4. ENVIRONMENTAL IMPACT ANALYSIS
5. GREENHOUSE GAS EMISSIONS

1. INTRODUCTION

This section provides a discussion of global climate change, existing regulations pertaining to global climate change, an inventory of the approximate greenhouse gas ("GHG") emissions that would result from the Project, and an analysis of the significance of the impact of these GHGs.

a. General Terms and Scientific Literature

Earth's natural warming process is known as the "greenhouse effect." This greenhouse effect compares the Earth and the atmosphere surrounding it to a greenhouse with glass panes. The glass allows solar radiation (sunlight) into Earth's atmosphere, but prevents radiative heat from escaping, thus warming Earth's atmosphere. Greenhouse gases (GHGs) keep the average surface temperature of the Earth close to a hospitable 60 degrees Fahrenheit. However, excessive concentrations of GHGs in the atmosphere can result in increased global mean temperatures, with associated adverse climatic and ecological consequences.

Scientists studying the particularly rapid rise in global temperatures have determined that human activity has resulted in increased emissions of GHGs, primarily from the burning of fossil fuels (during motorized transport, electricity generation, consumption of natural gas, industrial activity, manufacturing, etc.) and deforestation, as well as agricultural activity and the decomposition of solid waste.

Scientists refer to the global warming context of the past century as the "enhanced greenhouse effect" to distinguish it from the natural greenhouse effect.[1] While the increase in temperature is known as "global warming," the resulting change in weather patterns is known as "global climate change." Global climate change is evidenced in changes to wind patterns, storms, precipitation, and air temperature.

b. GHG Components

GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride.[2] CO_2 is the most abundant GHG. Other GHGs are less abundant, but have higher global warming potential than CO_2. Thus, emissions of other GHGs are frequently expressed in the equivalent mass of CO_2, denoted as CO_2e. Forest fires, decomposition, industrial processes, landfills, and consumption of fossil fuels for power generation, transportation, heating, and cooking are the primary sources of GHG emissions. A general description of

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1 *Climate Change 101: Understanding and Responding to Global Climate Change, published by the Pew Center on Global Climate Change and the Pew Center on the States.*

2 *As defined by California Assembly Bill (AB) 32 and Senate Bill (SB)104.*

the GHGs discussed is provided in Table 4.5.1, Description of Identified Greenhouse Gases, below.

Table 4.5.1
Description of Identified Greenhouse Gases

Greenhouse Gas	General Description
Carbon Dioxide (CO_2)	An odorless, colorless GHG, which has both natural and man made sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing; man made sources of carbon dioxide are burning coal, oil, natural gas, and wood.
Methane	A flammable gas and is the main component of natural gas. When one molecule of methane is burned in the presence of oxygen, one molecule of carbon dioxide and two molecules of water are released. There are no ill health effects from methane. A natural source of methane is the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain methane, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and cattle.
Nitrous Oxide (N_2O)	A colorless GHG. High concentrations can cause dizziness, euphoria, and sometimes slight hallucinations. Nitrous oxide is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used in rocket engines, race cars, and as an aerosol spray propellant.
Hydrofluorocarbons (HFCs)	HFCs are synthetic man-made chemicals that are used as a substitute for chlorofluorocarbons (CFCs) for automobile air conditioners and refrigerants. CFCs are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. Because they destroy stratospheric ozone, the production of CFCs was stopped as required by the Montreal Protocol in 1987.
Perfluorocarbons (PFCs)	PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above the earth's surface are able to destroy the compounds. PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane and hexafluoroethane. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.
Sulfur Hexafluoride (SF_6)	An inorganic, odorless, colorless, non-toxic, and nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Source: Association of Environment Professionals, Alternative Approaches to Analyze Greenhouse Gas Emissions and Global Climate Change in CEQA Documents, Final, June 29, 2007.

c. Global Warming Potential

Global Warming Potentials (GWPs) are one type of simplified index based upon radiative properties that can be used to estimate the potential future impacts of emissions of different gases upon the climate system in a relative sense. GWP is based on a number of factors, including the radiative efficiency (heat-absorbing ability) of each gas relative to that of CO_2, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO_2. A summary of the atmospheric lifetime and GWP of selected gases is presented at Table 4.5.2, Atmospheric Lifetimes and Global Warming Potentials. As indicated, GWP ranges from 1 to 23,900.

