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# **Nichols Ranch**

## **GREENHOUSE GAS ANALYSIS**

### **CITY OF LAKE ELSINORE**

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## **LIST OF ABBREVIATED TERMS**

(1)	Reference
APS	Alternative Planning Organizations
ARB	California Air Resources Board
CAA	Federal Clean Air Act
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resource Board
CAT	Climate Action Team
CBSC	California Building Standards Commission
CEC	California Energy Commission
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
CH <sub>4</sub>	Methane
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
CPUC	California Public Utilities Commission
EPA	Environmental Protection Agency
EPS	Emission Performance Standard
GCC	Global Climate Change
GHGA	Greenhouse Gas Analysis
GWP	Global Warming Potential
HFC	Hydrofluorocarbons
LCA	Life-Cycle Analysis
MMs	Mitigation Measures
MMTCO <sub>2</sub> e	Million Metric Ton of Carbon Dioxide Equivalent
MPOs	Metropolitan Planning Organizations
MTCO <sub>2</sub> e	Metric Ton of Carbon Dioxide Equivalent
N <sub>2</sub> O	Nitrogen Dioxide
NIOSH	National Institute for Occupational Safety and Health
NO <sub>x</sub>	Oxides of Nitrogen
PFC	Perfluorocarbons
PM <sub>10</sub>	Particulate Matter 10 microns in diameter or less

PM <sub>2.5</sub>	Particulate Matter 2.5 microns in diameter or less
PPM	Parts Per Million
Project	Nichols Ranch
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategies
UNFCCC	United Nations' Framework Convention on Climate Change
VOC	Volatile Organic Compounds

## EXECUTIVE SUMMARY

### ***GHG Impact #1: The Project would generate direct or indirect greenhouse gas emission that would result in a significant impact on the environment***

The Project will result in approximately 4,021.78 MTCO<sub>2</sub>e per year from construction, area, energy, waste, and water usage. In addition, the Project has the potential to result in an additional 9,136.27 MTCO<sub>2</sub>e per year from mobile sources if the assumption is made that all of the vehicle trips to and from the Project are “new” trips resulting from the development of the Project. As such, the Project has the potential to generate a total of approximately 13,158.05 MTCO<sub>2</sub>e per year as summarized on Table ES-1. Notwithstanding, an individual project cannot generate enough GHG emissions to influence global climate change. The project participates in this potential impact by its incremental contribution combined with the cumulative increase of all other sources of GHGs, which when taken together may have a significant impact on global climate change.

As substantiated herein, the proposed Project would be consistent with the CAP, would be in concert with AB 32 and international efforts to address global climate change, and would reflect specific local requirements that would substantially lessen cumulative GHG emissions impacts. The proposed Project would therefore also fulfill the description of mitigation found in *CEQA Guidelines* §15130(a)(3) and §15183.5. The Project’s incremental contribution to GHG emissions impacts would therefore not be cumulatively considerable.

**TABLE ES-1: TOTAL PROJECT 2030 GREENHOUSE GAS EMISSIONS (WITHOUT MITIGATION)**

Emission Source	Emissions (metric tons per year) CO <sub>2</sub> e
Annual construction-related emissions amortized over 30 years	128.92
Area	43.49
Energy	3,303.58
Mobile Sources	9,136.27
Waste	303.36
Water Usage	242.44
<b>Proposed Project Total Emissions</b>	<b>13,158.05</b>

Consistent with SB 32, the Project would be required to meet the reduction target of 40% below 1990 levels by 2030. It should be noted that consistency with the City’s CAP results in a 33% reduction below 1990 levels by 2030<sup>1</sup>. As such, in order to show consistency with SB 32, the Project would need to demonstrate a minimum of a 7% reduction through implementation of mitigations measures beyond what is required through the CAP.

<sup>1</sup> This is based on an assumption that the service population ratio for 2020 is equal to the City’s 1990 level of emissions (6.6 MTCO<sub>2</sub>e/yr/SP), and the 4.4 MTCO<sub>2</sub>e/yr/SP reduction specified by the CAP for 2030; this results in a 33% reduction below 1990 emission levels.

As shown on Table ES-2, the project's 2030 emissions would result in 11,156.33 MTCO<sub>2</sub>e per year after implementation of applicable mitigation measures, as shown in Section 1.3. This yields a reduction of approximately 15% which satisfies the additional 7% needed to meet the SB 32 reduction target, as shown in Table ES-3. Since the Project is consistent with the City's CAP and would demonstrate an additional 7% reduction through implementation of mitigation by 2030, the Project would be consistent with the statewide reduction targets for GHG emissions. As such, the Project would result in a less than significant direct or indirect GHG impact.

**TABLE ES-2: TOTAL PROJECT 2030 GREENHOUSE GAS EMISSIONS (WITH MITIGATION)**

Emission Source	Emissions (metric tons per year) CO <sub>2</sub> e
Annual construction-related emissions amortized over 30 years	128.92
Area	43.49
Energy	2,209.95
Mobile Sources	8,353.71
Waste	303.36
Water Usage	116.90
<b>Proposed Project Total Emissions</b>	<b>11,156.33</b>

**TABLE ES-3: 2030 GREENHOUSE GAS EMISSIONS (WITHOUT MITIGATION VS. WITH MITIGATION)**

Emission Source	Emissions (metric tons per year) CO <sub>2</sub> e	
	Without Mitigation	With Mitigation
<b>Total</b>	<b>13,158.05</b>	<b>11,156.33</b>
<b>Reduction</b>	<b>15.21%</b>	
<b>Project Minimum Improvement</b>	<b>7%</b>	
<b>Meets Requirement?</b>	<b>YES</b>	

***GHG Impact #2: The Project would conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.***

The Project would be consistent with and would not conflict with implementation of the goals and objectives established by Assembly Bill 32 (AB 32), Senate Bill 32 (SB 32) (or targets established by Executive Orders S-3-05 and B-30-15), and the City of Lake Elsinore Climate Action Plan (CAP) as evaluated in Section 3.6 of this report. As such, the Project would result in a less than significant impact with respect to this threshold.

## SUMMARY OF CEQA SIGNIFICANCE FINDINGS & MITIGATION MEASURES

The results of this Nichols Ranch Greenhouse Gas Analysis are summarized below based on the GHG Impact Criteria 1 and 2. Table ES-2 shows the findings of significance for potential greenhouse gas impacts under CEQA before and after any required mitigation measures described below.

**TABLE ES-2: SUMMARY OF CEQA SIGNIFICANCE FINDINGS**

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Direct GHG Emissions Impact (Criteria 1)	3.0	<i>Potentially Significant</i>	<i>Less Than Significant</i>
Consistency with Applicable Plan or Policies (Criteria 2)	3.0	<i>Potentially Significant</i>	<i>Less Than Significant</i>

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# 1 INTRODUCTION

This report presents the results of the greenhouse gas analysis (GHGA) prepared by Urban Crossroads, Inc., for the Nichols Ranch (referred to as “Project”). The purpose of this GHGA is to evaluate Project-related construction and operational emissions and determine the level of greenhouse gas (GHG) impacts as a result of constructing and operating the proposed Project. The proposed Nichols Ranch Project is located south of Nichols Road and east of Interstate 15 (I-15) in the City of Lake Elsinore, as shown on Exhibit 1-A.

## 1.1 PROJECT OVERVIEW

The proposed Project is located within the Alberhill Ranch Specific Plan and a portion (southern parcel) lies outside of the Specific Plan. For purposes of this air quality analysis it is anticipated that the Project will be evaluated in 3 phases, with Phase 1 having a projected Opening Year of 2020, Phase 2 having a project Opening Year of 2021, and Project Buildout anticipated to occur in 2024.

- Phase 1 (2020): 34 low-medium density residential dwelling units
- Phase 2 (2021): Phase 1 (2020) development plus 134 additional low-medium density residential dwelling units (buildout of residential) and an 8.3-acre park
- Phase 3 (2024): Phase 1 (2020) and Phase 2 (2021) development plus 6,000 square feet (sf) of fast-food restaurant with drive-through window use, 9,400 sf of high turnover (sit-down) restaurant use, 8,000 sf of health and fitness club use, 43,000 sf of office use, 5,500 sf of fast food without drive-through, a 16 vehicle fueling position gas station with convenience store and car wash, and 130 room hotel

## 1.2 REGULATORY REQUIREMENTS

The Project would be required to comply with all mandates imposed by the State of California and the South Coast Air Quality Management District aimed at the reduction of air quality emissions. Those that are applicable to the Project and that would assist in the reduction of greenhouse gas emissions are:

- Global Warming Solutions Act of 2006 (AB32) (1)
- Regional GHG Emissions Reduction Targets/Sustainable Communities Strategies (SB 375) (2)
- Pavley Fuel Efficiency Standards (AB1493). Establishes fuel efficiency ratings for new vehicles (3).
- Title 24 California Code of Regulations (California Building Code). Establishes energy efficiency requirements for new construction (4).
- Title 20 California Code of Regulations (Appliance Energy Efficiency Standards). Establishes energy efficiency requirements for appliances (5).
- Title 17 California Code of Regulations (Low Carbon Fuel Standard). Requires carbon content of fuel sold in California to be 10% less by 2020 (6).
- California Water Conservation in Landscaping Act of 2006 (AB1881). Requires local agencies to adopt the Department of Water Resources updated Water Efficient Landscape Ordinance or

EXHIBIT 1-A: LOCATION MAP



EXHIBIT 1-B: SITE PLAN



equivalent by January 1, 2010 to ensure efficient landscapes in new development and reduced water waste in existing landscapes (7).

- Statewide Retail Provider Emissions Performance Standards (SB 1368). Requires energy generators to achieve performance standards for GHG emissions (8).
- Renewable Portfolio Standards (SB 1078). Requires electric corporations to increase the amount of energy obtained from eligible renewable energy resources to 20 percent by 2010 and 33 percent by 2020 (9).
- Senate Bill 32 (SB 32). Requires the state to reduce statewide greenhouse gas emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15 (10).

Promulgated regulations that will affect the Project's emissions are accounted for in the Project's GHG calculations provided in this report. In particular, the Pavley Standards, Low Carbon Fuel Standards, and Renewable Portfolio Standards (RPS) will be in effect for the AB 32 target year of 2020, and therefore are accounted for in the Project's emission calculations.

### **1.3 APPLICABLE MITIGATION MEASURES**

#### **MM AQ-2**

##### *Lighting*

- Identify opportunities to provide natural lighting to reduce reliance on artificial lighting;
- Solar or light-emitting diodes (LEDs) lights shall be installed for outdoor lighting.

##### *Electric*

- Provide up to three charging stations for use by electric vehicles in non-residential areas;
- Prior to the issuance of building permits, the Project applicant shall ensure that the Project is designed to achieve efficiency exceeding current 2016 California Building Code Title 24 requirements by at least 15 percent for both residential and non-residential uses.

##### *Solar*

- Applicant must design and construct the roof of the buildings and structures to accommodate photovoltaic (PV) solar arrays taking into consideration limitations imposed by other rooftop equipment, roof warranties, building and fire code requirements, and other physical or legal limitations. The electrical system and infrastructure must be clearly labeled with noticeable and permanent signage which informs future tenant/purchasers of the existence of this infrastructure.

##### *Traffic*

- Regional vehicle miles traveled (VMT) and associated vehicular-source emissions are reduced by the following Project design features/attributes:
  - The suburban project will have at least three of the following on site and/or offsite within ¼-mile: Residential Development, Retail Development, Park, Open Space, or Office. The mixed-use development shall encourage walking and other non-automotive modes of transport from residential to office/commercial locations (and vice versa). The project shall minimize the need for external trips by including services/facilities for day care,

banking/ATM, restaurants, vehicle refueling, health care, personal services (e.g., salons, dry cleaning, etc.) and/or shopping;

- Pedestrian connections shall be constructed at selected roads within the Project, providing pedestrian access to the various uses and activity centers within the Project. Facilitating pedestrian access encourages people to walk instead of drive. The Project shall not impose barriers to pedestrian access and interconnectivity. Furthermore, the mix of uses within the Project acts to reduce travel distances and regional vehicle miles traveled (VMT) by consolidating trips and reducing requirements for multiple trips.

