>4</sub> include landfills, natural gas and petroleum systems, agricultural activities, coal mining, wastewater treatment, stationary and mobile combustion, and certain industrial processes (USEPA, April 2008).

*Nitrous Oxide.* Concentrations of nitrous oxide (N<sub>2</sub>O) also began to rise at the beginning of the industrial revolution. N<sub>2</sub>O is produced by microbial processes in soil and water, including those reactions that occur in fertilizers containing nitrogen. Use of these fertilizers has increased over the last century. N<sub>2</sub>O's GWP is 300 times that of CO<sub>2</sub>.

*Fluorinated Gases (HFCS, PFCS and SF<sub>6</sub>).* Fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfurhexafluoride (SF<sub>6</sub>), are greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are used as substitutes for ozone-depleting substances, such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and halons, which have been regulated since the mid-1980s because of their ozone-destroying potential and are phased out under the Montreal Protocol and Clean Air Act Amendments of 1990. Fluorinated gases are typically emitted in smaller quantities than CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, but each molecule can have a much greater global warming effect. SF<sub>6</sub> is the most potent greenhouse gas that the IPCC has evaluated.

Greenhouse Gas Inventory. California is the second largest contributor in the United States among states. If California were a country, it would be the sixteenth largest contributor among countries (AEP, 2007). Based upon the CARB *California Greenhouse Gas Inventory for 2000-2006* (<http://www.arb.ca.gov/cc/inventory/data/data.htm>), California produced 480 million metric tons [MMT] CDE in 2006. The major source of GHG in California is transportation, contributing 39% of the state's total GHG emissions. Electricity generation is the second largest source, contributing 22% of the state's GHG emissions. California emissions are due in part to its large size and large population. California had the fourth lowest CO<sub>2</sub> emissions per capita from fossil fuel combustion in the country in 2001, due 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 otherwise been (CEC, December 2006). Another factor that reduces California's per capita fuel use and GHG emissions, as compared to other states, is its relatively mild climate.

Effects of Global Climate Change (GCC). GCC has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21<sup>st</sup> century than were observed during the 20<sup>th</sup> century. A warming of about 0.2°C (0.36°F) per decade is projected, and there are identifiable signs that global warming could be taking place, including substantial ice loss in the Arctic (IPCC, 2007).

According to the California Energy Commission's (CEC) Draft Climate Action Team Biennial Report, potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CEC, March 2009). Below is a summary of some of the potential effects reported by an array of studies that could be experienced in California as a result of global climate change.



*Air Quality.* Higher temperatures, conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thereby ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state (CEC, March 2009).

*Water Supply.* Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. Studies have found that, “considerable uncertainty about precise impacts of climate change on California hydrology and water resources will remain, until we have more precise and consistent information about how precipitation patterns, timing, and intensity will change” (California Department of Water Resources [DWR], 2006). For example, some studies identify little change in total annual precipitation in projections for California (California Climate Change Center [CCCC], 2006). Other studies show significantly more precipitation (DWR, 2006). Even assuming that climate change leads to long-term increases in precipitation, analysis of the impact of climate change is further complicated by the fact that no studies have identified or quantified the runoff impacts that such an increase in precipitation would have in particular watersheds (CCCC, 2006). Also, little is known about how groundwater recharge and water quality will be affected (Id.). Higher rainfall could lead to greater groundwater recharge, although reductions in spring runoff and higher evapotranspiration could reduce the amount of water available for recharge (Ibid.).

The California Department of Water Resources (DWR, 2006) report on climate change and effects on the State Water Project (SWP), the Central Valley Project, and the Sacramento-San Joaquin Delta concludes that “[c]limate change will likely have a significant effect on California’s future water resources... [and] future water demand.” DWR also reports that “much uncertainty about future water demand [remains], especially [for] those aspects of future demand that will be directly affected by climate change and warming. While climate change is expected to continue through at least the end of this century, the magnitude and, in some cases, the nature of future changes is uncertain” (DWR, 2006).

This uncertainty serves to complicate the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood (DWR, 2006). DWR adds that “[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future.” Still, changes in water supply are expected to occur, and many regional studies have shown that large changes in the reliability of water yields from reservoirs could result from only small changes in inflows (Kiparsky, 2003; DWR, 2006; Cayan, 2006, Cayan, D., et al, 2006).

*Hydrology.* As discussed above, climate changes could potentially affect: the amount of snowfall, rainfall, and snow pack; the intensity and frequency of storms; flood hydrographs

(flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. Sea level rise may be a product of climate change through two main processes: expansion of sea water as the oceans warm and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

*Agriculture.* California has a \$30 billion agricultural industry that produces half of the country's fruits and vegetables. Higher CO<sub>2</sub> levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase; crop-yield could be threatened by a less reliable water supply; and greater ozone pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality (CCCC, 2006).

*Ecosystems and Wildlife.* Climate change and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increasing concentrations of GHGs are likely to accelerate the rate of climate change. Scientists expect that the average global surface temperature could rise as discussed previously: 1.0-4.5°F (0.6-2.5°C) in the next 50 years, and 2.2-10°F (1.4-5.8°C) in the next century, with substantial regional variation. Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Sea level could rise as much as two feet along most of the U.S. coast. Rising temperatures could have four major impacts on plants and animals: (1) timing of ecological events; (2) geographic range; (3) species' composition within communities; and (4) ecosystem processes, such as carbon cycling and storage (Parmesan, 2004; Parmesan, C. and H. Galbraith, 2004)

Regulatory Setting. Federal, state and local policies pertaining to Greenhouse gases are described below.

*California Regulations.* Assembly Bill (AB) 1493, requiring the development and adoption of regulations to achieve "the maximum feasible reduction of greenhouse gases," emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the State was signed into law in September 2002. In 2005, Executive Order S-3-05 established statewide GHG emissions reduction targets. S-3-05 provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80% of 1990 levels (CalEPA, 2006).

In response to EO S-3-05, the CalEPA created the Climate Action Team (CAT), which in March 2006, published the Climate Action Team Report (the "2006 CAT Report"). The 2006 CAT Report identified a recommended list of strategies that the state could pursue to reduce climate change greenhouse gas emissions. These are strategies that could be implemented by various state agencies to ensure that the AB 32 targets are met and can be met with existing authority of the state agencies. The strategies include the reduction of passenger and light duty truck emissions, the reduction of idling times for diesel trucks, an overhaul of shipping technology/

infrastructure, increased use of alternative fuels, increased recycling, and landfill methane capture, etc.

AB 32, the “California Global Warming Solutions Act of 2006,” was signed into law in the fall of 2006. AB 32 requires the CARB to adopt regulations by January 1, 2008 to require reporting and verification of statewide GHG emissions. The CARB was required to produce a plan by January 1, 2009 to indicate how emission reductions will be achieved from significant GHG sources via regulations, market mechanisms, and other actions. The bill requires achievement of a statewide GHG emissions limit equivalent to 1990 emissions by 2020 (essentially a 25% reduction below 2005 emission levels; same requirement as under S-3-05), and the adoption of rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions.