Table 4.5.2
Atmospheric Lifetimes and Global Warming Potentials

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50 – 200	1
Methane	12 (+/-3)	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF_4)	50,000	6,500
PFC: Hexafluoroethane (C_2F_6)	10,000	9,200
Sulfur Hexafluoride (SF_6)	3,200	23,900
Source: IPCC, 2006.		

d. Projected Impacts of Global Warming in California

According to the 2006 California Climate Action Team (CAT) Report, temperature increases arising from increased GHG emissions potentially could result in a variety of impacts to the people, economy, and environment of California associated with a projected increase in extreme conditions, with the severity of the impacts depending upon actual future emissions of GHGs and associated warming. If emissions from GHGs are not reduced significantly, the warming increase could have the following consequences in California[3]:

- The Sierra snowpack would decline between 70 and 90 percent, threatening California's water supply;
- Attainment of air quality standards would be impeded by increasing emissions, accelerating chemical processes, and raising inversion temperatures during stagnation episodes;

[3] *California Environmental Protection Agency, Climate Action Team Report to Governor Schwarzenegger and the Legislature, March 2006, p. 11.*

- Erosion of California's coastlines and sea water intrusion would increase;
- Pest infestation and vulnerability to fires of the State's forests would increase; and
- Rising temperatures would increase power demand, especially in the summer season.

e. California-Specific Adaptation Strategies

Because climate change is already affecting California and current emissions will continue to drive climate change in the coming decades, regardless of any mitigation measures that may be adopted, the necessity of adaptation to the impacts of climate change is recognized by the State of California. The 2009 California Climate Adaptation Strategy Discussion Draft begins what will be an ongoing process of adaptation, as directed by Executive Order S-13-08. The goals of the strategy are to analyze risks and vulnerabilities and identify strategies to reduce the risks. Once the strategies are identified and prioritized, government resources would be identified. Finally, the strategy includes identifying research needs and educating the public.

Climate change risks are evaluated using two distinct approaches: (1) projecting the amount of climate change that may occur using computer-based global climate models and (2) assessing the natural or human system's ability to cope with and adapt to change by examining past experience with climate variability and extrapolating this to understand how the systems may respond to the additional impact of climate change. The major anticipated climate changes expected in California include increases in temperature, decreases in precipitation, particularly as snowfall, and increases in sea level, as discussed above. These gradual changes will also lead to an increasing number of extreme events, such as heat waves, wildfires, droughts, and floods. This would impact public health, ocean and coast resources, water supply, agriculture, biodiversity, and transportation and energy infrastructure.

Key preliminary adaptation recommendations included in the *Strategy* are as follows:

- Appointment of a Climate Adaptation Advisory Panel;
- Improved water management in anticipation of reduced water supplies, including a 20 percent reduction in per capita water use by 2020;
- Consideration of project alternatives that avoid significant new development in areas that cannot be adequately protected from flooding due to climate change;
- Preparation of agency-specific adaptation plans, guidance or criteria by September 2010;
- Consideration of climate change impacts for all significant State projects;
- Assessment of climate change impacts on emergency preparedness;
- Identification of key habitats and development of plans to minimize adverse effects from

climate change;

- Development of guidance by the California Department of Public Health by September 2010 for use by local health departments to assess adaptation strategies;
- Amendment of Plans to assess climate change impacts and develop local risk reduction strategies by communities with General Plans and Local Coastal Plans; and
- Inclusion of climate change impact information into fire program planning by State fire fighting agencies.

2. ENVIRONMENTAL SETTING

a. Regulatory Framework

In response to growing scientific and political concern about global climate change, Federal, State, and local governmental entities have adopted a series of laws to reduce emissions of GHGs to the atmosphere. The following includes a discussion of the applicable regulations associated with greenhouse gas emissions in the context of land use planning and development.

(1) Federal Regulations

(a) United States Environmental Protection Agency (U.S. EPA)

In the past, the U.S. EPA has not regulated GHGs under the Clean Air Act because it asserted that the Act did not authorize it to issue mandatory regulations to address global climate change. However, in 2007 the U.S. Supreme Court held that the U.S. EPA must consider regulation of motor-vehicle GHG emissions.[4] The Court ruled that GHGs fit within the Clean Air Act's definition of a pollutant and that the U.S. EPA did not have a valid rationale for not regulating GHGs. In December 2009, the U.S. EPA issued an endangerment finding for GHGs under the Clean Air Act. This is the first step in regulating GHGs under the provisions of the Clean Air Act. In addition, on September 15, 2009, the National Highway Traffic Safety Administration and U.S. EPA announced a proposed joint rule that would explicitly tie fuel economy to GHG emissions reductions requirements. The proposed new Corporate Average Fuel Economy ("CAFE") Standards would cover automobiles for model years 2012 through 2016, and would require passenger cars and light trucks to meet a combined, per–mile, CO_2 emissions level. It is estimated that by 2016, this GHG emissions limit could equate to an overall light-duty vehicle fleet average fuel economy of as much as 35.5 miles per gallon.

[4] *Massachusetts v. Environmental Protection Agency et al. (127 S. Ct. 1438 (2007))*

(2) State Regulations

(a) California Global Warming Solutions Act (AB 32)

In response to growing scientific and political concern with global climate change, California has adopted a series of laws to reduce emissions of GHGs to the atmosphere from commercial and private activities within the State. In September 2002, then-Governor Gray Davis signed 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. On June 5, 2005, California Governor Arnold Schwarzenegger signed Executive Order S-3-05 setting the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels. In response to the Executive Order, the Secretary of Cal/EPA created the Climate Action Team (CAT), which subsequently published the Climate Action Team Report in March 2006 (the "2006 CAT Report"). The 2006 CAT Report identified a recommended list of strategies that the State could pursue to reduce climate change GHG emissions.