#### *Water*

- To reduce water demands and associated energy use, development proposals within the Project site shall be required to implement a Water Conservation Strategy and demonstrate a minimum 20% reduction in outdoor water usage when compared to baseline water demand (total expected water demand without implementation of the Water Conservation Strategy). Development proposals within the Project site will also be required to implement the following:
  - Landscaping palette emphasizing drought-tolerant plants consistent with provisions of the City of Lake Elsinore requirements;
  - Use of water-efficient irrigation techniques consistent with City of Lake Elsinore requirements.
- To reduce water consumption and the associated energy-usage, the Project will be designed to comply with the mandatory reductions in indoor water usage contained in the incumbent CalGreen Code (11) and any mandated reduction in outdoor water usage contained in the City's water efficient landscape requirements. Additionally, the Project shall implement the following:
  - U.S. EPA Certified WaterSense labeled or equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads;
  - Use energy star appliances (refrigerator, dish washer, and washing machine).

#### *Other*

- The Project is required to comply with SCAQMD Rule 445, which prohibits the use of wood burning stoves and fireplaces in new development.

## 2 CLIMATE CHANGE SETTING

### 2.1 INTRODUCTION TO GLOBAL CLIMATE CHANGE

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

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

### 2.2 GREENHOUSE GAS EMISSIONS INVENTORIES

#### *Global*

Worldwide anthropogenic (human) GHG emissions are tracked by the Intergovernmental Panel on Climate Change for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Human GHG emissions data for Annex I nations are available through 2016. For the Year 2016, the sum of these emissions totaled approximately 28,747,554 Gg CO<sub>2</sub>e<sup>2</sup> (12) (13). The GHG emissions in more recent years may differ from the inventories presented in Table 2-1; however, the data is representative of currently available inventory data.

2 The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2016 data, the UNFCCC data for the most recent year were used. United Nations Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF," The most recent GHG emissions for China were taken in 2012, while the most recent GHG emissions for India were taken in 2010.

### United States

As noted in Table 2-1, the United States, as a single country, was the number two producer of GHG emissions in 2016. The primary greenhouse gas emitted by human activities in the United States was CO<sub>2</sub>, representing approximately 81.6 percent of total greenhouse gas emissions. Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 93.5 percent of the GHG emissions (14).

**TABLE 2-1: TOP GHG PRODUCER COUNTRIES AND THE EUROPEAN UNION <sup>3</sup>**

Emitting Countries	GHG Emissions (Gg CO <sub>2</sub> e)
China	11,895,765
United States	6,511,302
European Union (28 member countries)	4,291,252
India	2,643,817
Russian Federation	2,100,850
Japan	1,304,568
<b>Total</b>	<b>28,747,554</b>

### State of California

CARB compiles GHG inventories for the State of California. Based upon the 2018 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2016 greenhouse gas emissions inventory, California emitted 429.4 MMTCO<sub>2</sub>e including emissions resulting from imported electrical power in 2015 (15).

## 2.3 GLOBAL CLIMATE CHANGE DEFINED

GCC refers to the change in average meteorological conditions on the earth with respect to temperature, wind patterns, precipitation and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO<sub>2</sub> (carbon dioxide), N<sub>2</sub>O (nitrous oxide), CH<sub>4</sub> (methane), hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the earth's atmosphere, but prevent radioactive heat from escaping, thus warming the earth's atmosphere. GCC can occur naturally as it has in the past with the previous ice ages.

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

Although California's rate of growth of greenhouse gas emissions is slowing, the state is still a

<sup>3</sup> Used <http://unfccc.int> data for Annex I countries. Consulted the CAIT Climate Data Explorer in <http://www.wri.org> site to reference Non-Annex I countries such as China and India.

substantial contributor to the U.S. emissions inventory total. In 2004, California is estimated to have produced 492 million gross metric tons of CO<sub>2</sub>e greenhouse gas emissions. Despite a population increase of 16 percent between 1990 and 2004, California has significantly slowed the rate of growth of greenhouse gas emissions due to the implementation of energy efficiency programs as well as adoption of strict emission controls (16).

## 2.4 GREENHOUSE GASES

For the purposes of this analysis, emissions of carbon dioxide, methane, and nitrous oxide were evaluated (see Table 3-4 later in this report) because these gasses are the primary contributors to GCC from development projects. Although there are other substances such as fluorinated gases that also contribute to GCC, these fluorinated gases were not evaluated as their sources are not well-defined and do not contain accepted emissions factors or methodology to accurately calculate these gases.

Water Vapor: Water vapor (H<sub>2</sub>O) is the most abundant, important, and variable greenhouse gas in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. A climate feedback is an indirect, or secondary, change, either positive or negative, that occurs within the climate system in response to a forcing mechanism. The feedback loop in which water is involved is critically important to projecting future climate change.

As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to 'hold' more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown as there are also dynamics that hold the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the earth's surface and heat it up).

There are no human health effects from water vapor itself; however, when some pollutants come in contact with water vapor, they can dissolve and the water vapor can then act as a pollutant-carrying agent. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include: evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.

Carbon Dioxide: Carbon dioxide (CO<sub>2</sub>) is an odorless and colorless GHG. Outdoor levels of carbon dioxide are not high enough to result in negative health effects. Carbon dioxide is emitted from natural and manmade sources. Natural sources include: the decomposition of dead organic

matter; respiration of bacteria, plants, animals and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include: the burning of coal, oil, natural gas, and wood. Carbon dioxide is naturally removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and chemical weathering of carbonate rocks (17).

Since the industrial revolution began in the mid-1700s, the sort of human activity that increases GHG emissions has increased dramatically in scale and distribution. Data from the past 50 years suggests a corollary increase in levels and concentrations. As an example, prior to the industrial revolution, CO<sub>2</sub> concentrations were fairly stable at 280 parts per million (ppm). Today, they are around 370 ppm, an increase of more than 30 percent. Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (18).

**Methane:** Methane (CH<sub>4</sub>) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10-12 years), compared to other GHGs. No health effects are known to occur from exposure to methane.

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

**Nitrous Oxide:** Nitrous oxide (N<sub>2</sub>O), also known as laughing gas, is a colorless greenhouse gas. Nitrous oxide can cause dizziness, euphoria, and sometimes slight hallucinations. In small doses, it is considered harmless. However, in some cases, heavy and extended use can cause Olney's Lesions (brain damage) (19).

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

**Chlorofluorocarbons:** Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C<sub>2</sub>H<sub>6</sub>) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs are no longer being used; therefore, it is not likely that health effects would be experienced. Nonetheless, in confined indoor locations, working with CFC-113 or other CFCs is thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.

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

Hydrofluorocarbons: Hydrofluorocarbons (HFCs) are synthetic, man-made chemicals that are used as a substitute for CFCs. Out of all the greenhouse gases, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 ( $\text{CHF}_3$ ), HFC-134a ( $\text{CF}_3\text{CH}_2\text{F}$ ), and HFC-152a ( $\text{CH}_3\text{CHF}_2$ ). Prior to 1990, the only significant emissions were of HFC-23. HFC-134a emissions are increasing due to its use as a refrigerant. The U.S. EPA estimates that concentrations of HFC-23 and HFC-134a are now about 10 parts per trillion (ppt) each; and that concentrations of HFC-152a are about 1 ppt (20). No health effects are known to result from exposure to HFCs, which are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons: Perfluorocarbons (PFCs) have stable molecular structures and do not break down through chemical processes in the lower atmosphere. High-energy ultraviolet rays, which occur about 60 kilometers above earth's surface, are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane ( $\text{CF}_4$ ) and hexafluoroethane ( $\text{C}_2\text{F}_6$ ). The U.S. EPA estimates that concentrations of  $\text{CF}_4$  in the atmosphere are over 70 ppt.

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

Sulfur Hexafluoride: Sulfur hexafluoride ( $\text{SF}_6$ ) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest global warming potential (GWP) of any gas evaluated (23,900). The U.S. EPA indicates that concentrations in the 1990s were about 4 ppt. In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

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

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

The atmospheric lifetime and GWP of selected greenhouse gases are summarized at Table 2-2. As shown in the table below, GWP for the Second Assessment Report (SAR), the Intergovernmental Panel on Climate Change (IPCC)'s scientific and socio-economic assessment on climate change, range from 1 for carbon dioxide to 23,900 for sulfur hexafluoride and GWP for the IPCC's 4<sup>th</sup> Assessment Report (AR4) range from 1 for carbon dioxide to 22,800 for sulfur hexafluoride.

**TABLE 2-2: GLOBAL WARMING POTENTIAL AND ATMOSPHERIC LIFETIME OF SELECT GHGS**

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)	
		Second Assessment Report (SAR)	4 <sup>th</sup> Assessment Report (AR4)
Carbon Dioxide	50-200	1	1
Methane	12 ± 3	21	25
Nitrous Oxide	114	310	298
HFC-23	270	11,700	14,800
HFC-134a	14	1,300	1,430
HFC-152a	1.4	140	124
Sulfur Hexafluoride (SF <sub>6</sub> )	3,200	23,900	22,800

Source: Table 2.14 of the IPCC Fourth Assessment Report, 2007

## 2.5 EFFECTS OF CLIMATE CHANGE IN CALIFORNIA

### *Public Health*

Higher temperatures may increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation could increase from 25 to 35 percent under the lower warming range (3-5.5°F) to 75 to 85 percent under the medium warming range (5.5-8°F). In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances, depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55 percent more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming range scenario (8-10.5°F), there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures could increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

### *Water Resources*

A vast network of man-made reservoirs and aqueducts captures and transports water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

If temperatures continue to increase, more precipitation could fall as rain instead of snow, and the snow that does fall could melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. Under the lower warming range scenario, snowpack losses could be only half as large as those possible if temperatures were to rise to the higher warming range. How much snowpack could be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snowpack could pose challenges to water managers and hamper hydropower generation. It could also adversely affect winter tourism. Under the lower warming range, the ski season at lower elevations could be reduced by as much as a month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding.

The State's water supplies are also at risk from rising sea levels. An influx of saltwater could degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern end of the Sacramento/San Joaquin River Delta – a major fresh water supply.

### *Agriculture*

Increased temperatures could cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. First, California farmers could possibly lose as much as 25 percent of the water supply they need. Although higher CO<sub>2</sub> levels can stimulate plant production and increase plant water-use efficiency, California's farmers could face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development could change, as could the intensity and frequency of pest and disease outbreaks. Rising temperatures could aggravate O<sub>3</sub> pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures could worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts.

In addition, continued global climate change could shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion could occur in many species while range contractions may be less likely in rapidly evolving species with significant populations already established. Should range contractions occur, new or different weed species could fill the emerging gaps. Continued global climate change could alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

### *Forests and Landscapes*

Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could

increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. In contrast, wildfires in northern California could increase by up to 90 percent due to decreased precipitation.

Moreover, continued global climate change has the potential to alter natural ecosystems and biological diversity within the state. For example, alpine and subalpine ecosystems could decline by as much as 60 to 80 percent by the end of the century as a result of increasing temperatures. The productivity of the state's forests has the potential to decrease as a result of global climate change.

### *Rising Sea Levels*

Rising sea levels, more intense coastal storms, and warmer water temperatures could increasingly threaten the state's coastal regions. Under the higher warming range scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate low-lying coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats. Under the lower warming range scenario, sea level could rise 12-14 inches.