In response to the requirements of AB 32, the CARB produced a list of 37 early actions for reducing GHG emissions in June 2007. The CARB expanded this list in October 2007 to 44 measures that have the potential to reduce GHG emissions by at least 42 million metric tons of CO<sub>2</sub> emissions by 2020, representing about 25% of the estimated reductions needed by 2020 (CARB, October 2007). After completing a comprehensive review and update process, the CARB approved a 1990 statewide GHG level and 2020 limit of 427 MMT CDE. The scoping plan required under AB 32, approved by the CARB Board on December 12, 2008, provides the outline for actions to reduce GHG in California. The scoping plan has a range of GHG reduction actions, which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 cost of implementation fee regulation to fund the program.

Senate Bill (SB) 97, signed in August 2007, acknowledges that GCC is an environmental issue that requires analysis under CEQA. In December 2009, the California Resources Agency (Resources Agency) adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG and GCC impacts.

Executive Order S-01-07 was enacted on January 18, 2007. The order mandates that a statewide goal be established to reduce the carbon intensity of California’s transportation fuels by at least 10% by 2020. In addition, a Low Carbon Fuel Standard (“LCFS”) for transportation fuels is to be established for California.

Senate Bill (SB) 375, signed in August 2008, requires the inclusion of sustainable communities’ strategies (SCS) in regional transportation plans (RTPs) for the purpose of reducing GHG emissions. The bill requires the CARB to set regional targets for the purpose of reducing greenhouse gas emissions from passenger vehicles, for 2020 and 2035. On January 23, 2009, the CARB appointed a Regional Targets Advisory Committee (RTAC) to provide recommendations on factors to be considered and methodologies to be used in the CARB target setting process, as required under SB 375. A final report was issued by the RTAC on September 29, 2009. The CARB must propose draft targets by June 30, 2010 and adopt final targets by September 30, 2010.



For more information on the assembly bills, executive orders, and reports discussed above, please refer to the following websites: [www.climatechange.ca.gov](http://www.climatechange.ca.gov) and [www.arb.ca.gov/cc/cc.htm](http://www.arb.ca.gov/cc/cc.htm).

*Local Regulations and CEQA Requirements.* GHG emissions and their contribution to global climate change have only recently been addressed in CEQA documents, such that CEQA and current case law do not provide specific guidance relative to their assessment. Quantitative significance thresholds for this topic have not been adopted by the State of California, though the South Coast Air Quality Management District (SCAQMD) has adopted interim GHG significance threshold for projects where the SCAQMD is lead agency (SCAQMD, December 5, 2008), which is applicable specifically to stationary source emissions and has not been recommended by SCAQMD for use with respect to land use projects. The Office of Planning and Research (OPR) is directed under SB 97 to prepare, develop, and transmit to the California Resources Agency (Resources Agency) guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions through CEQA. Draft guidelines were released in April 2009 and the Resources Agency adopted amendments to the *CEQA Guidelines* that took effect January 1, 2010. These updated *CEQA Guidelines* provide guidance on the analysis and mitigation of GHG emissions in CEQA documents, though they do not provide quantitative thresholds. The OPR also prepared *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA)* in 2008. *CEQA and Climate Change* offers informal guidance regarding the steps lead agencies should take to address climate change in their CEQA documents. This guidance was developed in cooperation with the Resources Agency, the California Environmental Protection Agency (CalEPA), and the CARB.

Methodology and Significance Thresholds. The information provided in this section is based on recently established California goals for reducing GHG emissions, as well as a project-specific emissions inventory developed for the proposed project. Determining how a proposed project might contribute to climate change and what the overall effect of an individual project would be based on that contribution is still undergoing debate at this time. As previously discussed, no adopted statewide thresholds or methodologies are currently available for determining the significance of a land use project's potential cumulative contribution to global climate change in CEQA documents. An individual project (unless it is a massive construction project, such as a dam or a new freeway project, or a large fossil-fuel fired power plant) does not generate sufficient GHG emissions to directly influence global climate change; therefore, the issue of global climate change typically involves an analysis of whether a project's contribution towards a cumulative impact is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

*Methodology.* Calculations of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O are provided for full disclosure of the magnitude of potential project effects. The analysis focuses on CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> as these are the GHG emissions that the project would emit in the largest quantities. Calculations were based on the methodologies discussed in the California Air Pollution Control Officers Association (CAPCOA) white paper (January 2008) and included the use of the California Climate Action Registry General Reporting Protocol (January 2009).

1) *Operational Emissions.* Operational emissions of CO<sub>2</sub>, associated with space heating and architectural coatings, were quantified using the URBEMIS 2007 (version 9.2.4) software model. N<sub>2</sub>O and CH<sub>4</sub> emissions were quantified using the California Climate Action Registry General Reporting Protocol (January 2009) indirect emissions factors for electricity use (see Appendix B for calculations). The calculations and emission factors contained in the General Reporting Protocol were selected based on technical advice provided to the Registry by the California Energy Commission. This methodology is considered reasonable and reliable for use, as it has been subjected to peer review by numerous public and private stakeholders, and in particular by the California Energy Commission, and is recommended by CAPCOA (January 2008).

2) *Emissions from Mobile Combustion.* Emissions of CO<sub>2</sub> from transportation sources were quantified using the URBEMIS 2007 (version 9.2.4) computer model. N<sub>2</sub>O and CH<sub>4</sub> emissions were quantified, using the California Climate Action Registry (CCAR) General Reporting Protocol (January 2009) direct emissions factors for mobile combustion (see Appendix B for calculations). Total daily mileage for weekday and weekend operations was calculated in URBEMIS 2007 and extrapolated to derive total annual mileage. Emission rates were based on the vehicle mix output, generated by URBEMIS 2007, and the emission factors found in CCAR General Reporting Protocol.

It should be noted that one of the limitations to a quantitative analysis is that emission models, such as URBEMIS, evaluate aggregate emissions and do not demonstrate, with respect to a global impact, what proportion of these emissions are “new” emissions, specifically attributable to the proposed project in question. For most projects, the main contribution of GHG emissions is from motor vehicles and the total vehicle miles traveled (VMT), but the quantity of these emissions appropriately characterized as “new” is uncertain. Traffic associated with a project may be relocated trips from other locales, and consequently, may result in either higher or lower net VMT. In this instance, it is likely that some of the proposed project-related GHG emissions, associated with traffic and energy demand, would be truly “new” emissions. However, it is also likely that some of the emissions represent diversion of emissions from other locations. Thus, although GHG emissions are associated with the project, it is not possible to discern how much diversion is occurring or what fraction of those emissions represents global increases. In the absence of information regarding the different types of trips, the VMT estimate generated by URBEMIS is used as a conservative, “worst-case” estimate.