In September 2006, the California Global Warming Solutions Act of 2006, also known as AB 32, was enacted by the California legislature. AB 32 focuses on reducing GHG emissions in California, and requires CARB, the State agency charged with regulating statewide air quality, to adopt new rules and regulations that would achieve greenhouse gas emissions equivalent to statewide levels in 1990 by 2020. To achieve this goal, AB 32 mandates that CARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved. As the intent of AB 32 is to limit 2020 emissions to the equivalent of those from 1990, and the present year (2009) is beyond the midpoint of this timeframe, the regulations would affect many existing sources of greenhouse and not just new general development projects.

As a central requirement of AB 32, the CARB was assigned the task of developing a Scoping Plan that outlines the State's strategy to achieve the 2020 greenhouse gas emissions limit. The Scoping Plan is defined by AB 32 as "achieving the maximum technologically feasible and cost-effective reductions in GHG emissions from sources or categories of sources of GHGs by 2020." In order to assess the scope of reductions needed to return to 1990 emissions levels, CARB first estimated the 2020 business-as-usual ("BAU") GHG emissions. These are the GHG emissions that would be expected to result if there were no GHG reduction measures, and as if the State were to proceed on its pre-AB 32 emissions track. After estimating that statewide 2020 BAU GHG emissions would be 596 metric tons, the Scoping Plan then identified recommended GHG reduction measures that would reduce BAU emissions by approximately 174 metric tons (an approximately 28.35% reduction) by 2020. This Scoping Plan, which was developed by CARB in coordination with the CAT, was first published in October 2008. The Scoping Plan proposed a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California, improve the environment, reduce the State's dependence on oil, diversify the State's energy sources, save energy, create new jobs, and enhance public health. An important component of the plan is a cap-and-trade program covering 85 percent of the State's emissions. Additional key recommendations

of the Scoping Plan include strategies to enhance and expand proven cost-saving energy efficiency programs; implementation of California's clean cars standards; and increases in the amount of clean and renewable energy used to power the State. Furthermore, the Scoping Plan proposes full deployment of the California Solar Initiative, high-speed rail, water-related energy efficiency measures, and a range of regulations to reduce emissions from trucks and from ships docked in California ports. The Scoping Plan was approved by CARB on December 11, 2008. The measures in the Scoping Plan would be developed over the next two years and be in place by 2012. As required by AB 32, CARB must update its Scoping Plan every five years to ensure that California remains on the path toward a low carbon future.

On August 19, 2011, following legal action in opposition to the Scoping Plan, CARB updated the Scoping Plan through a Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document ("FED" or "2011 Scoping Plan").[5] CARB's updated projected BAU emissions in the 2011 Scoping Plan is based on current economic forecasts (i.e., as influenced by the economic downturn) and certain GHG reduction measures already in place. The BAU projection for 2020 GHG emissions in California was originally estimated to be 596 $MMTCO_2E$. The updated calculation of the 2011 Scoping Plan's estimates for projected emissions in 2020, as of October 2010 based on current economic forecasts, totals 506.8 $MMTCO_2E$ (or approximately 507 $MMTCO_2E$). CARB now estimates only a 16 percent reduction below the estimated statewide BAU levels would now be necessary to return to 1990 emission levels (i.e., 427 $MMTCO_2E$) by 2020, instead of the 28.35% BAU reduction previously reported under the 2008 Scoping Plan.[6] This revised estimate is summarized in Table 4.5.3, Estimate of Emissions Reductions Needed from Proposed Scoping Plan or Other Measures Not Yet In Place, below.

(b) Sustainable Communities and Climate Protection Act (SB 375)

California's Sustainable Communities and Climate Protection Act, also referred to as Senate Bill 375 (SB 375) became effective January 1, 2009. The goal of SB 375 is to help achieve AB 32's GHG emissions reduction goals by aligning the planning processes for regional transportation, housing, and land use. SB 375 requires CARB to develop regional reduction targets for GHGs, and prompts the creation of regional plans to reduce emissions from vehicle use throughout the State. California's 18 Metropolitan Planning Organizations (MPOs) have been tasked with creating "Sustainable Community Strategies" (SCS) in an effort to reduce the region's vehicle miles traveled (VMT) in order to help meet AB 32 targets through integrated transportation, land use, housing and environmental planning. Pursuant to SB 375, CARB set per-capita GHG emission reduction targets from passenger vehicles for each of the State's 18 MPOs. For the SCAG region, the targets are set at eight percent below 2005 per capita emissions levels by 2020 and 13 percent below 2005 per capita emissions levels by 2035.