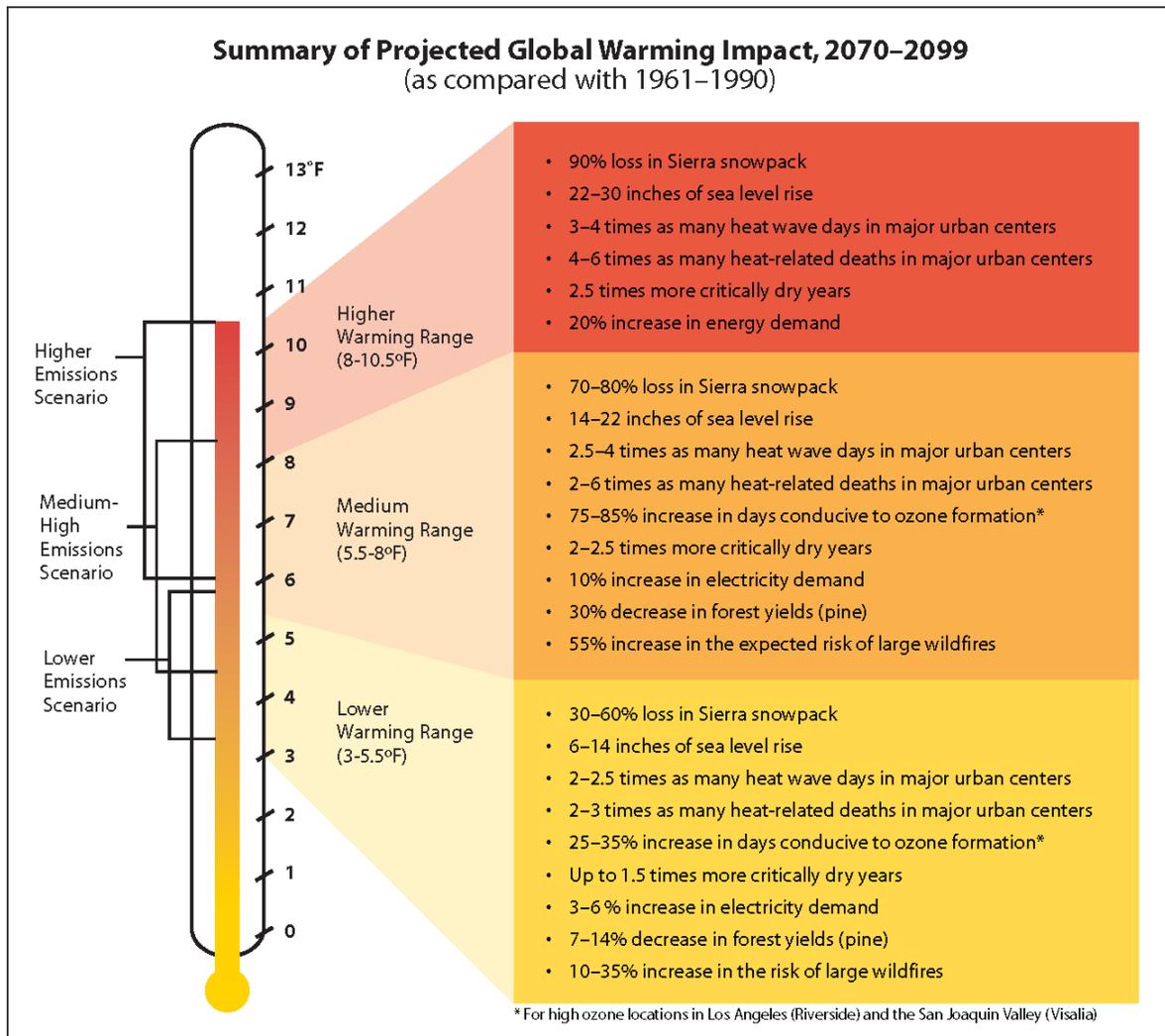
## **2.6 HUMAN HEALTH EFFECTS**

The potential health effects related directly to the emissions of carbon dioxide, methane, and nitrous oxide as they relate to development projects such as the proposed Project are still being debated in the scientific community. Their cumulative effects to global climate change have the potential to cause adverse effects to human health. Increases in Earth's ambient temperatures would result in more intense heat waves, causing more heat-related deaths. Scientists also purport that higher ambient temperatures would increase disease survival rates and result in more widespread disease. Climate change will likely cause shifts in weather patterns, potentially resulting in devastating droughts and food shortages in some areas (21). Exhibit 2-A presents the potential impacts of global warming.

Specific health effects associated with directly emitted GHG emissions are as follows:

Water Vapor: There are no known direct health effects related to water vapor at this time. It should be noted however that when some pollutants react with water vapor, the reaction forms a transport mechanism for some of these pollutants to enter the human body through water vapor.

## EXHIBIT 2-A: SUMMARY OF PROJECTED GLOBAL WARMING IMPACT



**Carbon Dioxide:** According to the National Institute for Occupational Safety and Health (NIOSH) high concentrations of carbon dioxide can result in health effects such as: headaches, dizziness, restlessness, difficulty breathing, sweating, increased heart rate, increased cardiac output, increased blood pressure, coma, asphyxia, and/or convulsions. It should be noted that current concentrations of carbon dioxide in the earth's atmosphere are estimated to be approximately 370 parts per million (ppm), the actual reference exposure level (level at which adverse health effects typically occur) is at exposure levels of 5,000 ppm averaged over 10 hours in a 40-hour workweek and short-term reference exposure levels of 30,000 ppm averaged over a 15 minute period (22).

**Methane:** Methane is extremely reactive with oxidizers, halogens, and other halogen-containing compounds. Methane is also an asphyxiant and may displace oxygen in an enclosed space (23).

**Nitrous Oxide:** Nitrous Oxide is often referred to as laughing gas; it is a colorless greenhouse gas. The health effects associated with exposure to elevated concentrations of nitrous oxide include

dizziness, euphoria, slight hallucinations, and in extreme cases of elevated concentrations nitrous oxide can also cause brain damage (23).

**Fluorinated Gases:** High concentrations of fluorinated gases can also result in adverse health effects such as asphyxiation, dizziness, headache, cardiovascular disease, cardiac disorders, and in extreme cases, increased mortality (22).

**Aerosols:** The health effects of aerosols are similar to that of other fine particulate matter. Thus, aerosols can cause elevated respiratory and cardiovascular diseases as well as increased mortality (24).

## 2.7 REGULATORY SETTING

### INTERNATIONAL

Climate change is a global issue involving GHG emissions from all around the world; therefore, countries such as the ones discussed below have made an effort to reduce GHGs.

**Intergovernmental Panel on Climate Change.** In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess the scientific, technical and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

**United Nations Framework Convention on Climate Change (Convention).** On March 21, 1994, the U.S. joined a number of countries around the world in signing the Convention. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

**International Climate Change Treaties.** The Kyoto Protocol is an international agreement linked to the Convention. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions at an average of five percent against 1990 levels over the five-year period 2008–2012. The Convention (as discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of “common but differentiated responsibilities.”

In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2°C above pre-industrial levels, subject to a review in 2015. The UN Climate Change Committee held additional meetings in Durban, South Africa in

November 2011; Doha, Qatar in November 2012; and Warsaw, Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

On September 23, 2014 more than 100 Heads of State and Government and leaders from the private sector and civil society met at the Climate Summit in New York hosted by the United Nations. At the Summit, heads of government, business and civil society announced actions in areas that would have the greatest impact on reducing emissions, including climate finance, energy, transport, industry, agriculture, cities, forests, and building resilience.

Parties to the U.N. Framework Convention on Climate Change (UNFCCC) reached a landmark agreement on December 12, 2015 in Paris, charting a fundamentally new course in the two-decade-old global climate effort. Culminating a four-year negotiating round, the new treaty ends the strict differentiation between developed and developing countries that characterized earlier efforts, replacing it with a common framework that commits all countries to put forward their best efforts and to strengthen them in the years ahead. This includes, for the first time, requirements that all parties report regularly on their emissions and implementation efforts, and undergo international review.

The agreement and a companion decision by parties were the key outcomes of the conference, known as the 21st session of the UNFCCC Conference of the Parties, or COP 21. Together, the Paris Agreement and the accompanying COP decision:

- Reaffirm the goal of limiting global temperature increase well below 2 degrees Celsius, while urging efforts to limit the increase to 1.5 degrees;
- Establish binding commitments by all parties to make “nationally determined contributions” (NDCs), and to pursue domestic measures aimed at achieving them;
- Commit all countries to report regularly on their emissions and “progress made in implementing and achieving” their NDCs, and to undergo international review;
- Commit all countries to submit new NDCs every five years, with the clear expectation that they will “represent a progression” beyond previous ones;
- Reaffirm the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the first time encouraging voluntary contributions by developing countries too;
- Extend the current goal of mobilizing \$100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025;
- Extend a mechanism to address “loss and damage” resulting from climate change, which explicitly will not “involve or provide a basis for any liability or compensation;”
- Require parties engaging in international emissions trading to avoid “double counting;” and
- Call for a new mechanism, similar to the Clean Development Mechanism under the Kyoto Protocol, enabling emission reductions in one country to be counted toward another country’s NDC (C2ES 2015a) (25).

## NATIONAL

Prior to the last decade, there have been no concrete federal regulations of GHGs or major planning for climate change adaptation. The following are actions regarding the federal government, GHGs, and fuel efficiency.

**GHG Endangerment.** In *Massachusetts v. Environmental Protection Agency* 549 U.S. 497 (2007), decided on April 2, 2007, the Supreme Court found that four GHGs, including carbon dioxide, are air pollutants subject to regulation under Section 202(a)(1) of the Clean Air Act. The Court held that the EPA Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing GHG emissions standards for vehicles, as discussed in the section “Clean Vehicles” below. After a lengthy legal challenge, the U.S. Supreme Court declined to review an Appeals Court ruling that upheld the EPA Administrator’s findings (26).

**Clean Vehicles.** Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the U.S. On April 1, 2010, the EPA and the Department of Transportation’s National Highway Safety Administration announced a joint final rule establishing a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the U.S.

The first phase of the national program applies to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this carbon dioxide level solely through fuel economy improvements. Together, these standards would cut carbon dioxide emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The EPA and the National Highway Safety Administration issued final rules on a second-phase joint rulemaking establishing national standards for light-duty vehicles for model years 2017 through 2025 in August 2012 (EPA 2012c). The new standards for model years 2017 through 2025 apply to

passenger cars, light-duty trucks, and medium duty passenger vehicles. The final standards are projected to result in an average industry fleetwide level of 163 grams/mile of carbon dioxide (CO<sub>2</sub>) in model year 2025, which is equivalent to 54.5 miles per gallon (mpg) if achieved exclusively through fuel economy improvements.

The EPA and the U.S. Department of Transportation issued final rules for the first national standards to reduce GHG emissions and improve fuel efficiency of heavy-duty trucks and buses on September 15, 2011, effective November 14, 2011. For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20 percent reduction in carbon dioxide emissions and fuel consumption by the 2018 model year. For heavy-duty pickup trucks and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10-percent reduction for gasoline vehicles and a 15 percent reduction for diesel vehicles by the 2018 model year (12 and 17 percent respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles, the engine and vehicle standards would achieve up to a 10 percent reduction in fuel consumption and carbon dioxide emissions from the 2014 to 2018 model years.

**Mandatory Reporting of GHGs.** The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory GHG reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of GHGs Rule, which became effective January 1, 2010. The rule requires reporting of GHG emissions from large sources and suppliers in the U.S., and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the EPA.

**New Source Review.** The EPA issued a final rule on May 13, 2010, that establishes thresholds for GHGs that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule “tailors” the requirements of these Clean Air Act permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. In the preamble to the revisions to the Federal Code of Regulations, the EPA states:

This rulemaking is necessary because without it the Prevention of Significant Deterioration and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the Clean Air Act, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to GHG sources, starting with the largest GHG emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources, but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for GHG emissions until at least April 30, 2016.

The EPA estimates that facilities responsible for nearly 70 percent of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities.

**Standards of Performance for GHG Emissions for New Stationary Sources: Electric Utility Generating Units.** As required by a settlement agreement, the EPA proposed new performance standards for emissions of carbon dioxide for new, affected, fossil fuel-fired electric utility generating units on March 27, 2012. New sources greater than 25 megawatts would be required to meet an output based standard of 1,000 pounds of carbon dioxide per megawatt-hour, based on the performance of widely used natural gas combined cycle technology. It should be noted that on February 9, 2016 the U.S. Supreme Court issued a stay of this regulation pending litigation. Additionally, the current EPA Administrator has also signed a measure to repeal the Clean Power Plan, including the CO<sub>2</sub> standards.