*Significance Thresholds.* This analysis is based on the methodologies recommended by the CAPCOA January 2008 *CEQA and Climate Change* white paper. CAPCOA conducted an analysis of various approaches and significance thresholds, ranging from a zero threshold (all projects are cumulatively considerable) to a high of 40,000 – 50,000 metric tons CDE per year. For example, assuming a zero threshold and the AB 32 2020 targets, this approach would require all discretionary projects to achieve a 33% reduction from projected “business-as-usual” emissions to be considered less than significant. A zero threshold approach could be considered on the basis that climate change is a global phenomenon, and not controlling small source emissions would potentially neglect a major portion of the GHG inventory. However, the *CEQA Guidelines* also recognize that there may be a point where a project’s contribution, although above zero, would not be a considerable contribution to the cumulative impact (*CEQA Guidelines*, Section 15130 (a)). Therefore, a threshold of greater than zero is considered more appropriate for the analysis of GHG emissions under CEQA.



Another method, based on a market capture approach that requires mitigation for greater than 90% of likely future discretionary development, would use a quantitative threshold of greater than 900 metric tons CDE/year for most projects, which would generally correspond to office projects of approximately 35,000 square feet, retail projects of approximately 11,000 square feet, or supermarket space of approximately 6,300 square feet. Another potential threshold of 10,000 metric tons was considered by the Market Advisory Committee for inclusion in a GHG Cap and Trade System in California. A 10,000 metric ton significance threshold would correspond to the GHG emissions of approximately 550 residential units, 400,000 square feet of office space, 120,000 square feet of retail, and 70,000 square feet of supermarket space (CAPCOA, January 2008). This threshold would capture roughly half of new residential or commercial development (CAPCOA, January 2008). The basic concepts for the various approaches suggested by CAPCOA are used herein to determine whether or not the proposed project's GHG emissions are "cumulatively considerable." Table 4.2-7 shows CAPCOA's suggested quantitative, non-zero thresholds for GHG emissions.

The SCAQMD has adopted interim GHG significance threshold for projects where the SCAQMD is lead agency (SCAQMD, December 5, 2008), which is applicable specifically to stationary source emissions and has not been recommended by SCAQMD for use with respect to land use projects. The City of Pasadena has not adopted thresholds of significance for Greenhouse Gas emissions. Therefore, the information provided in this section is based on recently established California goals for reducing GHG emissions.

Impact Analysis.

1) *Area Source Emissions.* This category includes emissions from consumption of electricity and natural gas as part of building operation and heating/cooling. Operation of the proposed project would consume an estimated 517,080 kilowatt-hours [kWh]/year of electricity under Scenario 1, or would consume 264,480 kilowatt-hours [kWh]/year of electricity under Scenario 2 (refer to Table 4.2-8). The electricity that is used at the site is generated at offsite power plants, and is primarily produced by the combustion of fossil fuels, which yields mostly CO<sub>2</sub>, and to a smaller extent N<sub>2</sub>O and CH<sub>4</sub>.

**Table 4.2-7  
 CAPCOA Suggested Quantitative Non-Zero Thresholds for  
 Greenhouse Gas Emissions**

90% Market Capture	~900 tons CDE/year
CARB Reporting Threshold/Cap and Trade Entry Level	Report: 25,000 tons CDE/year Cap and Trade: 10,000 tons CDE/year
Regulated Inventory Capture	~40,000 - 50,000 tons CDE/year
Unit-Based Threshold Based on Market Capture	Residential development > 50 du* Commercial space > 50,000 sf* Industrial (with emissions > 900 tons CDE)



**Table 4.2-7  
 CAPCOA Suggested Quantitative Non-Zero Thresholds for  
 Greenhouse Gas Emissions**

90% Market Capture	~900 tons CDE/year
Statewide, Regional, or Area-wide Significance (CEQA Guidelines 15206(b)).	Residential development > 500 du Office space > 250,000 sf Retail space > 500,000 sf Hotels > 500 units Industrial project > 1,000 employees, 40 ac, or 650,000 sf

\*du = dwelling units

\*sf = square feet

Sources: California Air Pollution Control Officers Association (CAPCOA), CEQA & Climate Change, January 2008.

**Table 4.2-8  
 Estimated Electricity Consumption**

Type of Use	Units (1,000 sf or DU)	Electricity Demand Factor	Annual Electricity Demand
<b>Scenario 1 Net Increase in Development</b>			
Church Use	42.1	4,800 / 1,000 sf/year *	202,080 kWh/year
Senior Residential Units	45	7,000 / unit *	315,000 kWh/year
<i>Scenario 1 Net Increase in Electricity Consumption</i>			<i>517,080 kWh/year</i>
<b>Scenario 2 Net Increase in Development</b>			
Church Use	55.1	4,800 / 1,000 sf/year*	264,480 kWh/year
<i>Scenario 2 Net Increase in Electricity Consumption</i>			<i>264,480 kWh/year</i>

sf = square feet, DU = dwelling unit

kWH = kilowatt hour

\*Demand factor from Energy Information Administration, 2008. 2003 CBECS Detailed Tables.

As discussed above, GHG emissions from the generation of electricity can be calculated using emissions factors from the CCAR General Reporting Protocol. CO<sub>2</sub> emission estimates using the URBEMIS model also take into account emissions from operational sources such as natural gas used for space heating. Table 4.2-9 shows the area source emissions of GHGs associated with the proposed project, estimated at 351 metric tons of CDE per year for Scenario 1 or 194 metric tons of CDE per year for Scenario 2.



**Table 4.2-9  
 Estimated Annual Area Source Emissions of Greenhouse Gases**

Emission Source	Annual Emissions	
	Emissions	CDE
<b>Scenario 1 Net Increase</b>		
Carbon Dioxide (CO <sub>2</sub> ) <sup>1</sup>	385.93 (short ton, US)	350 metric tons
Methane (CH <sub>4</sub> ) <sup>2</sup>	0.01 metric tons	0 metric tons
Nitrous Oxide (N <sub>2</sub> O) <sup>2</sup>	< 0.01 metric tons	1 metric tons
<i>Scenario 1 Net Increase in Operational Emissions</i>		<i>351 metric tons</i>
<b>Scenario 2 Net Increase</b>		
Carbon Dioxide (CO <sub>2</sub> ) <sup>1</sup>	212.92 (short ton, US)	193 metric tons
Methane (CH <sub>4</sub> ) <sup>2</sup>	< 0.01 metric tons	0 metric tons
Nitrous Oxide (N <sub>2</sub> O) <sup>2</sup>	< 0.01 metric tons	0 metric tons
<i>Scenario 2 Net Increase in Operational Emissions</i>		<i>194 metric tons</i>

*Notes: Values may not add due to rounding*

<sup>1</sup> See Appendix B for calculations. Includes energy from electrical usage and area source emissions from natural gas and heating.