[5] *Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED), Attachment D, CARB, August 19, 2011.*

[6] *Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED), Attachment D, page 11, CARB, August 19, 2011.*

Table 4.5.3
Estimate of Emissions Reductions Needed from the
2011 Scoping Plan Measures Not Yet In Place

Emission Category	GHG Emissions ($MMTCO_2E$)
2008 Scoping Plan	
2020 BAU Forecast (CARB 2008 Scoping Plan)	596
2020 Emissions Target Set by AB 32 (i.e., 1990 level)	427
Reduction below Business As Usual necessary to achieve 1990 levels by 2020	**169 (28.35%)** [a]
2011 Scoping Plan	
Revised 2020 BAU Forecast (CARB 2011 Scoping Plan)	507
2020 Emissions Target Set by AB 32 (i.e., 1990 level)	427
Percent Reduction below Business As Usual necessary to achieve 1990 levels by 2020	**80 (16%)** [b]

[a] 596-427 = 169/596 = 28.35%
[b] 507-427 = 80/507 = 15.779% is approximately 16%.
Source: Data derived from Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED), Attachment D, Table 1.2-3 and page 11, CARB, August 19, 2011.

(c) SB 97 & CEQA Guidelines

In August 2007, the Legislature adopted Senate Bill 97 (SB 97), requiring the Office of Planning and Research (OPR) to prepare and transmit new CEQA guidelines for the mitigation of GHG emissions or the effects of GHG emissions to the Resources Agency by July 1, 2009. Following receipt of these guidelines, the Resources Agency was required to certify and adopt the guidelines prepared by OPR by January 1, 2010.

OPR submitted its proposed guidelines to the Secretary for Natural Resources on April 13, 2009. The Natural Resources Agency then undertook the formal rulemaking process to certify and adopt the amendments as part of the State regulations implementing CEQA. The CEQA Guidelines Amendments were adopted on December 30, 2009 and became effective on March 18, 2010.

The CEQA Guideline Amendments do not specify a threshold of significance for GHG emissions, nor do they prescribe assessment methodologies or specific mitigation measures. Instead, the amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but rely on the lead agencies in making their own significance threshold determinations based upon substantial evidence. The CEQA Guidelines Amendments also encourage public agencies to make use of programmatic mitigation plans and programs from which to tier when they perform individual project analyses.

(d) Title 24 Energy Efficiency Standards

California's Energy Efficiency Standards for Residential and Nonresidential Buildings, located at Title 24, Part 6 of the California Code of Regulations and commonly referred to as "Title 24," were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

The most recent update to Title 24 was adopted by the CEC on April 23, 2008. The requirement for when the 2008 standards must be followed is dependent on when the application for the building permit is submitted. If the application for the building permit is submitted on or after January 1, 2010, the 2008 standards must be met. The CEC adopted the 2008 changes to the Building Energy Efficiency Standards to respond to the mandates of AB 32 and to pursue California energy policy that energy efficiency is the resource of first choice for meeting California's energy needs.

(e) California Green Building Standards

The California Green Building Standards Code, which is Part 11 of the California Code of Regulations, is commonly referred to as the CALGreen Code. The 2008 edition, the first edition of the CALGreen Code, contained only voluntary standards. The 2010 CALGreen Code is a Code with mandatory requirements for State-regulated buildings and structures throughout California beginning on January 1, 2011. The 2010 CALGreen Code contains requirements for construction site selection, stormwater control during construction, construction waste reduction, indoor water use reduction, material selection, natural resource conservation, site irrigation conservation and more. The Code provides for design options allowing the designer to determine how best to achieve compliance for a given site or building condition. The Code also requires building commissioning which is a process for the verification that all building systems, like heating and cooling equipment and lighting systems, are functioning at their maximum efficiency.

3. Local Regulations

(a) City of Malibu General Plan

The City of Malibu General Plan identifies various policies and programs for improving and preserving the natural and man-made environment within the City of Malibu. While not directly related to global climate change, the following policies identify the need to reduce energy usage and solid waste generation and improve air quality within the City, which would have the secondary effect of reducing GHG emissions. Accordingly, the following goals and policies could apply to the Proposed Project:

Conservation (Con) Goal 3: Energy Conserved

Con Objective 3.1: Use of innovative, energy efficient techniques and systems.

Con Policy 3.1.1: The City shall educate the community regarding the importance of and techniques for energy conservation;

Con Policy 3.1.2: The City shall encourage state-of-the-art energy efficient standards for all new construction design;

Con Policy 3.1.3: The City shall protect solar access; and

Con Policy 3.1.4: The City shall encourage uses of solar and other nonpolluting renewable energy sources.

Con Goal 5: Solid Waste Reduced and Recycled

Con Objective 5.1: 50% reduction in the amount of solid waste generated by the community and disposed of in landfills by the year 2000.

Con Policy 5.1.1: The City shall reduce solid waste;

Con Policy 5.1.2: The City shall encourage recycling; and

Con Policy 5.1.3: The City shall encourage co-composting.

Safety (S) Goal 1: A community that is free from all avoidable risks to safety, health, and welfare from natural and man-made hazards.

S Objective 1.1: Losses to life and property from natural and man-made hazards greatly reduced from historic levels.