**Cap and Trade.** Cap and trade refers to a policy tool where emissions are limited to a certain amount and can be traded, or provides flexibility on how the emitter can comply. Successful examples in the U.S. include the Acid Rain Program and the NO<sub>x</sub> Budget Trading Program and Clean Air Interstate Rule in the northeast. There is no federal GHG cap and trade program currently; however, some states have joined to create initiatives to provide a mechanism for cap and trade.

The Regional GHG Initiative is an effort to reduce GHGs among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. Each state caps carbon dioxide emissions from power plants, auctions carbon dioxide emission allowances, and invests the proceeds in strategic energy programs that further reduce emissions, save consumers money, create jobs, and build a clean energy economy. The Initiative began in 2008.

The Western Climate Initiative partner jurisdictions have developed a comprehensive initiative to reduce regional GHG emissions to 15 percent below 2005 levels by 2020. The partners were originally California, British Columbia, Manitoba, Ontario, and Quebec. However, Manitoba and Ontario are not currently participating. California linked with Quebec's cap and trade system January 1, 2014, and joint offset auctions took place in 2015 (C2ES 2015).

**SmartWay Program.** The SmartWay Program is a public-private initiative between the EPA, large and small trucking companies, rail carriers, logistics companies, commercial manufacturers, retailers, and other federal and state agencies. Its purpose is to improve fuel efficiency and the environmental performance (reduction of both GHG emissions and air pollution) of the goods movement supply chains. SmartWay is comprised of four components (EPA 2014):

1. SmartWay Transport Partnership: A partnership in which freight carriers and shippers commit to benchmark operations, track fuel consumption, and improve performance annually.
2. SmartWay Technology Program: A testing, verification, and designation program to help freight companies identify equipment, technologies, and strategies that save fuel and lower emissions.
3. SmartWay Vehicles: A program that ranks light-duty cars and small trucks and identifies superior environmental performers with the SmartWay logo.

4. SmartWay International Interests: Guidance and resources for countries seeking to develop freight sustainability programs modeled after SmartWay.

SmartWay effectively refers to requirements geared towards reducing fuel consumption. Most large trucking fleets driving newer vehicles are compliant with SmartWay design requirements. Moreover, over time, all heavy-duty trucks will have to comply with the ARB GHG Regulation that is designed with the SmartWay Program in mind, to reduce GHG emissions by making them more fuel-efficient. For instance, in 2015, 53 foot or longer dry vans or refrigerated trailers equipped with a combination of SmartWay-verified low-rolling resistance tires and SmartWay-verified aerodynamic devices would obtain a total of 10 percent or more fuel savings over traditional trailers.

Through the SmartWay Technology Program, the EPA has evaluated the fuel saving benefits of various devices through grants, cooperative agreements, emissions and fuel economy testing, demonstration projects and technical literature review. As a result, the EPA has determined the following types of technologies provide fuel saving and/or emission reducing benefits when used properly in their designed applications, and has verified certain products:

- Idle reduction technologies – less idling of the engine when it is not needed would reduce fuel consumption.
- Aerodynamic technologies minimize drag and improve airflow over the entire tractor-trailer vehicle. Aerodynamic technologies include gap fairings that reduce turbulence between the tractor and trailer, side skirts that minimize wind under the trailer, and rear fairings that reduce turbulence and pressure drop at the rear of the trailer.
- Low rolling resistance tires can roll longer without slowing down, thereby reducing the amount of fuel used. Rolling resistance (or rolling friction or rolling drag) is the force resisting the motion when a tire rolls on a surface. The wheel will eventually slow down because of this resistance.
- Retrofit technologies include things such as diesel particulate filters, emissions upgrades (to a higher tier), etc., which would reduce emissions.
- Federal excise tax exemptions.

## CALIFORNIA

### Legislative Actions to Reduce GHGs

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce GHGs of any state in the nation. Some legislation such as the landmark Assembly Bill (AB 32) California Global Warming Solutions Act of 2006 was specifically enacted to address GHG emissions. Other legislation such as Title 24 and Title 20 energy standards were originally adopted for other purposes such as energy and water conservation, but also provide GHG reductions. This section describes the major provisions of the legislation.

**AB 32.** The California State Legislature enacted AB 32, which requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. “GHGs” as defined under AB 32 include carbon dioxide, methane, N<sub>2</sub>O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list

of GHGs. The California Air Resources Board (ARB) is the state agency charged with monitoring and regulating sources of GHGs. AB 32 states the following:

Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

ARB approved the 1990 GHG emissions level of 427 MMTCO<sub>2</sub>e on December 6, 2007 (ARB 2007). Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 MMTCO<sub>2</sub>e. Emissions in 2020 in a “business as usual” (BAU) scenario were estimated to be 596 MMTCO<sub>2</sub>e, which do not account for reductions from AB 32 regulations (ARB 2008). At that level, a 28.4 percent reduction was required to achieve the 427 million MTCO<sub>2</sub>e 1990 inventory. In October 2010, ARB prepared an updated 2020 forecast to account for the recession and slower forecasted growth. The forecasted inventory without the benefits of adopted regulation is now estimated at 545 million MTCO<sub>2</sub>e. Therefore, under the updated forecast, a 21.7 percent reduction from BAU is required to achieve 1990 levels (ARB 2010).

#### **PROGRESS IN ACHIEVING AB 32 TARGETS AND REMAINING REDUCTIONS REQUIRED**

The State has made steady progress in implementing AB 32 and achieving targets included in Executive Order S-3-05. The progress is shown in updated emission inventories prepared by ARB for 2000 through 2012 (ARB 2014a). The State has achieved the Executive Order S-3-05 target for 2010 of reducing GHG emissions to 2000 levels. As shown below, the 2010 emission inventory achieved this target.

- 1990: 427 million MTCO<sub>2</sub>e (AB 32 2020 target)
- 2000: 463 million MTCO<sub>2</sub>e (an average 8 percent reduction needed to achieve 1990 base)
- 2010: 450 million MTCO<sub>2</sub>e (an average 5 percent reduction needed to achieve 1990 base)

ARB has also made substantial progress in achieving its goal of achieving 1990 emissions levels by 2020. As described earlier in this section, ARB revised the 2020 BAU inventory forecast to account for new lower growth projections, which resulted in a new lower reduction from BAU to achieve the 1990 base. The previous reduction from 2020 BAU needed to achieve 1990 levels was 28.4 percent and the latest reduction from 2020 BAU is 21.7 percent.

- 2020: 545 million MTCO<sub>2</sub>e BAU (an average 21.7 percent reduction from BAU needed to achieve 1990 base)

**ARB Scoping Plan.** ARB’s Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State’s emissions to 1990 levels by the year 2020 to comply with AB 32 (ARB 2008). The Scoping Plan identifies recommended measures for multiple GHG emission sectors and the associated emission reductions needed to achieve the year 2020 emissions

target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 GHG target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California’s clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State’s long-term commitment to AB 32 implementation.

The ARB approved the First Update to the Scoping Plan (Update) on May 22, 2014. The Update identifies the next steps for California’s climate change strategy. The Update shows how California continues on its path to meet the near-term 2020 GHG limit, but also sets a path toward long-term, deep GHG emission reductions. The report establishes a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. The Update identifies progress made to meet the near-term objectives of AB 32 and defines California’s climate change priorities and activities Climate for the next several years. The Update does not set new targets for the State, but describes a path that would achieve the long term 2050 goal of Executive Order S-05-03 for emissions to decline to 80 percent below 1990 levels by 2050 (ARB 2014).

Forecasting the amount of emissions that would occur in 2020 if no actions are taken was necessary to assess the amount of reductions California must achieve to return to the 1990 emissions level by 2020 as required by AB 32. The no-action scenario is known as “business-as-usual” or BAU. The ARB originally defined the BAU scenario as emissions in the absence of any GHG emission reduction measures discussed in the Scoping Plan.

As part of CEQA compliance for the Scoping Plan, ARB prepared a Supplemental Functional Equivalent Document (FED) in 2011. The FED included an updated 2020 BAU emissions inventory projection based on current economic forecasts (i.e., as influenced by the economic downturn) and emission reduction measures already in place, replacing its prior 2020 BAU emissions inventory. ARB staff derived the updated emissions estimates by projecting emissions growth, by sector, from the state’s average emissions from 2006–2008. The new BAU estimate includes emission reductions for the million-solar-roofs program, the AB 1493 (Pavley I) motor vehicle GHG emission standards, and the Low Carbon Fuels Standard. In addition, ARB factored into the 2020 BAU inventory emissions reductions associated with 33 percent Renewable Energy Portfolio Standard (RPS) for electricity generation. The updated BAU estimate of 507 MMTCO<sub>2e</sub> by 2020

requires a reduction of 80 MMTCO<sub>2</sub>e, or a 16 percent reduction below the estimated BAU levels to return to 1990 levels (i.e., 427 MMTCO<sub>2</sub>e) by 2020.

In order to provide a BAU reduction that is consistent with the original definition in the Scoping Plan and with threshold definitions used in thresholds adopted by lead agencies for CEQA purposes and many climate action plans, the updated inventory without regulations was also included in the Supplemental FED. The ARB 2020 BAU projection for GHG emissions in California was originally estimated to be 596 MMTCO<sub>2</sub>e. The updated ARB 2020 BAU projection in the Supplemental FED is 545 MMTCO<sub>2</sub>e. Considering the updated BAU estimate of 545 MMTCO<sub>2</sub>e by 2020, ARB estimates a 21.7 percent reduction below the estimated statewide BAU levels is necessary to return to 1990 emission levels (i.e., 427 MMTCO<sub>2</sub>e) by 2020, instead of the approximate 28.4 percent BAU reduction previously reported under the original Climate Change Scoping Plan (2008).

### 2017 Climate Change Scoping Plan Update

In November 2017, ARB released the final 2017 Scoping Plan Update, which identifies the State's post-2020 reduction strategy. The 2017 Scoping Plan Update reflects the 2030 target of a 40 percent reduction below 1990 levels, set by Executive Order B-30-15 and codified by Senate Bill 32 (SB 32). Key programs that the proposed Second Update builds upon include the Cap-and-Trade Regulation, the Low Carbon Fuel Standard, and much cleaner cars, trucks and freight movement, utilizing cleaner, renewable energy, and strategies to reduce methane emissions from agricultural and other wastes.

The 2017 Scoping Plan establishes a new emissions limit of 260 MMTCO<sub>2</sub>e for the year 2030, which corresponds to a 40 percent decrease in 1990 levels by 2030.

California's climate strategy will require contributions from all sectors of the economy, including the land base, and will include enhanced focus on zero- and near-zero-emission (ZE/NZE) vehicle technologies; continued investment in renewables, including solar roofs, wind, and other distributed generation; greater use of low carbon fuels; integrated land conservation and development strategies; coordinated efforts to reduce emissions of short-lived climate pollutants (methane, black carbon, and fluorinated gases); and an increased focus on integrated land use planning to support livable, transit-connected communities and conservation of agricultural and other lands. Requirements for direct GHG reductions at refineries will further support air quality co-benefits in neighborhoods, including in disadvantaged communities historically located adjacent to these large stationary sources, as well as efforts with California's local air pollution control and air quality management districts (air districts) to tighten emission limits on a broad spectrum of industrial sources. Major elements of the 2017 Scoping Plan framework include:

- Implementing and/or increasing the standards of the Mobile Source Strategy, which include increasing ZEV buses and trucks.
- Low Carbon Fuel Standard (LCFS), with an increased stringency (18 percent by 2030).
- Implementing SB 350, which expands the Renewables Portfolio Standard (RPS) to 50 percent RPS and doubles energy efficiency savings by 2030.

- California Sustainable Freight Action Plan, which improves freight system efficiency, utilizes near-zero emissions technology, and deployment of ZEV trucks.
- Implementing the proposed Short-Lived Climate Pollutant Strategy (SLPS), which focuses on reducing methane and hydrofluorocarbon emissions by 40 percent and anthropogenic black carbon emissions by 50 percent by year 2030.
- Continued implementation of SB 375.
- Post-2020 Cap-and-Trade Program that includes declining caps.
- 20 percent reduction in GHG emissions from refineries by 2030.
- Development of a Natural and Working Lands Action Plan to secure California’s land base as a net carbon sink.