<sup>2</sup> California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009, page 33-40.

See Appendix B for GHG emission factor assumptions and calculations.

2) *Emissions from Mobile Combustion.* Mobile source GHG emissions were estimated using the average daily trips estimate from the traffic study to calibrate trip generation numbers used in the URBEMIS 2007 model (v. 9.2.4), which was used to derive the total annual vehicle miles traveled. Table 4.2-10 shows the estimated mobile emissions of GHGs based on this VMT. Emissions from mobile sources are estimated at 1,390 MT CDE per year under Scenario 1, or 1,575 MT CDE per year under Scenario 2.

3) *Combined Stationary and Mobile Source Emissions.* Table 4.2-11 combines the operational and mobile GHG emissions associated with the proposed development, which would total approximately 1,741 MT CDE per year under Scenario 1 and approximately 1,769 MT CDE per year under Scenario 2. The total emissions for Scenario 1 and Scenario 2 represent about 0.0004% of California's total 2006 emissions of 480 million metric tons. These emission projections indicate that the majority of the project GHG emissions are associated with vehicular travel (80-90%). It should be noted that mobile emissions are in part a redirection of existing travel to other locations, and so may already be a part of the total California GHG emissions.



**Table 4.2-10  
 Estimated Annual Mobile Emissions of Greenhouse Gases**

Emission Source	Annual Emissions	
	Emissions	CDE
<b>Scenario 1 Net Increase</b>		
Carbon Dioxide (CO <sub>2</sub> ) <sup>1</sup>	1,460 tons (short, US)	1,324 metric tons
Methane (CH <sub>4</sub> ) <sup>2</sup>	0.17 metric tons	4 metric tons
Nitrous Oxide (N <sub>2</sub> O) <sup>2</sup>	0.20 metric tons	62 metric tons
<i>Scenario 1 Net Increase in Operational Emissions</i>		<i>1,390 metric tons</i>
<b>Scenario 2 Net Increase</b>		
Carbon Dioxide (CO <sub>2</sub> ) <sup>1</sup>	1,843 tons (short, US)	1,502 metric tons
Methane (CH <sub>4</sub> ) <sup>2</sup>	0.19 metric tons	4 metric tons
Nitrous Oxide (N <sub>2</sub> O) <sup>2</sup>	0.22 metric tons	69 metric tons
<i>Scenario 2 Net Increase in Operational Emissions</i>		<i>1,575 metric tons</i>

*Notes: Values may not add due to rounding*

<sup>1</sup> *Mobile Emissions from URBEMIS 2007 (version 9.2.4) results for mobile sources.*

<sup>2</sup> *California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009, page 41-48.*

*See Appendix B for GHG emission factor assumptions and calculations.*

**Table 4.2-11  
 Combined Annual Emissions of  
 Greenhouse Gases**

Emission Source	Annual Emissions
Scenario 1	1,741 metric tons CDE
Scenario 2	1,769 metric tons CDE

*Source: Table 4.2-8 and Table 4.2-9*

Conclusion. As discussed above under *Significance Thresholds*, CAPCOA (January 2008) provided several approaches to consider potential cumulative significance of projects with respect to GHGs. The proposed project's contribution of up to 1,741 metric tons CDE/year under Scenario 1 and up to 1,769 metric tons CDE/year under Scenario 2 would exceed the 900-ton 90% Market Capture Threshold shown in Table 4.2-7, but would not exceed the other two emissions-based thresholds. It is further noted that this annual emission rate does not exceed the SCAQMD's interim threshold of 10,000 metric tons for stationary sources.

The proposed net increase of 42,100 sf of church support uses and 45 residential units for seniors (Scenario 1) would exceed the Unit-Based Threshold Based on Market Capture, but would not



exceed the Threshold for Statewide, Regional, or Area-Wide Significance. The proposed net increase of 55,100 sf of church support uses (Scenario 2) would exceed the Unit-Based Threshold Based on Market Capture, but would not exceed the Threshold for Statewide, Regional, or Area-Wide Significance.

The project consists of infill development on an already developed site. The additional church space that is proposed for construction would replace some of the existing over-utilized space, and would provide additional structures to house existing programs. The project under either scenario is not anticipated to result in a substantial influx of new church patrons, though the reorganization is anticipated to result in a better use of the existing church property. As the City of Pasadena is generally built out, most commercial development within the City is infill or redevelopment and would be expected to generally reduce VMT and reliance on the drive-alone automobile use as compared to further suburban growth at the periphery of the region. A reduction in vehicle use and vehicle miles traveled can result in a reduction in fuel consumption and in air pollutant emissions, including GHG emissions. Recent research indicates that infill development reduces VMT and associated air pollutant emissions, as compared to development on sites at the periphery of metropolitan areas, also known as "greenfield" sites. For example, a 1999 simulation study conducted for the U.S. Environmental Protection Agency (EPA), comparing infill development to greenfield development, found that infill development results in substantially fewer VMT per capita (39% to 52%) and generates fewer emissions of most air pollutants and greenhouse gases. Table 4.2-12 shows the results of the EPA study.

**Table 4.2-12  
 Comparison of VMT and Emissions: Infill versus Greenfield  
 Development**

Case Study	Per Capita Daily VMT, Infill as a Percentage of Greenfield	Emissions, Infill as a Percentage of Greenfield
San Diego, CA	52%	CO 88% NO <sub>x</sub> 58% SO <sub>x</sub> 51% PM 58% CO <sub>2</sub> 55%
Montgomery County, MD	42%	CO 52% NO <sub>x</sub> 69% SO <sub>x</sub> 110% PM 50% CO <sub>2</sub> 54%
West Palm Beach, FL	39%	CO 75% NO <sub>x</sub> 72% SO <sub>x</sub> 94% PM 47% CO <sub>2</sub> 50%

*Source: Allen, E., Anderson, G., and Schroeer, W., "The Impacts of Infill vs. Greenfield Development: A Comparative Case Study Analysis," U.S. Environmental Protection Agency, Office of Policy, EPA Publication #231-R-99-005, September 2, 1999.*

The project site is centrally located within the Civic Center/Midtown Subdistrict of the Central District Specific Plan. The site is within ¼ mile of three ARTS routes, including Route 20, Route 10



and Route 40. There are a total of 121 daily buses (Monday –Friday) that stop within ¼ mile of the site. In addition, the site is within ½ mile of the Metro Gold Line Memorial Park Station, which has 93 trains per day (Monday –Friday).