S Policy 1.1.6: The City shall reduce air pollution and improve Malibu's air quality.

b. Existing Conditions

(1) Existing Statewide Greenhouse Gas Emissions

The California Energy Commission (CEC) published the *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004* in December 2006. This report indicates that California emitted between 425 to 468 million metric tons of greenhouse gases in 1990. California has the second lowest per capita rate of CO_2 emissions in the nation, with only the District of Columbia being lower. Between 1990 and 2000, California's population grew by approximately 13.8% (or 4.1 million) people and during the 1990 to 2003 period, California's gross State product grew by 83 percent (in dollars, not adjusted for inflation). However, California's GHG emissions were calculated to have grown by only 12 percent over the same period. The report concluded that California's ability to slow the rate of growth of GHG emissions was largely due to the success of its energy efficiency, renewable energy programs, and commitment to clean air and clean energy. The State's programs and commitments were calculated to have lowered its GHG emissions rate of growth by more than half of what it would have been otherwise.

(2) Existing Project Site Emissions

The Project Site is currently improved with the former Los Angeles County Sheriff's Station, which was decommissioned in the early 1990s. The existing Sheriff's Station building includes approximately 23,882 square feet of developed floor area, of which approximately 7,279 square feet is located below

grade in a basement level and approximately 16,603 square feet is located at-grade. Because the former Sheriff's Station has been decommissioned for more than 20 years, the existing Project Site is considered to have zero existing GHG emissions for purposes of this analysis.

3. ENVIRONMENTAL IMPACTS

a. Methodology

The California Climate Action Registry (CCAR) General Reporting Protocol, recommends the separation of GHG emissions into three categories that reflect different aspects of ownership or control over emissions. They include the following:

Scope 1: Direct, on-site combustion of fossil fuels (e.g., natural gas, propane, gasoline, and diesel).

Scope 2: Indirect, off-site emissions associated with purchased electricity or purchased steam.

Scope 3: Indirect emissions associated with other emissions sources, such as third-party vehicles and embodied energy.[7]

CARB believes that consideration of so-called indirect emissions provides a more complete picture of the GHG footprint of a facility. Annually reported indirect energy usage aids the conservation awareness of a facility and provides information to CARB to be considered for future strategies.[8] CARB has proposed requiring the calculation of direct and indirect GHG emissions as part of the AB 32 reporting requirements. Additionally, the OPR has noted that lead agencies "should make a good-faith effort, based on available information, to calculate, model, or estimate…GHG emissions from a project, including the emissions associated with vehicular traffic, energy consumption, water usage and construction activities."[9] Therefore, direct and indirect emissions have been calculated for the Project from these sources.

(1) Construction-Related Emissions

Construction emissions were calculated using the California Emissions Estimator Model (CalEEMod Version 2013.2.2), which is based on OFFROAD2011 model outputs. OFFROAD2011 is an emissions estimation model developed by CARB to calculate emissions from off-road road equipment, including construction equipment. The output values used in this analysis were modeled to be project-specific, based on equipment mix, usage rates (hours per day), and length of construction schedule. For a complete

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[7] *Embodied energy is a scientific term that refers to the quantity of energy required to manufacture and supply to the point of use a product, material, or service.*

[8] *CARB, Initial Statement of Reasons for Rulemaking, Proposed Regulation for Mandatory Reporting of Greenhouse Gas Emissions Pursuant to the California Global Warming Solutions Act of 2006 (AB 32), Planning and Technical Support Division Emission Inventory Branch, October 19, 2007.*

[9] *State of California Office of Planning and Research (OPR), Technical Advisory, CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review, June 19, 2008.*

discussion on these construction assumptions, please refer to Section 4.2, Air Quality, of this Draft EIR. The mobile source emission methodology for on-road construction emissions, associated with worker commute and delivery of materials, uses a vehicle miles traveled rate calculated by CalEEMod in order to generate values for annual emissions. Emission factors are derived from the EMFAC2007 model using light duty automobile factors for worker commute and heavy duty truck factors for deliveries.

The Association of Environmental Professionals (AEP) has recently recommended that total construction emissions be amortized and added to operational emissions (AEP 2010). This amortization method has also been used by the SCAQMD. Accordingly, the construction-related GHG emissions have been amortized to be consistent with this guidance.

The most common GHGs emitted in association with the construction of land use developments include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CalEEMod provides these GHGs and translates them into a common currency of carbon dioxide equivalent (CO_2e). In order to obtain the CO_2e, an individual GHG is multiplied by its global warming potential (GWP). The GWP designates on a pound for pound basis the potency of the GHG compared to CO_2. CalEEMod uses GWP from the IPCC Second Assessment Report (SAR).

(2) Operation-Related Emissions

CalEEMod Version 2013.2.2 was used to calculate the energy use and potential emissions generated by implementation of the Project. These factors include motor vehicles, electricity, natural gas, water usage/wastewater generation, hearth combustion, landscaping/maintenance equipment, and solid waste generation and disposal.

Motor vehicle emission calculations associated with operation of the Project use a projection of annual vehicle miles travelled (VMT), which is derived from the trips provided in the Project Traffic Study and the default trip characteristics in CalEEMod. These values account for the daily and seasonal variations in trip frequency and length associated with travel to and from the Project Site and other activities that require a commute.

GHGs are emitted as a result of activities in buildings for which electricity and natural gas are used as energy sources. Combustion of any type of fuel emits criteria pollutants and GHGs directly into the atmosphere; when this occurs in a building this is a direct emission source associated with that building and CalEEMod calculates all of these pollutants. GHGs are also emitted during the generation of electricity from fossil fuels. When electricity is used, the electricity generation typically takes place off-site at a power plant; electricity use generally causes emissions in an indirect manner, and therefore, GHG emissions have been calculated from electricity generation.