In addition to the statewide strategies listed above, the 2017 Scoping Plan also identifies local governments as essential partners in achieving the State’s long-term GHG reduction goals and identifies local actions to reduce GHG emissions. As part of the recommended actions, CARB recommends that local governments achieve a community-wide goal to achieve emissions of no more than 6 MTCO<sub>2e</sub> or less per capita by 2030 and 2 MTCO<sub>2e</sub> or less per capita by 2050. For CEQA projects, CARB states that lead agencies may develop evidenced-based bright-line numeric thresholds—consistent with the Scoping Plan and the State’s long-term GHG goals—and projects with emissions over that amount may be required to incorporate on-site design features and mitigation measures that avoid or minimize project emissions to the degree feasible; or, a performance-based metric using a climate action plan or other plan to reduce GHG emissions is appropriate.

According to research conducted by the Lawrence Berkeley National Laboratory and supported by ARB, California, under its existing and proposed GHG reduction policies, is on track to meet the 2020 reduction targets under AB 32 and could achieve the 2030 goals under SB 32. The research utilized a new, validated model known as the California LBNL GHG Analysis of Policies Spreadsheet (CALGAPS), which simulates GHG and criteria pollutant emissions in California from 2010 to 2050 in accordance to existing and future GHG-reducing policies. The CALGAPS model showed that GHG emissions through 2020 could range from 317 to 415 MTCO<sub>2e</sub> per year, “indicating that existing state policies will likely allow California to meet its target [of 2020 levels under AB 32].” CALGAPS also showed that by 2030, emissions could range from 211 to 428 MTCO<sub>2e</sub> per year, indicating that “even if all modeled policies are not implemented, reductions could be sufficient to reduce emissions 40 percent below the 1990 level [of SB 32].” CALGAPS analyzed emissions through 2050 even though it did not generally account for policies that might be put in place after 2030. Though the research indicated that the emissions would not meet the State’s 80 percent reduction goal by 2050, various combinations of policies could allow California’s cumulative emissions to remain very low through 2050 (27) (28).

**Senate Bill 32.** On September 8, 2016, Governor Jerry Brown signed the Senate Bill (SB) 32 and its companion bill, Assembly Bill (AB) 197. SB 32 requires the state to reduce statewide GHG emissions to 40 percent below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal of 1990 levels by 2020 and provides an intermediate goal to achieving S-3-05, which sets a statewide GHG reduction

target of 80 percent below 1990 levels by 2050. AB 197 creates a legislative committee to oversee regulators to ensure that ARB is not only respond to the Governor, but also the Legislature (10) (29).

**Cap and Trade Program.** The Scoping Plan identifies a Cap-and-Trade Program as one of the key strategies for California to reduce GHG emissions. According to ARB, a cap-and-trade program will help put California on the path to meet its goal of reducing GHG emissions to 1990 levels by the year 2020 and ultimately achieving an 80 percent reduction from 1990 levels by 2050. Under cap-and-trade, an overall limit on GHG emissions from capped sectors is established, and facilities subject to the cap will be able to trade permits to emit GHGs within the overall limit.

ARB adopted a California Cap-and-Trade Program pursuant to its authority under AB 32. See 17 California Code of Regulations (CCR) §§ 95800 to 96023. The Cap-and-Trade Program is designed to reduce GHG emissions from major sources (deemed “covered entities”) by setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve AB 32’s emission-reduction mandate of returning to 1990 levels of emissions by 2020. The statewide cap for GHG emissions from the capped sectors (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and will decline over time, achieving GHG emission reductions throughout the program’s duration.

Covered entities that emit more than 25,000 MTCO<sub>2e</sub> per year must comply with the Cap-and-Trade Program. Triggering of the 25,000 MTCO<sub>2e</sub> per year “inclusion threshold” is measured against a subset of emissions reported and verified under the California Regulation for the Mandatory Reporting of GHG Emissions (Mandatory Reporting Rule or “MRR”).

Under the Cap-and-Trade Program, ARB issues allowances equal to the total amount of allowable emissions over a given compliance period and distributes these to regulated entities. Covered entities are allocated free allowances in whole or part (if eligible), and may buy allowances at auction, purchase allowances from others, or purchase offset credits. Each covered entity with a compliance obligation is required to surrender “compliance instruments” (30) for each MTCO<sub>2e</sub> of GHG they emit. There also are requirements to surrender compliance instruments covering 30 percent of the prior year’s compliance obligation by November of each year. For example, in November 2014, a covered entity was required to submit compliance instruments to cover 30 percent of its 2013 GHG emissions.

The Cap-and-Trade Program provides a firm cap, ensuring that the 2020 statewide emission limit will not be exceeded. An inherent feature of the Cap-and-Trade program is that it does not guarantee GHG emissions reductions in any discrete location or by any particular source. Rather, GHG emissions reductions are only guaranteed on an accumulative basis. As summarized by ARB in the First Update:

The Cap-and-Trade Regulation gives companies the flexibility to trade allowances with others or take steps to cost-effectively reduce emissions at their own facilities. Companies that emit more have to turn in more allowances or other compliance instruments. Companies that can cut their GHG emissions have to turn in fewer allowances. But as the cap declines, aggregate emissions must be

reduced. In other words, a covered entity theoretically could increase its GHG emissions every year and still comply with the Cap-and-Trade Program if there is a reduction in GHG emissions from other covered entities. Such a focus on aggregate GHG emissions is considered appropriate because climate change is a global phenomenon, and the effects of GHG emissions are considered cumulative (ARB 2014).

The Cap-and-Trade Program works with other direct regulatory measures and provides an economic incentive to reduce emissions. If California's direct regulatory measures reduce GHG emissions more than expected, then the Cap-and-Trade Program will be responsible for relatively fewer emissions reductions. If California's direct regulatory measures reduce GHG emissions less than expected, then the Cap-and-Trade Program will be responsible for relatively more emissions reductions. Thus, the Cap-and-Trade Program assures that California will meet its 2020 GHG emissions reduction mandate:

The Cap-and-Trade Program establishes an overall limit on GHG emissions from most of the California economy—the “capped sectors.” Within the capped sectors, some of the reductions are being accomplished through direct regulations, such as improved building and appliance efficiency standards, the [Low Carbon Fuel Standard] LCFS, and the 33 percent [Renewables Portfolio Standard] RPS. Whatever additional reductions are needed to bring emissions within the cap is accomplished through price incentives posed by emissions allowance prices. Together, direct regulation and price incentives assure that emissions are brought down cost-effectively to the level of the overall cap. The Cap-and-Trade Regulation provides assurance that California's 2020 limit will be met because the regulation sets a firm limit on 85 percent of California's GHG emissions. In sum, the Cap-and-Trade Program will achieve aggregate, rather than site specific or project-level, GHG emissions reductions. Also, due to the regulatory architecture adopted by ARB in AB 32, the reductions attributed to the Cap-and-Trade Program can change over time depending on the State's emissions forecasts and the effectiveness of direct regulatory measures (ARB 2014).

As of January 1, 2015, the Cap-and-Trade Program covered approximately 85 percent of California's GHG emissions. The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. Accordingly, GHG emissions associated with CEQA projects' electricity usage are covered by the Cap-and-Trade Program.

The Cap-and-Trade Program also covers fuel suppliers (natural gas and propane fuel providers and transportation fuel providers) to address emissions from such fuels and from combustion of other fossil fuels not directly covered at large sources in the Program's first compliance period. While the Cap-and-Trade Program technically covered fuel suppliers as early as 2012, they did not have a compliance obligation (i.e., they were not fully regulated) until 2015. The Cap-and-Trade Program covers the GHG emissions associated with the combustion of transportation fuels in California, whether refined in-state or imported. The point of regulation for transportation fuels is when they are “supplied” (i.e., delivered into commerce). Accordingly, as with stationary

source GHG emissions and GHG emissions attributable to electricity use, virtually all, if not all, of GHG emissions from CEQA projects associated with vehicle-miles traveled (VMT) are covered by the Cap-and-Trade Program (ARB 2015) (30).

In addition, the Scoping Plan differentiates between “capped” and “uncapped” strategies. “Capped” strategies are subject to the proposed cap-and-trade program. The Scoping Plan states that the inclusion of these emissions within the Program will help ensure that the year 2020 emission targets are met despite some degree of uncertainty in the emission reduction estimates for any individual measure. Implementation of the capped strategies is calculated to achieve a sufficient amount of reductions by 2020 to achieve the emission target contained in AB 32. “Uncapped” strategies that will not be subject to the cap-and-trade emissions caps and requirements are provided as a margin of safety by accounting for additional GHG emission reductions.<sup>4</sup>

**SB 375 - the Sustainable Communities and Climate Protection Act of 2008.** Passing the Senate on August 30, 2008, Senate Bill (SB) 375 was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions, which emits over 40 percent of the total GHG emissions in California. SB 375 states, “Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32.” SB 375 does the following: it (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28, states that CEQA findings for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts, or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network, if the project:

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the ARB accepts as achieving the GHG emission reduction targets.
2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies).
3. Incorporates the mitigation measures required by an applicable prior environmental document.

**AB 1493 Pavley Regulations and Fuel Efficiency Standards.** California AB 1493, enacted on July 22, 2002, required ARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA’s denial of an implementation waiver. The EPA subsequently granted

<sup>4</sup> On March 17, 2011, the San Francisco Superior Court issued a final decision in *Association of Irrigated Residents v. California Air Resources Board* (Case No. CPF-09-509562). While the Court upheld the validity of the ARB Scoping Plan for the implementation of AB 32, the Court enjoined ARB from further rulemaking under AB 32 until ARB amends its CEQA environmental review of the Scoping Plan to address the flaws identified by the Court. On May 23, 2011, ARB filed an appeal. On June 24, 2011, the Court of Appeal granted ARB’s petition staying the trial court’s order pending consideration of the appeal. In the interest of informed decision-making, on June 13, 2011, ARB released the expanded alternatives analysis in a draft Supplement to the AB 32 Scoping Plan Functional Equivalent Document. The ARB Board approved the Scoping Plan and the CEQA document on August 24, 2011.

the requested waiver in 2009, which was upheld by the U.S. District Court for the District of Columbia in 2011.

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in about a 22 percent reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards will result in about a 30 percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low-Emission Vehicle Program referred to as LEV III or the Advanced Clean Cars program. The Advanced Clean Car program combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce GHGs from new cars by 34 percent from 2016 levels by 2025. The new rules will clean up gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid electric vehicles and hydrogen fuel cell cars. The package will also ensure adequate fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

**SB 350— Clean Energy and Pollution Reduction Act of 2015.** In October 2015, the legislature approved and the Governor signed SB 350, which reaffirms California’s commitment to reducing its GHG emissions and addressing climate change. Key provisions include an increase in the renewables portfolio standard (RPS), higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for electric vehicle charging stations. Provisions for a 50 percent reduction in the use of petroleum statewide were removed from the Bill because of opposition and concern that it would prevent the Bill’s passage. Specifically, SB 350 requires the following to reduce statewide GHG emissions:

- Increase the amount of electricity procured from renewable energy sources from 33 percent to 50 percent by 2030, with interim targets of 40 percent by 2024, and 25 percent by 2027.
- Double the energy efficiency in existing buildings by 2030. This target will be achieved through the California Public Utility Commission (CPUC), the California Energy Commission (CEC), and local publicly-owned utilities.
- Reorganize the Independent System Operator (ISO) to develop more regional electrify transmission markets and to improve accessibility in these markets, which will facilitate the growth of renewable energy markets in the western United States (California Leginfo 2015).

#### EXECUTIVE ORDERS RELATED TO GHG EMISSIONS

California’s Executive Branch has taken several actions to reduce GHGs through the use of Executive Orders. Although not regulatory, they set the tone for the state and guide the actions of state agencies.

**Executive Order S-3-05.** Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for GHG emissions:

- 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.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

**Executive Order S-01-07 – Low Carbon Fuel Standard.** The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California’s transportation fuels by at least 10 percent by 2020. In particular, the Executive Order established a Low Carbon Fuel Standard and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the “life-cycle carbon intensity” of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (State Alternative Fuels Plan adopted by California Energy Commission on December 24, 2007) and was submitted to ARB for consideration as an “early action” item under AB 32. The ARB adopted the Low Carbon Fuel Standard on April 23, 2009.