CAPCOA’s suggested quantitative thresholds are generally more applicable to development on greenfield sites, where there would be an increase in VMT and associated GHG emissions than to infill development, which would generally reduce regional VMT and associated emissions. For this reason, the most conservative (i.e., lowest) thresholds, suggested by CAPCOA, would not be appropriate for the proposed project given that it is located in a community that is highly urbanized. Consequently, the second lowest threshold of 10,000 metric tons CDE/year has been used herein as a quantitative benchmark for significance and qualitative consideration of the California Environmental Protection Agency’s (CalEPA) GHG emissions reduction strategies that were prepared by CalEPA’s Climate Action Team (CAT) established by Executive Order S-3-05 for projects below 10,000 tons CDE/year or by the 2008 Attorney General Greenhouse Gas Reduction Report. The CAT strategies are recommended to reduce GHG emissions at a statewide level to meet the goals of the Executive Order S-3-05 (<http://www.climatechange.ca.gov>). A project’s contribution to cumulative impacts to global climate change is considered cumulatively considerable if the project would generate 10,000 tons CDE/year. For projects that would generate fewer than 10,000 tons CDE/year, the impact would be considered cumulatively considerable if the project would be inconsistent with one or more of the CAT’s or Attorney General’s GHG reduction strategies.

As indicated above, CDE emissions associated with the proposed project would be less than 10,000 tons/year. Therefore, the project’s impact would be cumulatively considerable if the project were inconsistent with CAT strategies. Please note that several of these actions are already required by California regulations. Tables 4.2-13 and 4.2-14 illustrate that the proposed project would be consistent with the GHG reduction strategies set forth by the 2006 CAT Report and the 2008 Attorney General’s Greenhouse Reduction Report. Therefore, the project’s contribution to cumulative GHG emissions and climate change would not be cumulatively considerable.

**Table 4.2-13  
 Project Consistency with Applicable Climate Action Team Greenhouse  
 Gas Emission Reduction Strategies**

<i>Strategy</i>	<i>Project Consistency</i>
<b>California Air Resources Board</b>	
<b><i>Vehicle Climate Change Standards</i></b>  AB 1493 (Pavley) required the state to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of climate change emissions emitted by passenger vehicles and light duty trucks. Regulations were adopted by the CARB in September 2004.	<b>Consistent:</b> The vehicles that travel to and from the project site on public roadways would be in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase.
<b><i>Diesel Anti-Idling</i></b>  The CARB adopted a measure to limit diesel-fueled commercial motor vehicle idling in July 2004.	<b>Consistent:</b> Current State law restricts diesel truck idling to five minutes or less. Diesel trucks operating from, and making deliveries to, the project site are subject to this state-wide law. Construction vehicles are also subject to this regulation.



**Table 4.2-13  
 Project Consistency with Applicable Climate Action Team Greenhouse  
 Gas Emission Reduction Strategies**

<i>Strategy</i>	<i>Project Consistency</i>
<p><b><i>Hydrofluorocarbon Reduction</i></b></p> <p>1) Ban retail sale of HFC in small cans.                      2) Require that only low GWP refrigerants be used in new vehicular systems.                      3) Adopt specifications for new commercial refrigeration.                      4) Add refrigerant leak-tightness to the pass criteria for vehicular inspection and maintenance programs.                      5) Enforce federal ban on releasing HFCs.</p>	<p><b>Consistent:</b> This strategy applies to consumer products. All applicable products would comply with the regulations that are in effect at the time of manufacture.</p>
<p><b><i>Alternative Fuels: Biodiesel Blends</i></b></p> <p>CARB would develop regulations to require the use of 1% to 4% biodiesel displacement of California diesel fuel.</p>	<p><b>Consistent:</b> The diesel vehicles that travel to and from the project site on public roadways could utilize this fuel once it is commercially available.</p>
<p><b><i>Alternative Fuels: Ethanol</i></b></p> <p>Increased use of E-85 fuel.</p>	<p><b>Consistent:</b> Employees/patrons of the project site could choose to purchase flex-fuel vehicles and utilize this fuel once it is commercially available in the region and local vicinity.</p>
<p><b><i>Heavy-Duty Vehicle Emission Reduction Measures</i></b></p> <p>Increased efficiency in the design of heavy duty vehicles and an education program for the heavy duty vehicle sector.</p>	<p><b>Consistent:</b> The heavy-duty vehicles that travel to and from the project site on public roadways would be subject to all applicable CARB efficiency standards that are in effect at the time of vehicle manufacture.</p>
<p><b><i>Achieve 50% Statewide Recycling Goal</i></b></p> <p>Achieving the State's 50% waste diversion mandate as established by the Integrated Waste Management Act of 1989, (AB 939, Sher, Chapter 1095, Statutes of 1989), will reduce climate change emissions associated with energy intensive material extraction and production as well as methane emission from landfills. A diversion rate of 48% has been achieved on a statewide basis. Therefore, a 2% additional reduction is needed.</p>	<p><b>Consistent:</b> The City of Pasadena exceeds the 50% diversion rate. The City has implemented several programs including a construction demolition recycling program and a pay as you go residential collection program. These programs in association with other efforts have resulted in waste diversion of 54% to 62% between the years of 2003 and 2006. The 2006 data indicates that the City diverted 58% of the City's total waste stream. It is anticipated that the project would similarly divert at least 50% of its solid waste.</p>
<p><b><i>Zero Waste – High Recycling</i></b></p> <p>Efforts to exceed the 50% goal would allow for additional reductions in climate change emissions.</p>	<p><b>Consistent:</b> The City of Pasadena solid waste diversion rate was 58% in 2006. It is anticipated that the project would similarly divert at least 50% of its solid waste. The project would also be subject to all applicable State and City requirements for solid waste reduction as they change in the future.</p>
<p><b>Department of Forestry</b></p>	
<p><b><i>Urban Forestry</i></b></p> <p>A new statewide goal of planting 5 million trees in urban areas by 2020 would be achieved through the expansion of local urban forestry programs.</p>	<p><b>Consistent:</b> The project would be landscaped to include several outdoor garden areas including a forecourt between the existing rectory and the proposed West Building, a pre-function garden, an outdoor seating area on the north side of the West Building, two play yards, and a contemplative garden with a labyrinth. The City also has a PWP Cool Trees Program, which offers residents electricity rebates for planting select</p>



**Table 4.2-13  
 Project Consistency with Applicable Climate Action Team Greenhouse  
 Gas Emission Reduction Strategies**