The amount of water used and wastewater generated by a project has indirect GHG emissions associated with it. These emissions are a result of the energy used to supply, distribute, and treat the water and wastewater. It will often be the case that the water treatment and wastewater treatment occur outside of the project area. In this case, it is still important to quantify the energy and associated GHG emissions attributable to the water use. In addition to the indirect GHG emissions associated with energy use,

wastewater treatment can directly emit both methane and nitrous oxide. Thus, GHG emissions have been calculated from water used and wastewater generated by the Project.

Municipal solid waste (MSW) is the amount of material that is disposed of in landfills, by recycling, or by composting. CalEEMod calculates the indirect GHG emissions associated with waste that is disposed of at a landfill. The program uses annual waste disposal rates from the California Department of Resources Recycling and Recovery (CalRecyle) data for individual land uses. If waste disposal information was not available, waste generation data was used. CalEEMod uses the overall California Waste Stream composition to generate the necessary types of different waste disposed into landfills. The program quantifies the GHG emissions associated with the decomposition of the waste which generates methane based on the total amount of degradable organic carbon. The program will also quantify the CO_2 emissions associated with the combustion of methane, if applicable. Default landfill gas concentrations were used as reported in Section 2.4 of AP-42.[10] The IPCC has a similar method to calculate GHG emissions from MSW in its 2006 Guidelines for National Greenhouse Gas Inventories.

Planting trees will sequester CO_2 and is considered to result in a one-time carbon-stock change. Trees sequester CO_2 while they are actively growing. The amount of CO_2 sequestered depends on the type of tree. CalEEMod uses default annual CO_2 accumulation per tree for specific broad species classes.

Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, roto-tillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers, as well as air compressors, generators, and pumps. The emissions associated from landscape equipment use was processed using OFFROAD 2011 and ARB's Technical Memo: Change in Population and Activity Factors for Lawn and Garden Equipment (6/13/2003).

b. Thresholds of Significance

A project's GHG emissions typically would be relatively very small in comparison to State or global GHG emissions and, consequently, they would, in isolation, have no significant direct impact on climate change. Rather, it is the increased accumulation of GHG from more than one project and many sources in the atmosphere that may result in global climate change, which can cause the adverse environmental effects previously discussed. Accordingly, the threshold of significance for GHG emissions determines whether a project's contribution to global climate change is "cumulatively considerable." Many air quality agencies concur (SCAQMD, SLVAPCD, etc.) that GHG and climate change should be evaluated as a potentially significant cumulative, rather than project direct impact.

Neither the SCAQMD nor the State CEQA Guidelines Amendments as adopted by the Natural Resources Agency on December 30, 2009 provide any adopted thresholds of significance for addressing GHG emissions. Nonetheless, the new Sections 15064.4, 15064.7 and 15126.4 of the CEQA Guidelines Amendments serve to assist lead agencies in determining the significance of the impacts of GHGs.

[10] *See AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors, prepared by the Office of Air Quality Planning and Standards, U.S. EPA, January 1995.*

Specifically, Section 15064.4 of CEQA Guidelines Amendments, entitled "Determining the Significance of Impacts from Greenhouse Gas Emissions," states the following:

> (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:
>
> > (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitation of the particular model or methodology selected for use; and/or
> >
> > (2) Rely on a qualitative analysis or performance based standards.
>
> (b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:
>
> > (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
> >
> > (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
> >
> > (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

Finally, the CEQA Guidelines Amendments supplemented Section VII of Appendix G of the State CEQA Guidelines to state that, a project could have a significant environmental impact if it would:

(a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or

(b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

In reliance upon these CEQA Guideline Amendments and the guidance documents referenced above, the Project would have significant cumulative environmental impact if it would:

(a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment by conflicting with or obstructing the goals or strategies of AB 32, or

(b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases such as the CalGreen Code.

c. Project Impacts

(1) Estimated Construction GHG Emissions

Construction emissions represent an episodic, temporary source of GHG emissions. Emissions are generally associated with the operation of construction equipment and the disposal of construction waste. To be consistent with the guidance from the SCAQMD for calculating criteria pollutants from construction activities, only GHG emissions from on-site construction activities and off-site hauling and construction worker commuting are considered as Project-generated. As explained by CAPCOA in its 2008 white paper, the information needed to characterize GHG emissions from manufacture, transport, and end-of-life of construction materials would be speculative at the CEQA analysis level. CEQA does not require an evaluation of speculative impacts (CEQA Guidelines § 15145). Therefore, the construction analysis does not consider such GHG emissions. All GHG emissions are reported on an annual basis.