The Low Carbon Fuel Standard was challenged in the U.S. District Court in Fresno in 2011. The court’s ruling issued on December 29, 2011, included a preliminary injunction against ARB’s implementation of the rule. The Ninth Circuit Court of Appeals stayed the injunction on April 23, 2012, pending final ruling on appeal, allowing ARB to continue to implement and enforce the regulation. The Ninth Circuit Court’s decision, filed September 18, 2013, vacated the preliminary injunction. In essence, the court held that Low Carbon Fuel Standards adopted by ARB were not in conflict with federal law. On August 8, 2013, the Fifth District Court of Appeal (California) ruled ARB failed to comply with CEQA and the Administrative Procedure Act (APA) when adopting regulations for Low Carbon Fuel Standards. In a partially published opinion, the Court of Appeal reversed the trial court’s judgment and directed issuance of a writ of mandate setting aside Resolution 09-31 and two executive orders of ARB approving Low Carbon Fuel Standards (LCFS) regulations promulgated to reduce GHG emissions. However, the court tailored its remedy to protect the public interest by allowing the LCFS regulations to remain operative while ARB complies with the procedural requirements it failed to satisfy.

To address the Court ruling, ARB was required to bring a new LCFS regulation to its Board for consideration in February 2015. The proposed LCFS regulation was required to contain revisions to the 2010 LCFS as well as new provisions designed to foster investments in the production of the low-carbon intensity (low-CI) fuels, offer additional flexibility to regulated parties, update critical technical information, simplify and streamline program operations, and enhance enforcement. The second public hearing was held on September 24 and September 25, 2015, where the LCFS Regulation was adopted. The Final Rulemaking Package adopting the regulation

was filed with Office of Administrative Law (OAL) on October 2, 2015. OAL had until November 16, 2015 to make a determination (ARB 2015d).

**Executive Order S-13-08.** Executive Order S-13-08 states that “climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California’s economy, to the health and welfare of its population and to its natural resources.” Pursuant to the requirements in the Order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the “. . . first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States.” Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

**Executive Order B-30-15.** On April 29, 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The Governor’s executive order aligns California’s GHG reduction targets with those of leading international governments ahead of the United Nations Climate Change Conference in Paris late 2015. The Order sets a new interim statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050 and directs ARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of CO<sub>2</sub> equivalent (MMCO<sub>2</sub>e). The Order also requires the state’s climate adaptation plan to be updated every three years, and for the State to continue its climate change research program, among other provisions. As with Executive Order S-3-05, this Order is not legally enforceable for local governments and the private sector. Legislation that would update AB 32 to make post 2020 targets and requirements a mandate is in process in the State Legislature.

#### **CALIFORNIA REGULATIONS AND BUILDING CODES**

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California’s energy consumption relatively flat even with rapid population growth.

**Title 20 Appliance Efficiency Standards.** California Code of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1608: Appliance Efficiency Regulations regulates the sale of appliances in California. The Appliance Efficiency Regulations include standards for both federally regulated appliances and non-federally regulated appliances. 23 categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles or other mobile equipment (CEC 2012).

**Title 24 Energy Efficiency Standards and California Green Building Standards.** California Code of Regulations Title 24 Part 6: California’s Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted 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 efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The newest 2016 version of Title 24 was adopted by the California Energy Commission (CEC) and became effective on January 1, 2017.

The CEC indicates that the 2016 Title 24 standards will reduce energy consumption by 5 percent for nonresidential buildings above that achieved by the 2013 Title 24 (CEC 2015).

California Code of Regulations, Title 24, Part 11: California Green Building Standards Code (CALGreen) is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on January 1, 2011, and is administered by the California Building Standards Commission. CALGreen is updated on a regular basis, with the most recent update consisting of the 2016 California Green Building Code Standards that became effective January 1, 2017. Local jurisdictions are permitted to adopt more stringent requirements, as state law provides methods for local enhancements. CALGreen recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they establish a minimum 50 percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. The State Building Code provides the minimum standard that buildings must meet in order to be certified for occupancy, which is generally enforced by the local building official. CALGreen requires:

- Short-term bicycle parking. If a commercial project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack (5.106.4.1.1).
- Long-term bicycle parking. For new buildings with 10 or more tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking capacity, with a minimum of one space (5.106.4.1.2).
- Designated parking. Provide designated parking in commercial projects for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling (5.410.1).
- Construction waste. A minimum 65 percent diversion of construction and demolition waste from landfills, increasing voluntarily to 80 percent for new homes and commercial projects (5.408.1, A5.408.3.1 [nonresidential], A5.408.3.1 [residential]). All (100 percent) of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled (5.408.3).
- Wastewater reduction. Each building shall reduce the generation of wastewater by one of the following methods:
  - The installation of water-conserving fixtures (5.303.3) or
  - Using nonpotable water systems (5.303.4).
- Water use savings. 20 percent mandatory reduction of indoor water use with voluntary goal standards for 30, 35 and 40 percent reductions (5.303.2, A5303.2.3 [nonresidential]).

- Water meters. Separate water meters for buildings in excess of 50,000 square feet or buildings projected to consume more than 1,000 gallons per day (5.303.1).
- Irrigation efficiency. Moisture-sensing irrigation systems for larger landscaped areas (5.304.3).
- Materials pollution control. Low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard (5.404).
- Building commissioning. Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies (5.410.2)..

**Model Water Efficient Landscape Ordinance.** The Model Water Efficient Landscape Ordinance (Ordinance) was required by AB 1881, the Water Conservation Act. The bill required local agencies to adopt a local landscape ordinance at least as effective in conserving water as the Model Ordinance by January 1, 2010. Reductions in water use of 20 percent consistent with (SBX-7-7) 2020 mandate are expected upon compliance with the ordinance. Governor Brown’s Drought Executive Order of April 1, 2015 (EO B-29-15) directed Department of Water Resources (DWR) to update the Ordinance through expedited regulation. The California Water Commission approved the revised Ordinance on July 15, 2015 effective December 15, 2015. New development projects that include landscape areas of 500 square feet or more are subject to the Ordinance. The update requires:

- More efficient irrigation systems;
- Incentives for graywater usage;
- Improvements in on-site stormwater capture;
- Limiting the portion of landscapes that can be planted with high water use plants; and
- Reporting requirements for local agencies.

**ARB Refrigerant Management Program.** ARB adopted a regulation in 2009 to reduce refrigerant GHG emissions from stationary sources through refrigerant leak detection and monitoring, leak repair, system retirement and retrofitting, reporting and recordkeeping, and proper refrigerant cylinder use, sale, and disposal. The regulation is set forth in sections 95380 to 95398 of Title 17, California Code of Regulations. The rules implementing the regulation establish a limit on statewide GHG emissions from stationary facilities with refrigeration systems with more than 50 pounds of a high GWP refrigerant. The refrigerant management program is designed to (1) reduce emissions of high-GWP GHG refrigerants from leaky stationary, non-residential refrigeration equipment; (2) reduce emissions from the installation and servicing of refrigeration and air-conditioning appliances using high-GWP refrigerants; and (3) verify GHG emission reductions.

**Tractor-Trailer GHG Regulation.** The tractors and trailers subject to this regulation must either use EPA SmartWay certified tractors and trailers, or retrofit their existing fleet with SmartWay verified technologies. The regulation applies primarily to owners of 53-foot or longer box-type trailers, including both dry-van and refrigerated-van trailers, and owners of the heavy-duty tractors that pull them on California highways. These owners are responsible for replacing or retrofitting their affected vehicles with compliant aerodynamic technologies and low rolling

resistance tires. Sleeper cab tractors model year 2011 and later must be SmartWay certified. All other tractors must use SmartWay verified low rolling resistance tires. There are also requirements for trailers to have low rolling resistance tires and aerodynamic devices.

**Phase 1 and 2 Heavy-Duty Vehicle GHG Standards.** ARB has adopted a new regulation for greenhouse gas (GHG) emissions from heavy-duty trucks and engines sold in California. It establishes GHG emission limits on truck and engine manufacturers and harmonizes with the U.S. EPA rule for new trucks and engines nationally. Existing heavy-duty vehicle regulations in California include engine criteria emission standards, tractor-trailer GHG requirements to implement SmartWay strategies (i.e., the Heavy-Duty Tractor-Trailer Greenhouse Gas Regulation), and in-use fleet retrofit requirements such as the Truck and Bus Regulation. In September 2011, the U.S. EPA adopted their new rule for heavy-duty trucks and engines. The U.S. EPA rule has compliance requirements for new compression and spark ignition engines, as well as trucks from Class 2b through Class 8. Compliance requirements begin with model year (MY) 2014 with stringency levels increasing through MY 2018. The rule organizes truck compliance into three groupings, which include a) heavy-duty pickups and vans; b) vocational vehicles; and c) combination tractors. The U.S. EPA rule does not regulate trailers.

ARB staff has worked jointly with the U.S. Environmental Protection Agency (U.S. EPA) and the National Highway Traffic Safety Administration (NHTSA) on the next phase of federal greenhouse gas (GHG) emission standards for medium- and heavy-duty vehicles, called federal Phase 2. The federal Phase 2 standards were built on the improvements in engine and vehicle efficiency required by the Phase 1 emission standards and represent a significant opportunity to achieve further GHG reductions for 2018 and later model year heavy-duty vehicles, including trailers.

U.S. EPA and NHTSA issued a Notice of Proposed Rulemaking for Phase 2 in June 2015, and published the final rule in October 2016. ARB staff plans to bring a proposed California Phase 2 program before the Board in early 2018. ARB staff remains committed to a strong national program which will support California's GHG reduction commitments.

**SB 97 and the CEQA Guidelines Update.** Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code states “(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of GHG emissions or the effects of GHG emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a).” Section 21097 was also added to the Public Resources Code. It provided CEQA protection until January 1, 2010 for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, in stating that the failure to analyze adequately the effects of GHGs would not violate CEQA.

On April 13, 2009, the Office of Planning and Research submitted to the Secretary for Natural Resources its recommended amendments to the CEQA Guidelines for addressing GHG emissions. On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act

rulemaking process for certifying and adopting these amendments pursuant to Public Resources Code section 21083.05. Following a 55-day public comment period and two public hearings, the Natural Resources Agency proposed revisions to the text of the proposed Guidelines amendments. The Natural Resources Agency transmitted the adopted amendments and the entire rulemaking file to the Office of Administrative Law on December 31, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

A new section, CEQA Guidelines Section 15064.4, was added to assist agencies in determining the significance of GHG emissions. The new section allows agencies the discretion to determine whether a quantitative or qualitative analysis is best for a particular project. However, little guidance is offered on the crucial next step in this assessment process—how to determine whether the project’s estimated GHG emissions are significant or cumulatively considerable.

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts, respectively. GHG mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze GHG emissions in an EIR when a project’s incremental contribution of emissions may be cumulatively considerable, however it does not answer the question of when emissions are cumulatively considerable.

Section 15183.5 permits programmatic GHG analysis and later project-specific tiering, as well as the preparation of GHG Reduction Plans. Compliance with such plans can support a determination that a project’s cumulative effect is not cumulatively considerable, according to Section 15183.5(b).

In addition, the amendments revised Appendix F of the CEQA Guidelines, which focuses on Energy Conservation. The sample environmental checklist in Appendix G was amended to include GHG questions.

## **REGIONAL**

The project is within the Southern California Air Basin (SoCAB), which is under the jurisdiction of the SCAQMD.

### **South Coast Air Quality Management District**

SCAQMD is the agency responsible for air quality planning and regulation in the SoCAB. The SCAQMD addresses the impacts to climate change of projects subject to SCAQMD permit as a lead agency if they are the only agency having discretionary approval for the project and acts as a responsible agency when a land use agency must also approve discretionary permits for the project. The SCAQMD acts as an expert commenting agency for impacts to air quality. This

expertise carries over to GHG emissions, so the agency helps local land use agencies through the development of models and emission thresholds that can be used to address GHG emissions.