<i>Strategy</i>	<i>Project Consistency</i>
	<p>varieties of deciduous trees on residential properties in an effort to reduce the amount of energy required to cool structures in the summer and heat structures in the winter.</p> <p>The City also has an urban forestry program, a tree protection ordinance, a master street tree plan, all of which promote conservation and enhancement of urban forestry resources.</p>
<b>Department of Water Resources</b>	
<p><b><i>Water Use Efficiency</i></b></p> <p>Approximately 19% of all electricity, 30% of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce greenhouse gas emissions.</p>	<p><b>Consistent:</b> The City of Pasadena has a number of water conservation programs in place, including rebate programs for commercial, single family residential and multi-family residential customers. Rebates are available for low flow fixtures, irrigation controllers, synthetic turf, HVAC equipment, landscape equipment, cleaning equipment, medical/dental equipment and food service equipment. In addition, the City has implemented mandatory water conservation measures that prohibit water waste and restrict exterior watering to select days. The project would also be required to conserve an additional 20% beyond baseline water usage pursuant to mitigation measure W-1.</p>
<b>Energy Commission (CEC)</b>	
<p><b><i>Building Energy Efficiency Standards in Place and in Progress</i></b></p> <p>Public Resources Code 25402 authorizes the CEC to adopt and periodically update its building energy efficiency standards (that apply to newly constructed buildings and additions to and alterations to existing buildings).</p>	<p><b>Consistent:</b> The project will need to comply with the standards of Title 24 that are in effect at the time of development. In addition, the project will be designed consistent with Leadership in Energy and Environmental Design (LEED) certification pursuant to the requirements of Municipal Code 14.90.040. The LEED program is designed to assign credits for environmentally-friendly design features and construction practices, so that projects may have less impact on the environment than standard construction would.</p> <p>The project would be designed to maximize energy efficiency and the site specific microclimate has been accounted for in the environmental systems of the building.</p>
<p><b><i>Appliance Energy Efficiency Standards in Place and in Progress</i></b></p> <p>Public Resources Code 25402 authorizes the Energy Commission to adopt and periodically update its appliance energy efficiency standards (that apply to devices and equipment using energy that are sold or offered for sale in California).</p>	<p><b>Consistent:</b> Under State law, appliances that are purchased for the project - both pre- and post-development – would be consistent with energy efficiency standards that are in effect at the time of manufacture.</p>



**Table 4.2-13  
 Project Consistency with Applicable Climate Action Team Greenhouse  
 Gas Emission Reduction Strategies**

<i>Strategy</i>	<i>Project Consistency</i>
<p><b><i>Fuel-Efficient Replacement Tires &amp; Inflation Programs</i></b></p> <p>State legislation established a statewide program to encourage the production and use of more efficient tires.</p>	<p><b>Consistent:</b> Employees and patients/clients of the proposed project could purchase tires for their vehicles that comply with state programs for increased fuel efficiency.</p>
<p><b><i>Municipal Utility Energy Efficiency Programs/Demand Response</i></b></p> <p>Includes energy efficiency programs, renewable portfolio standard, combined heat and power, and transitioning away from carbon-intensive generation.</p>	<p><b>Consistent:</b> PWP has a number of energy efficiency programs including an Energy Efficiency Rebate Program, a Pasadena Solar Initiative Program, a Green Power Program, a High Performance Building Program, and a Pasadena LEED Certification Program. These programs serve to increase the efficiency of structures and to increase the amount of power derived from renewable sources. The project would be designed in accordance with LEED requirements, as discussed above.</p>
<p><b><i>Municipal Utility Renewable Portfolio Standard</i></b></p> <p>California's Renewable Portfolio Standard (RPS), established in 2002, requires that all load serving entities achieve a goal of 20% of retail electricity sales from renewable energy sources by 2017, within certain cost constraints.</p>	<p><b>Consistent:</b> The PWP has purchased a six megawatt share in wind power from the High Winds Generation Facility in Solano County. In addition, the City has also instituted the Pasadena Solar Initiative, which waives permitting fees for solar installations and offers guidance to PWP customers that are interested in owning solar arrays. PWP has a goal of helping its customers install a total of 14,000 kilowatts by 2017. These programs are helping the PWP to meet California's Renewable Portfolio Standards.</p>
<p><b><i>Municipal Utility Combined Heat and Power</i></b></p> <p>Cost effective reduction from fossil fuel consumption in the commercial and industrial sector through the application of on-site power production to meet both heat and electricity loads.</p>	<p><b>Consistent:</b> The project will be designed in accordance with LEED specifications and will adhere to the City's requirements for energy efficient development.</p>
<p><b><i>Alternative Fuels: Non-Petroleum Fuels</i></b></p> <p>Increasing the use of non-petroleum fuels in California's transportation sector, as recommended as recommended in the CEC's 2003 and 2005 Integrated Energy Policy Reports.</p>	<p><b>Consistent:</b> Employees and patrons of the project site could purchase alternative fuel vehicles and utilize these fuels once they are commercially available in the region and local vicinity.</p>
<p><b>Business, Transportation and Housing</b></p>	
<p><b><i>Measures to Improve Transportation Energy Efficiency</i></b></p> <p>Builds on current efforts to provide a framework for expanded and new initiatives including incentives, tools and information that advance cleaner transportation and reduce climate change emissions.</p>	<p><b>Consistent:</b> The proposed project is an urban infill development; the proposed land uses would have readily available access to public transportation, which could incrementally reduce the number of regional vehicle trips.</p>
<p><b><i>Smart Land Use and Intelligent Transportation Systems (ITS)</i></b></p> <p>Smart land use strategies encourage jobs/housing proximity, promote transit-oriented development, and encourage high-density residential/commercial development along transit corridors.</p>	<p><b>Consistent:</b> The project consists of an intensification of an existing church use. The project could include development of up to 45 senior residential units (Scenario 1) or a youth recreation center (Scenario 2). Under either of these options, the project patrons would be likely to use transit options such as buses or</p>



**Table 4.2-13  
 Project Consistency with Applicable Climate Action Team Greenhouse  
 Gas Emission Reduction Strategies**