For analytical purposes, it is assumed the construction of the Proposed Project would occur over an approximate 17-month period. Emissions of GHGs were calculated using CalEEMod Version 2012.2.2 for each year of construction of the Project and the results of this analysis are presented in Table 4.5.4, Project Construction-Related Greenhouse Gas Emissions. Please refer to Section 4.2, Air Quality, for a complete discussion regarding the construction assumptions used in this analysis. As shown in Table 4.5.4, the greatest annual increase in GHG emissions from the Project's construction activities would be 376.73 CO_2e MTY in 2016. The total amount of construction related GHG emissions is estimated to be approximately 450.34 CO_2e MTY, or approximately 15.01 CO_2e MTY amortized over a 30-year period.

Table 4.5.4
Project Construction-Related Greenhouse Gas Emissions

Year	CO_2e Emissions (Metric Tons per Year) [a]
2015	62.45
2016	376.73
2017	11.16
Total	*450.34*
Amortized (over 30 years)	*15.01*

(2) Estimated Operational GHG Emissions

Operational GHG emissions would result from the usage of on-road mobile vehicles, electricity, natural gas, water, and generation of solid waste and wastewater. Emissions of GHGs are shown in Table 4.5.5, Project Operational Greenhouse Gas Emissions. As shown in Table 4.5.5, the Project would generate a net increase of approximately 919.93 CO_2e MTY without any energy reduction measures. With the 2013 California Green Building Standards Code (CALGreen Code) energy conservation measures that are proposed, the Project's GHG emissions would be reduced to 880.29 CO_2e MTY.

Table 4.5.5
Project Operational Greenhouse Gas Emissions

Emissions Source	CO_2e Emissions (Metric Tons per Year)		Percent Reduction
	Unmitigated	Mitigated	
Area	< 1	< 1	0 %
Energy	143.42	120.54	-16 %
Mobile	717.98	717.98	0 %
Waste	26.17	13.09	-50 %
Water	17.35	13.67	-21 %
Construction Emissions [a]	15.01	15.01	0 %
Project Net Emissions	***919.93***	***880.29***	***-4 %***

[a] The total construction GHG emissions were amortized over 30 years and added to the operation of the Project consistent with SCAQMD methodology.
Source: Parker Environmental Consultants, December 2014. Calculation data and results provided in Appendix G to this Draft EIR.

(3) Project Consistency With Plans, Policies and Regulations

(a) GHG Emissions Associated With Energy Demand

As discussed previously, energy use is regulated at the Federal, State and local levels. Energy use reduction has been identified as a key component of reducing GHG emissions across the State and in the City of Malibu. Specifically, as a component of AB 32, the CARB Scoping Pan has identified several energy-efficiency measures for both electricity and natural gas that can reduce greenhouse gas emissions significantly. The most applicable of these measures for the Proposed Project are: to provide more stringent building codes and appliance efficiency standards; expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings; and, encourage local government programs that lead by example and tap into local authority over planning, development, and code compliance. As discussed previously, the Proposed Project is required to comply with the 2013 CALGreen Code. Specific mandatory requirements and elective measures are provided for nonresidential uses such as the Project. The Proposed Project would be subject to all applicable provisions of the CALGreen Code for low-rise residential buildings because the Proposed Project would not exceed six stories. For example, as it relates to energy use, the Project must be built to meet Title 24 2013 Standards. The Proposed Project would meet these, and many other, code requirements and would

therefore be consistent with applicable energy reduction measures at the State and local levels.

(b) GHG Emissions Associated With Solid Waste Generation

Solid waste generation is regulated at the Federal, State and local levels. As it relates to GHG emissions, the CARB Scoping Plan discusses recycling efforts as part of the expansion of Green Building strategies across the State. Specifically, the Scoping Plan states a Green Building strategy will produce greenhouse gas saving through buildings that exceed minimum energy efficiency standards, decrease consumption of potable water, reduce solid waste during construction and operation, and incorporate sustainable materials. The operations on the Project Site would continue to be subject to requirements set forth in AB 939 requiring each city and county to divert 50 percent of its solid waste from landfill disposal through source reduction, recycling, and composting. Additionally, as required by the California Solid Waste Reuse and Recycling Access Act of 1991, the Project would be required to provide adequate storage areas for the collection and storage of recyclable waste materials. Therefore, the Proposed Project would be consistent with applicable solid waste reduction measures at the State and local levels.

(c) GHG Emissions Associated With Water Use

Water use is regulated at the Federal, State and local levels. As it relates to GHG emissions, the CARB Scoping Plan states that approximately one-fifth of the electricity and one-third of the non-power plant natural gas consumed in the State are associated with water delivery, treatment and use. The Scoping Plan also states improved Green Building strategies will produce greenhouse gas saving through buildings that exceed minimum energy efficiency standards, decrease consumption of potable water, reduce solid waste during construction and operation, and incorporate sustainable materials. In accordance with the CalGreen Code, the Proposed Project would be subject to the following measures aimed at reducing GHGs associated with water use: provide a schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by at least 20 percent; and, provide irrigation design and controllers that are weather- or soil moisture-based that automatically adjust irrigation in response to changes in plants' needs as weather conditions change, and weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). The Proposed Project would meet these water saving requirements, and would therefore be consistent with applicable water reduction measures at the State and local levels.