In 2008, SCAQMD formed a Working Group to identify GHG emissions thresholds for land use projects that could be used by local lead agencies in the SoCAB. The Working Group developed several different options that are contained in the SCAQMD Draft Guidance Document – Interim CEQA GHG Significance Threshold, that could be applied by lead agencies. The working group has not provided additional guidance since release of the interim guidance in 2008. The SCAQMD Board has not approved the thresholds; however, the Guidance Document provides substantial evidence supporting the approaches to significance of GHG emissions that can be considered by the lead agency in adopting its own threshold. The current interim thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a GHG reduction plan. If a project is consistent with a qualifying local GHG reduction plan, it does not have significant GHG emissions.
- Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A project’s construction emissions are averaged over 30 years and are added to the project’s operational emissions. If a project’s emissions are below one of the following screening thresholds, then the project is less than significant:
  - Residential and Commercial land use: 3,000 MTCO<sub>2</sub>e per year
  - Based on land use type: residential: 3,500 MTCO<sub>2</sub>e per year; commercial: 1,400 MTCO<sub>2</sub>e per year; or mixed use: 3,000 MTCO<sub>2</sub>e per year
- Tier 4 has the following options:
  - Option 1: Reduce BAU emissions by a certain percentage; this percentage is currently undefined.
  - Option 2: Early implementation of applicable AB 32 Scoping Plan measures
  - Option 3, 2020 target for service populations (SP), which includes residents and employees: 4.8 MTCO<sub>2</sub>e/SP/year for projects and 6.6 MTCO<sub>2</sub>e/SP/year for plans;
  - Option 3, 2035 target: 3.0 MTCO<sub>2</sub>e/SP/year for projects and 4.1 MTCO<sub>2</sub>e/SP/year for plans
- Tier 5 involves mitigation offsets to achieve target significance threshold.

The SCAQMD’s interim thresholds used the Executive Order S-3-05 year 2050 goal as the basis for the Tier 3 screening level. Achieving the Executive Order’s objective would contribute to worldwide efforts to cap carbon dioxide concentrations at 450 ppm, thus stabilizing global climate.

SCAQMD only has authority over GHG emissions from development projects that include air quality permits. At this time, it is unknown if the project would include stationary sources of emissions subject to SCAQMD permits. Notwithstanding, if the Project requires a stationary permit, it would be subject to the applicable SCAQMD regulations.

SCAQMD Regulation XXVII, adopted in 2009 includes the following rules:

- Rule 2700 defines terms and post global warming potentials.
- Rule 2701, SoCal Climate Solutions Exchange, establishes a voluntary program to encourage, quantify, and certify voluntary, high quality certified GHG emission reductions in the SCAQMD.
- Rule 2702, GHG Reduction Program created a program to produce GHG emission reductions within the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

#### **CITY OF LAKE ELSINORE CLIMATE ACTION PLAN**

The City of Lake Elsinore Climate Action Plan (CAP) is a comprehensive document to ensure that the City reduces community-wide GHG emissions consistent with AB 32 and Executive Order S-3-05 (31). The CAP was prepared concurrently with the City’s General Plan and EIR, to serve as the City’s primary information and policy document for GHG emissions reductions in order to analyze and reduce potentially significant GHG emissions resulting from development under the City of Lake Elsinore General Plan.

The CAP includes a “Project-Level CAP Consistency Worksheet” to determine if further analysis is required. It should be noted that the “Project-Level CAP Consistency Worksheet” is generally applicable to traditional land use development projects. As such, pursuant to the CAP documentation, consistency with the CAP is identified in Section 3.6 of this report.

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### 3 PROJECT GREENHOUSE GAS IMPACT

#### 3.1 INTRODUCTION

The Project has been evaluated to determine if it will result in a significant greenhouse gas impact. The SCAQMD recommends analyzing direct and indirect project GHG emissions generated within California and not life-cycle emissions because the life-cycle effects from a project could occur outside of California, might not be very well understood or documented, and would be challenging to mitigate (32). Additionally, the science to calculate life cycle emissions is not yet established or well defined, therefore SCAQMD has not recommended, and is not requiring, life-cycle emissions analysis. The significance of these potential impacts is described in the following section.

#### 3.2 PROJECT RELATED GREENHOUSE GAS EMISSIONS

On October 17, 2017, the SCAQMD in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the California Emissions Estimator Model™ (CalEEMod™) v2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (VOCs, NO<sub>x</sub>, SO<sub>x</sub>, CO, PM<sub>10</sub>, and PM<sub>2.5</sub>) and greenhouse gas (GHG) emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (33). Accordingly, the latest version of CalEEMod™ has been used for this Project to determine greenhouse gas emissions. Output from the model runs for both construction and operational activity are provided in Appendix 3.1 and 3.2. The CalEEMod model includes GHG emissions from the following source categories: construction, area, energy, mobile, waste, water.

#### 3.3 CONSTRUCTION AND OPERATIONAL LIFE-CYCLE ANALYSIS

A full life-cycle analysis (LCA) for construction and operational activity is not included in this analysis due to the lack of consensus guidance on LCA methodology at this time (34). Life-cycle analysis (i.e., assessing economy-wide GHG emissions from the processes in manufacturing and transporting all raw materials used in the project development, infrastructure and on-going operations) depends on emission factors or econometric factors that are not well established for all processes. At this time a LCA would be extremely speculative and thus has not been prepared.

Additionally, the SCAQMD recommends analyzing direct and indirect project GHG emissions generated within California and not life-cycle emissions because the life-cycle effects from a project could occur outside of California, might not be very well understood or documented, and would be challenging to mitigate (32). Additionally, the science to calculate life cycle emissions is not yet established or well defined, therefore SCAQMD has not recommended, and is not requiring, life-cycle emissions analysis.

### 3.4 CONSTRUCTION EMISSIONS

Construction activities associated with the proposed Project will result in emissions of CO<sub>2</sub> and CH<sub>4</sub> from construction activities. The report *Nichols Ranch Air Quality Impact Analysis Report*, Urban Crossroads, Inc. (2018) contains detailed information regarding construction activity (35).

For construction phase Project emissions, GHGs are quantified and amortized over the life of the Project. To amortize the emissions over the life of the Project, the SCAQMD recommends calculating the total greenhouse gas emissions for the construction activities, dividing it by a 30-year project life then adding that number to the annual operational phase GHG emissions (36). As such, construction emissions were amortized over a 30-year period and added to the annual operational phase GHG emissions.

### 3.5 OPERATIONAL EMISSIONS

Operational activities associated with the proposed Project will result in emissions of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O from the following primary sources:

- Area Source Emissions
- Energy Source Emissions
- Mobile Source Emissions
- Solid Waste
- Water Supply, Treatment and Distribution

#### 3.5.1 AREA SOURCE EMISSIONS

##### Landscape Maintenance Equipment

Landscape maintenance equipment would generate emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category would include lawnmowers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping of the Project. CalEEMod default parameters were used to estimate emissions associated with landscape maintenance equipment for the Project scenario.

##### Hearths/Fireplaces

GHG emissions would result from the combustion of wood or biomass and are considered biogenic emissions of CO<sub>2</sub>. The emissions associated with use of hearths/fireplaces were calculated based on assumptions provided in the CalEEMod model. The Project is required to comply with SCAQMD Rule 445, which prohibits the use of wood burning stoves and fireplaces in new development. In order to account for the requirements of this Rule, the unmitigated CalEEMod model estimates were adjusted to remove wood burning stoves and fireplaces. As the project is required to comply with SCAQMD Rule 445, the removal of wood burning stoves and fireplaces is not considered "mitigation" although it must be identified as such in CalEEMod in order to treat the case appropriately.

### 3.5.2 ENERGY SOURCE EMISSIONS

#### Combustion Emissions Associated with Natural Gas and Electricity

GHGs are emitted from buildings as a result of activities for which electricity and natural gas are typically used as energy sources. Combustion of any type of fuel emits CO<sub>2</sub> and other GHGs directly into the atmosphere; these emissions are considered direct emissions associated with a building, the building energy use emissions do not include street lighting<sup>5</sup>. GHGs are also emitted during the generation of electricity from fossil fuels; these emissions are considered to be indirect emissions. Unless otherwise noted, CalEEMod default parameters were used.

### 3.5.3 MOBILE SOURCE EMISSIONS

#### Vehicles

Project mobile source greenhouse gas impacts are dependent on both overall daily vehicle trip generation and the effect of the Project on peak hour traffic volumes and traffic operations in the vicinity of the Project. The Project-related operational air quality impacts are derived primarily from vehicle trips generated by the Project. Trip characteristics available from the report, *Nichols Ranch Traffic Impact Analysis* (Urban Crossroads, Inc. 2018) were utilized in this analysis (37).

Per *Nichols Ranch Traffic Impact Analysis* prepared by Urban Crossroads, Inc. the Project is expected to generate a net total of approximately 6,901 trip-ends per day (actual vehicles) on a typical weekday with 734 AM peak hour trips and 622 PM peak hour trips (37). It should be noted that weekday and Saturday trip characteristics are based on CalEEMod defaults. This greenhouse gas study relies on the net Project trips (as opposed to the passenger car equivalents) to accurately account for the effect of individual truck emissions associated with the Project. Trip characteristics based on CalEEMod defaults were

### 3.5.4 SOLID WASTE

Residential and commercial land uses will result in the generation and disposal of solid waste. A large percentage of this waste will be diverted from landfills by a variety of means, such as reducing the amount of waste generated, recycling, and/or composting. The remainder of the waste not diverted will be disposed of at a landfill. GHG emissions from landfills are associated with the anaerobic breakdown of material. CalEEMod default parameters were used to estimate GHG emissions associated with the disposal of solid waste for the Project scenario.

### 3.5.5 WATER SUPPLY, TREATMENT AND DISTRIBUTION

Indirect GHG emissions result from the production of electricity used to convey, treat and distribute water and wastewater. The amount of electricity required to convey, treat and distribute water depends on the volume of water as well as the sources of the water. CalEEMod

<sup>5</sup> The CalEEMod emissions inventory model does not include indirect emission related to street lighting. Indirect emissions related to street lighting are expected to be negligible and cannot be accurately quantified at this time as there is insufficient information as to the number and type of street lighting that would occur.

default parameters were used to estimate GHG emissions associated with water supply, treatment and distribution for the Project scenario.

### 3.6 EMISSIONS SUMMARY

#### ***GHG Impact #1: The Project would generate direct or indirect greenhouse gas emission that would result in a significant impact on the environment***

The Project will result in approximately 4,021.78 MTCO<sub>2e</sub> per year from construction, area, energy, waste, and water usage. In addition, the Project has the potential to result in an additional 9,136.27 MTCO<sub>2e</sub> per year from mobile sources if the assumption is made that all of the vehicle trips to and from the Project are “new” trips resulting from the development of the Project. As such, the Project has the potential to generate a total of approximately 13,158.05 MTCO<sub>2e</sub> per year as summarized on Table 3-1. Notwithstanding, an individual project cannot generate enough GHG emissions to influence global climate change. The project participates in this potential impact by its incremental contribution combined with the cumulative increase of all other sources of GHGs, which when taken together may have a significant impact on global climate change.

As substantiated herein, the proposed Project would be consistent with the CAP, would be in concert with AB 32 and international efforts to address global climate change, and would reflect specific local requirements that would substantially lessen cumulative GHG emissions impacts. The proposed Project would therefore also fulfill the description of mitigation found in *CEQA Guidelines* §15130(a)(3) and §15183.5. The Project’s incremental contribution to GHG emissions impacts would therefore not be cumulatively considerable.

**TABLE 3-1: TOTAL PROJECT 2030 GREENHOUSE GAS EMISSIONS (WITHOUT MITIGATION)**

Emission Source	Emissions (metric tons per year) CO <sub>2e</sub>
Annual construction-related emissions amortized over 30 years	128.92
Area	43.49
Energy	3,303.58
Mobile Sources	9,136.27
Waste	303.36
Water Usage	242.44
<b>Proposed Project Total Emissions</b>	<b>13,158.05</b>

As per SB 32, the Project would be required to meet the reduction target of 40% below 1990 levels by 2030. It should be noted that consistency with the City’s CAP results in a 33% reduction below 1990 levels by 2030<sup>6</sup>. In order to show consistency with SB 32, the Project would need to

<sup>6</sup> This is based on an assumption that the service population ratio for 2020 is equal to the City’s 1990 level of emissions (6.6 MTCO<sub>2e</sub>/yr/SP), and the 4.4 MTCO<sub>2e</sub>/yr/SP reduction specified by the CAP for 2030; this results in a 33% reduction below 1990 emission levels.

demonstrate a minimum of 7% reduction through implementation of mitigations measures beyond what is required through the CAP.