<i>Strategy</i>	<i>Project Consistency</i>
<p>ITS is the application of advanced technology systems and management strategies to improve operational efficiency of transportation systems and movement of people, goods and services.</p> <p>The Governor is finalizing a comprehensive 10-year strategic growth plan with the intent of developing ways to promote, through state investments, incentives and technical assistance, land use, and technology strategies that provide for a prosperous economy, social equity and a quality environment.</p> <p>Smart land use, demand management, ITS, and value pricing are critical elements in this plan for improving mobility and transportation efficiency. Specific strategies include: promoting jobs/housing proximity and transit-oriented development; encouraging high density residential/commercial development along transit/rail corridor; valuing and congestion pricing; implementing intelligent transportation systems, traveler information/traffic control, incident management; accelerating the development of broadband infrastructure; and comprehensive, integrated, multimodal/intermodal transportation planning.</p>	<p>trains. The project is located within ¼ mile of three bus routes and within ½ mile of the Metro Gold Line Memorial Park Station. In addition, the project is in close proximity to residential, shopping, civic and employment opportunities.</p>
<b>State and Consumer Service Agency (Department of General Services)</b>	
<p><b>Green Buildings Initiative</b></p> <p>Green Building Executive Order, S-20-04 (CA 2004), sets a goal of reducing energy use in public and private buildings by 20% by the year 2015, as compared with 2003 levels. The Executive Order and related action plan spell out specific actions state agencies are to take with state-owned and -leased buildings. The order and plan also discuss various strategies and incentives to encourage private building owners and operators to achieve the 20% target.</p>	<p><b>Consistent:</b> PWP has a number of energy efficiency programs including an Energy Efficiency Rebate Program, a Pasadena Solar Initiative Program, a Green Power Program, a High Performance Building Program, and a Pasadena LEED Certification Program. These programs serve to increase the efficiency of structures and to increase the amount of power derived from renewable sources. The project would be designed in accordance with LEED requirements as discussed above.</p>
<b>Public Utilities Commission (PUC)</b>	
<p><b>Accelerated Renewable Portfolio Standard</b></p> <p>The Governor has set a goal of achieving 33% renewable in the State's resource mix by 2020. The joint PUC/Energy Commission September 2005 Energy Action Plan II (EAP II) adopts the 33% goal.</p>	<p><b>Consistent:</b> The PWP has purchased a six megawatt share in wind power from the High Winds Generation Facility in Solano County. In addition, the City has also instituted the Pasadena Solar Initiative, which waives permitting fees for solar installations and offers guidance to PWP customers that are interested in owning solar arrays. PWP has a goal of helping its customers install a total of 14,000 kilowatts by 2017. These programs are helping the PWP to meet California's Renewable Portfolio Standards. The project would be designed in accordance with LEED specifications, though it has not yet been determined which credits will be incorporated into the design of the structures.</p>
<p><b>California Solar Initiative</b></p> <p>The solar initiative includes installation of 1 million solar</p>	<p><b>Consistent:</b> Although solar roofs are not as of yet proposed as part of the project, the project would not preclude the</p>



**Table 4.2-13  
 Project Consistency with Applicable Climate Action Team Greenhouse  
 Gas Emission Reduction Strategies**

<i>Strategy</i>	<i>Project Consistency</i>
roofs or an equivalent 3,000 MW by 2017 on homes and businesses, increased use of solar thermal systems to offset the increasing demand for natural gas, use of advanced metering in solar applications, and creation of a funding source that can provide rebates over 10 years through a declining incentive schedule.	implementation of this strategy by building operators or energy providers. In addition, as noted above, the City has its own Pasadena Solar Initiative Program.

**Table 4.2-14  
 Project Consistency with Applicable Attorney General Greenhouse Gas  
 Reduction Measures**

<i>Strategy</i>	<i>Project Consistency</i>
<b>Transportation-Related Emissions</b>	
<p><b><i>Diesel Anti-Idling</i></b></p> <p>Set specific limits on idling time for commercial vehicles, including delivery vehicles.</p>	<p><b>Consistent:</b> Currently, the CARB's Airborne Toxic Control Measure (ATCM) to Limit Diesel-Fueled Commercial Motor Vehicle Idling restricts diesel truck idling to five minutes or less. Diesel trucks operating from and making deliveries to, the project site are subject to this state-wide law. Construction vehicles are also subject to this regulation.</p>
<p><b><i>Transportation Emissions Reduction</i></b></p> <p>The project applicant shall promote ride sharing program e.g., by designating a certain percentage of parking spaces for high-occupancy vehicles, providing larger parking spaces to accommodate vans used for ride-sharing, and designating adequate passenger loading and unloading waiting areas.</p>	<p><b>Consistent:</b> The project involves intensification of an existing church use. The site is in close proximity (1/4 mile) to mass transit options including three Pasadena ARTS bus routes as well as the Metro Gold Line Memorial Park station (1/2 mile). In addition, the project subterranean garage shows an electrical vehical charging station.</p>
<p><b><i>Transportation Emissions Reduction</i></b></p> <p>Contribute transportation impact fees per residential and commercial unit to the City, to facilitate and increase public transit service.</p>	<p><b>Consistent:</b> The project applicant would be required to pay applicable fees. The City has a Trip Reduction ordinance, which requires submittal of a Transportation System Management (TSM) Program for review and approval, along with fee payments. In addition, the City's Traffic Reduction and Transportation Improvement Fee (TR-TIF) program funds improvements to manage traffic on designated multimodal corridors and funds public transit improvements to encourage non-automobile travel in the City.</p>
<p><b><i>Transportation Emissions Reduction</i></b></p> <p>Provide shuttle service to public transportation.</p>	<p><b>Consistent:</b> Shuttle service to public transportation would be unnecessary as the proposed project is within ¼ mile of three ARTS Lines and within ½ mile of the Metro Gold Line Memorial Park station.</p>
<p><b><i>Transportation Emissions Reduction</i></b></p> <p>Incorporate bike lanes into the project circulation system.</p>	<p><i>Not applicable.</i> The proposed project would use the existing City of Pasadena circulation system. However, the project would not preclude the addition of bike lanes to City streets.</p>



**Table 4.2-14  
 Project Consistency with Applicable Attorney General Greenhouse Gas  
 Reduction Measures**

<b>Strategy</b>	<b>Project Consistency</b>
<p><b>Transportation Emissions Reduction</b></p> <p>Provide onsite bicycle and pedestrian facilities (showers, bicycle parking, etc.) for commercial uses, to encourage employees to bicycle or walk to work.</p>	<p><b>Consistent:</b> The project involves intensification of an existing church use. The project is required to provide bicycle parking racks. Moreover, as discussed above, the project is in close proximity to several mass transit options as well as being centrally located to residential development.</p>
<p><b>Solid Waste and Energy Emissions</b></p>	
<p><b>Solid Waste Reduction Strategy</b></p> <p>Project construction shall require reuse and recycling of construction and demolition waste.</p>	<p><b>Consistent:</b> Chapter 8.62 of the Pasadena Municipal Code requires a minimum of 50% diversion for demolition and construction waste.</p>
<p><b>Water Use Efficiency</b></p> <p>Require measures that reduce the amount of water sent to the sewer system – see examples in CAT standard above. (Reduction in water volume sent to the sewer system means less water has to be treated and pumped to the end user, thereby saving energy.</p>	<p><b>Consistent:</b> The project would be required to conserve an additional 20% beyond baseline water usage pursuant to mitigation measure W-1. Thus the project would be required to reduce water sent to the sewer system.</p>
<p><b>Land Use Measures, Smart Growth Strategies and Carbon Offsets</b></p>	
<p><b>Smart Land Use and Intelligent Transportation Systems</b></p> <p>Encourage mixed-use and high density development to reduce vehicle trips, promote alternatives to vehicle travel and promote efficient delivery of services and goods.</p>	<p><b>Consistent:</b> The proposed project is an urban infill development located in a high densely developed area. Additionally, the proposed project is located along a public transit corridor.</p>
<p><b>Smart Land Use and Intelligent Transportation Systems</b></p> <p>Require pedestrian-only streets and plazas within the project site and destinations that may be reached conveniently by public transportation, walking or bicycling.</p>	<p><b>Consistent:</b> The project includes a forecourt between the existing Rectory and West Building, two play yards, and a contemplative garden with a labyrinth. The site will only have vehicular access to the subterranean garage. The project consists of the intensification of an existing church use. The site is privately owned, but will be accessible to the public as patrons of the church. The site is within ¼ mile of three ARTS routes and is within ½ mile of the Metro Gold Line Memorial Park station.</p>

The City’s 2009 Green City Action Plan is a progressive list of environmental initiatives for the City to take in its quest to become a sustainable and green community and follows the framework of the United Nations Green Cities Declaration and Urban Environmental Accords. The initiatives contained in the plan include developing a green fleet of city vehicles, using only environmentally friendly cleaning products in City buildings, and buying “green” goods where possible. Table 4.2-15 shows the project’s consistency with the 2009 Green City Action Plan.