(d) GHG Emissions Associated With Motor Vehicles

As discussed previously, motor vehicle related GHG emissions are regulated at the Federal, State and local levels. As discussed in the CARB Scoping Plan, the Transportation sector – largely the cars and trucks that move goods and people – is the largest contributor with 38 percent of the State's total greenhouse gas emissions. Many of the transportation related reduction measures identified in the Scoping Plan are focused on improving motor vehicle efficiencies through more restrictive statewide laws and regulations. Some of these measures include: Pavley I & II Standards for light-duty vehicles, Low Carbon Fuel Standards, aerodynamic improvements for heavy-duty vehicles, and medium- and heavy-

duty vehicle hybridizations. Together, these measures were estimated to reduce the State's 2020 forecasted emissions by 52.60 $MMTCO_2E$. These regulatory measures are aimed at improving efficiencies of the motor vehicle fleet mix across the State and are not measures that the Proposed Project can implement or be responsible for improving upon. The project would not propose any components that would impede CARBs regulatory measures aimed at improving fuel efficiencies of the motor vehicle fleet. Thus, the Project would be consistent with statewide goals of reducing GHG emissions associated with motor vehicles.

Based on the above, the Project would be consistent with all feasible and applicable strategies to reduce greenhouse gas emissions in California and the City of Malibu. As such, the Proposed Project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases and these impacts would be considered less than significant.

(e) Consistency with Local Plans and Policies

The Proposed Project would be consistent with local energy conservation plans and policies, which would further reduce the Project's GHG emissions. Consistent with Conservation Objective 3.1, the Proposed Project incorporates an innovative, energy efficient technique for a passive heating and cooling air ventilation system. As a public institution, the architectural design of the proposed college facility would promote SMC's commitment to sustainable energy practices. Conservation Policy 3.1.2: directs the City to encourage such state-of-the-art energy efficient standards for all new construction design. Consistent with Conservation Policy 3.1.3, the Proposed Project would protect solar access. The Project is located within a central area of the Civic Center complex and will not impede or block solar access to adjacent land uses. The shade and shadows cast by the proposed 35' – 10" structure would fall predominately on-site within the surface parking areas.

Consistent with SMC's commitment to sustainable building practices, the Proposed Project would institute an on site solid waste recycling program. As discussed in Section 2.0, Project Description, the Proposed Project's construction and demolition debris would be recycled to the maximum extent feasible. The City of Malibu's Construction and Demolition (C&D) Debris Recycling program requires projects to recycle or reuse a minimum 50% of the waste generated. Its purpose is to increase the diversion of C&D debris from disposal facilities and will assist the City in meeting the State's 50% waste reduction mandate (AB 939). For purposes of this analysis it is assumed that the Applicant will ensure all construction and demolition activities are compliant with the City's AB 939 goals. Thus, the Project would be consistent with Conservation Objective 5.1 (to achieve 50% reduction [citywide] in the amount of solid waste generated by the community and disposed of in landfills by the year 2000); Conservation Policy 5.1.1 (the City shall reduce solid waste); Conservation Policy 5.1.2 (the City shall encourage recycling).

4. CUMULATIVE IMPACTS

Although the Proposed Project is expected to emit GHGs, the emission of GHGs by a single project into the atmosphere is not itself necessarily an adverse environmental effect. Rather, it is the increased accumulation of GHG from more than one project and many sources in the atmosphere that may result in

global climate change. The resultant consequences of that climate change can cause adverse environmental effects. A project's GHG emissions typically would be relatively very small in comparison to State or global GHG emissions and, consequently, they would, in isolation, have no significant direct impact on climate change. The Proposed Project's GHG emissions would not be considered to be substantial when compared to California's statewide GHG emissions.

The State of California has mandated a goal of reducing statewide emissions to 1990 levels by 2020, even though statewide population and commerce is predicted to continue to expand. In order to achieve this goal, CARB is in the process of establishing and implementing regulations to reduce statewide GHG emissions. However, currently there are no significance thresholds, specific reduction targets, and no approved policy or guidance to assist in determining significance at the project or cumulative level. Additionally, there is currently no generally accepted methodology to determine whether GHG emissions associated with a specific project represents new emissions or existing, displaced emissions.

Moreover, a sizeable percentage of the operational GHG emissions conservatively associated with the proposed Project should not be considered new emissions attributable to the Project because the future students and users of the SMC Malibu Campus already generate emissions through their current activities. As discussed previously, the Project is consistent with the CalGreen Code. Furthermore, this document emphasizes improving energy conservation, energy efficiency, increasing renewable energy generation, and changing transportation and land use patterns to reduce automobile dependence. The Proposed Project incorporates measures that would advance these objectives and would not impede statewide measures that are not directly applicable to the Project.

Given the Project's consistency with State, regional, and City greenhouse gas emission reduction goals and objectives, its contribution to the cumulative impact of global climate change would be less than significant and would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs. Similarly, related projects would also be subject to these emissions reduction goals and objectives. Therefore, the potential impact on global warming resulting from implementation of the Proposed Project and related projects would not be cumulatively considerable.

5. MITIGATION MEASURES

No mitigation measures required.