**Table 4.2-15  
 Project Consistency with Applicable Green City Action Plan Measures**

<i>Strategy</i>	<i>Project Consistency</i>
<b>UEA 1 Climate Change.</b> Reduce greenhouse gas emissions by 25% by 2030.	<b>Consistent:</b> As discussed above, the proposed project includes a number of measures that would reduce greenhouse gas emissions, including transit options available to senior residents or youth on the project site. In addition, the project is in close proximity to residential, shopping, civic and employment opportunities. The additional church space that is proposed for construction would replace some of the existing over-utilized space, and would provide additional structures to house existing programs. In addition, the project would be designed to achieve LEED certification.
<b>UEA 4 Zero Waste.</b> Achieve zero waste to landfills and incinerators by 2040.	<b>Consistent:</b> Chapter 8.62 of the Pasadena Municipal Code requires a minimum of 50% diversion for demolition and construction waste.
<b>UEA 8 Urban Planning.</b> Advance higher density, mixed use, walkable, bikeable and disabled-accessible neighborhoods which coordinate land use and transportation with open space systems for recreation and ecological restoration.	<b>Consistent:</b> The project includes a forecourt between the existing Rectory and West Building, two play yards, and a contemplative garden with a labyrinth. The project consists of the intensification of an existing church use. The site is privately owned, but will be accessible to the public as patrons of the church. The site is within ¼ mile of three ARTS routes and is within ½ mile of the Metro Gold Line Memorial Park station.
<b>UEA 10 Green Space Access.</b> Ensure that there is an accessible public park or recreational open space within ½ kilometer of all residents by 2015.	<b>Consistent:</b> The project includes a forecourt between the existing Rectory and West Building, two play yards, and a contemplative garden with a labyrinth.
<b>UEA 15 Traffic Congestion.</b> Implement a policy to reduce the percentage of commute trips by single occupancy vehicles by 10% by 2012.	<b>Consistent.</b> The project involves intensification of an existing church use. The site is in close proximity (1/4 mile) to mass transit options including three Pasadena ARTS bus routes as well as the Metro Gold Line Memorial Park station (1/2 mile).
<b>UEA 18 Air Quality.</b> Establish an Air Quality Index (AQI) to measure the level of air pollution and set the goal of reducing by 10% by 2012 the number of days categorized in the AQI range as “unhealthy” or “hazardous.”	<b>Consistent:</b> Estimates of project emissions are shown in Table 4.2-6. As indicated, overall emissions would not exceed SCAQMD thresholds for ROG, NOx, CO, PM <sub>10</sub> or PM <sub>2.5</sub> .
<b>UEA 19 Potable Water Conservation.</b> Reduce per capita water consumption by 10% by 2015.	<b>Consistent:</b> The project would be required to conserve an additional 20% beyond baseline water usage pursuant to mitigation measure W-1. Thus the project would reduce water consumption.

Effective as a permanent city policy on April 15, 2006, the City Council approved a set of progressive green building regulations for public and private sector buildings – Pasadena Municipal Code Chapter 14.90 Green Building Practices Ordinance. The City’s Green Building Ordinance applies to the following projects:



1. *City buildings of 5,000 square feet or more of new gross floor area;*
2. *Nonresidential buildings of 25,000 square feet or more of new gross floor area;*
3. *Tenant improvements of 25,000 square feet or more of gross floor area and requiring a building permit as determined by the building official or designee;*
4. *Mixed-use projects and multi-family residential projects that include a residential building which has four stories in height, or more, of new construction;*
5. *Renovations of city buildings of 15,000 square feet or more and as determined by the building official or designee. Such renovations shall not include ordinary repairs nor apply to specialized building types such as warehouses, park restrooms, or the like.*

The Green Building Ordinance includes the following standards for compliance:

1. *All applicable projects are required to retain the services of a LEED™ accredited professional and complete LEED™ project registration prior to issuance of a building permit.*
2. *All applicable projects shall submit a LEED checklist and supporting documentation indicating points meeting at a minimum LEED "Certified" level incorporated into documentation for a building permit. Projects as described in Section 14.90.040(A)(2) of 50,000 square feet or more of new gross square footage shall meet LEED "Silver" level. These projects would include typical office, retail, medical, and academic buildings with occupied and conditioned spaces. The LEED checklist shall be prepared, signed, and dated by the project LEED accredited professional. All building documents shall indicate in the general notes and/or individual detail drawings, where feasible, the green building measures employed to attain the applicable LEED rating.*
3. *Applicable city buildings are required to attain LEED certification and meet, at a minimum, LEED "Silver" rating.*
4. *Building commissioning, although specified as a prerequisite for LEED™ certification, is not required for applicable projects under this chapter except for city buildings. Applicants are encouraged to verify that fundamental building systems are designed, installed, and calibrated to operate as intended.*
5. *All applicable projects shall meet the applicable LEED water use reduction credit that requires applicants to employ strategies that, in aggregate, use 20% less water than a standard building using the Energy Policy Act of 1992 fixture performance requirements for interior water usage.*

The proposed project would be required to be designed as LEED “Certified”, and may achieve LEED Silver status by accruing a minimum of 33 points above standard building and construction practices. The project’s contribution of 1,741 metric tons of CDE/year under Scenario 1, or of 1,769 metric tons CDE/year under Scenario 2 based on standard electricity consumption, natural gas consumption, and average daily trips does not account for reductions that would be associated with a LEED design. It would be speculative to assign additional reductions without a method of quantifying reductions for the project; however it is plausible that the project’s generation of up to 1,741 metric tons CDE/year under Scenario 1, or up to

1,769 metric tons CDE/year under Scenario 2 will be further reduced due to LEED design enhancements.

It should also be noted that the global climate change would not be expected to have a substantial impact on the project. The project location would not be affected by minor changes in sea level and the project would not require a substantial volume of water resources so any changes in available water resources (resulting from climate change) would not have a substantial effect on the viability of the project. Given that the project will be designed as a LEED project, incorporating long term design and operational features that are sustainable, and because the project's effects represent about 0.0004% (Scenario 1 or Scenario 2) of California's total 2006 emissions of 480 million metric tons, the project's effects are not cumulatively considerable.