As shown on Table 3-2, the project's 2030 emissions would result in 11,156.33 MTCO<sub>2</sub>e per year after implementation of applicable mitigation measures, as shown in Section 1.3. This yields a reduction of approximately 15% which satisfies the additional 7% needed to meet the SB 32 reduction target, as shown in Table 3-3. Since the Project is consistent with the City's CAP and would demonstrate an additional 7% reduction through implementation of mitigation by 2030, the Project would be consistent with the statewide reduction targets for GHG emissions. As such, the Project would result in a less than significant direct or indirect GHG impact.

**TABLE 3-2: TOTAL PROJECT 2030 GREENHOUSE GAS EMISSIONS (WITH MITIGATION)**

Emission Source	Emissions (metric tons per year) CO <sub>2</sub> e
Annual construction-related emissions amortized over 30 years	128.92
Area	43.49
Energy	2,209.95
Mobile Sources	8,353.71
Waste	303.36
Water Usage	116.90
<b>Proposed Project Total Emissions</b>	<b>11,156.33</b>

**TABLE 3-3: 2030 GREENHOUSE GAS EMISSIONS (WITHOUT MITIGATION VS. WITH MITIGATION)**

Emission Source	Emissions (metric tons per year) CO <sub>2</sub> e	
	Without Mitigation	With Mitigation
<b>Total</b>	<b>13,158.05</b>	<b>11,156.33</b>
<b>Reduction</b>	<b>15.21%</b>	
<b>Project Minimum Improvement</b>	<b>7%</b>	
<b>Meets Requirement?</b>	<b>YES</b>	

***GHG Impact #2: The Project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.***

#### **Consistency with City of Lake Elsinore CAP**

In 2006, California adopted AB 32, which requires the state to reduce statewide GHG emissions to 1990 levels by 2020, a reduction target that was introduced in EO S-3-05. In 2016, California adopted SB 32, which requires the state to reduce statewide GHG emissions to 40% below 1990 levels by 2030, a reduction target that was introduced in EO B-30-15.

AB 32 and SB 32 codified state targets and directed State regulatory agencies to develop rules and regulations to meet the targets; AB 32 and SB 32 do not stipulate project-specific requirements. Specific requirements are codified in rules and regulations developed by

regulatory agencies such as CARB and SCAQMD, and local City actions such as the City of Lake Elsinore CAP.

The City's CAP, adopted in 2011, certified that the City's target is consistent with AB 32's 2020 goals. The City CAP ensures that the City will be providing local GHG reductions that will complement state efforts to reduce GHG emissions to the AB 32 target. The proposed Project would not conflict with the applicable CAP reduction measures, as shown in Table ES-2. In addition to CAP requirements, Table ES-3 also discusses consistency with AB 32.

The proposed Project would not conflict with the CAP and AB 32 as shown on Tables 3-4 and 3-5. It is important to note, that Projects that are consistent with the City's CAP are also required to demonstrate an additional 7% reduction in order to establish consistency with SB 32. As shown in Table 3-2 and 3-3, the Project yields an additional 15% reduction beyond what is required by the CAP. As such, the Project would result in a less than significant direct or indirect GHG impact after implementation of mitigation measures.

**TABLE 3-4: PROJECT CONSISTENCY WITH CITY OF LAKE ELSINORE CAP**

CAP Measure	Applicability to Proposed Project	Remarks
Measure T-1.2: Pedestrian Infrastructure	Applicable	This measure requires the installation of sidewalks along new and reconstructed streets and sidewalks or paths to internally link all uses and provide connections to neighborhood activity centers, major destinations, and transit facilities contiguous with the project site. The Project would be required to provide sidewalks along Nichols Road, El Toro Road, and all internal streets. This measure is implemented by the Department of Public Works and Building Department through policy development, development review, and conditions of approval. The proposed Project elements would be required to comply with conditions of approval imposed by the City. As such, the proposed Project would not conflict with this measure.
Measure T-1.4: Bicycle Infrastructure	Applicable	This measure requires new development to implement and connect to the network of Class I, II and III bikeways, trails and safety

CAP Measure	Applicability to Proposed Project	Remarks
		<p>features identified in the General Plan, Bike Lane Master Plan, Trails Master Plan and Western Riverside County Non- Motorized Transportation plan. Consistent with the City's General Plan and Specific Plan a Class II bicycle lane is required along Nichols Road. This measure is implemented by the Department of Public Works, Community Services Department, and Building Department through policy development, development review, and conditions of approval. The proposed Project elements would be required to comply with conditions of approval imposed by the City. As such, the proposed Project would not conflict with this measure.</p>
<p>Measure T-1.5: Bicycle Parking Standards</p>	<p>Applicable</p>	<p>This measure requires the City to enforce short-term and long-term bicycle parking standards for new non- residential developments. This measure is implemented by the Department of Public Works and Building Department through development review and conditions of approval. The proposed Project elements would be required to comply with conditions of approval imposed by the City. As such, the proposed Project would not conflict with this measure.</p>
<p>Measure T-2.1: Designated Parking for Fuel Efficient Vehicles</p>	<p>Applicable</p>	<p>This measure requires new non-residential developments to designate 10% of total parking spaces for low-emitting, fuel-efficient vehicles. This measure is implemented by the Department of Planning, Public Works and Building through development review and conditions of approval. The proposed Project elements would</p>

CAP Measure	Applicability to Proposed Project	Remarks
		be required to comply with conditions of approval imposed by the City. As such, the proposed Project would not conflict with this measure.
Measure T-4.1: Commute Trip Reduction Program	Applicable	This measure requires the City to institute a commute trip reduction program for employers with fewer than 100 employees. This measure is implemented by the Department of Planning through amendment to the Municipal Code. The Project would be comprised of various project-specific actions, some of which may be subject to this measure. The proposed Project elements would be required to comply with the City's Municipal Code. As such, the proposed Project would not conflict with this measure.
Measure E-1.1: Tree Planting Requirements	Applicable	This measure requires new developments to plant at minimum one 15-gallon nondeciduous, umbrella-form tree per 30 linear feet of boundary length near buildings. This measure is implemented by the Departments of Planning, Public Works, and Parks and Recreation through City ordinance, development review process, and conditions of approval. The proposed Project elements would be required to comply with the City ordinances and conditions of approval. As such, the proposed Project would not conflict with this measure.
Measure E-1.2: Cool Roof Requirements	Applicable	This measure requires new non-residential development to use roofing materials having solar reflectance, thermal emittance or Solar Reflectance Index consistent

CAP Measure	Applicability to Proposed Project	Remarks
		with CalGreen Tier 1 values. This measure is implemented by the Departments of Planning and Building through City ordinance, development review process, and conditions of approval. The proposed Project elements would be required to comply with the City ordinances and conditions of approval. As such, the proposed Project would not conflict with this measure.
Measure E-1.3: Energy Efficient Building Standards	Applicable	This measure requires that new construction exceed the California Energy Code requirements, based on the 2008 Energy Efficiency Standards by 15% by 2020, through either the performance based or prescriptive approach described in the California Green Building Code. This measure is implemented by the Departments of Planning, Public Works, and Building through City ordinance, development review process, and conditions of approval. The proposed Project elements would be required to comply with the City ordinances and conditions of approval. As such, the proposed Project would not conflict with this measure.
Measure E-3.2: Energy Efficient Street and Traffic Signal Lights	Applicable	This measure requires the City to work with Southern California Edison to replace existing high-pressure sodium street lights and traffic lights with high efficiency alternatives, such as Low Emitting Diode (LED) lights; replace existing City owned traffic lights with LED lights; require any new street and traffic lights to be LED. This measure is currently being implemented by the Department of Public Works through renovation. The Planning

CAP Measure	Applicability to Proposed Project	Remarks
		<p>Department obtains compliance through Municipal Code amendment, the development and review process, and conditions of approval.</p> <p>This measure would apply to any traffic lights replaced or installed as part of the Project. The proposed Project elements would be required to comply with the municipal code and conditions of approval. As such, the proposed Project would not conflict with this measure.</p>
Measure E-4.1: Landscaping Ordinance	Applicable	<p>This measure requires the City to enforce the City's AB 1881 Landscaping Ordinance, which requires that landscaping be water efficient, thereby consuming less energy and reducing emissions. This measure is implemented by the Departments of Building and Planning through City ordinance, development and review process, and conditions of approval. The proposed Project elements would be required to comply with these landscape requirements. As such, the proposed Project would not conflict with this measure.</p>
Measure E-4.2: Indoor Water Conservation Requirements	Applicable	<p>This measure requires that development projects reduce indoor water consumption by 30% by 2020. This measure is implemented by the Departments of Building and Planning through amendments to the Municipal Code and conditions of approval. The proposed Project elements would be required to comply with the City's Municipal Code and conditions of approval. As such, the proposed Project would not conflict with this measure. The proposed Project was analyzed with this</p>

CAP Measure	Applicability to Proposed Project	Remarks
		measure, and no conflicts were identified.
Measure E-5.1: Renewable Energy Incentives	Applicable	This measure facilitates the voluntary installation of small-scale renewable energy systems, such as solar photovoltaic and solar hot water systems, by connecting residents and businesses with technical and financial assistance through the City website. This measure is implemented by the Departments of Building and Planning through outreach and incentive programs. No elements of the proposed Project would conflict with this measure.
Measure S-1.4: Construction and Demolition Waste Diversion	Applicable	This measure requires development projects to divert, recycle or salvage at least 65% of nonhazardous construction and demolition debris generated at the site by 2020 and requires all construction and demolition projects to be accompanied by a waste management plan for the project. This measure is implemented by the Departments of Planning and Building through City contracts, Municipal Code amendments, development and review process, and conditions of approval. The proposed Project project-specific elements would be required to comply with the City's Municipal Code and conditions of approval. As such, the proposed Project would not conflict with this measure.

The 2017 Scoping Plan also identifies local governments as essential partners in achieving the State's long-term GHG reduction goals and identifies local actions to reduce GHG emissions. As part of the recommended actions, CARB recommends that local governments achieve a community-wide goal to achieve emissions of no more than 6 MTCO<sub>2</sub>e or less per capita by 2030 and 2 MTCO<sub>2</sub>e or less per capita by 2050. For CEQA projects, CARB states that lead agencies may

develop evidenced-based bright-line numeric thresholds—consistent with the Scoping Plan and the State’s long-term GHG goals—and projects with emissions over that amount may be required to incorporate on-site design features and mitigation measures that avoid or minimize project emissions to the degree feasible; or, a performance-based metric using a climate action plan or other plan to reduce GHG emissions is appropriate. Additionally, the Appendix B of the Scoping Plan presents plan-level GHG reduction actions that can be implemented by local governments. As noted on page 99 of the Scoping Plan, these goals are appropriate for the plan level (city, county, subregional, or regional level), but not for specific individual projects because they include all emissions sectors in the State (38).

### **Consistency with AB 32**

ARB’s *Scoping Plan* identifies strategies to reduce California’s greenhouse gas emissions in support of AB32. Many of the strategies identified in the Scoping Plan are not applicable at the project level, such as long-term technological improvements to reduce emissions from vehicles. Some measures are applicable and supported by the project, such as energy efficiency. Finally, while some measures are not directly applicable, the project would not conflict with their implementation. Reduction measures are grouped into 18 action categories, as follows:

1. **California Cap-and-Trade Program Linked to Western Climate Initiative Partner Jurisdictions.** Implement a broad-based California cap-and-trade program to provide a firm limit on emissions. Link the California cap-and-trade program with other Western Climate Initiative Partner programs to create a regional market system to achieve greater environmental and economic benefits for California.<sup>7</sup> Ensure California’s program meets all applicable AB 32 requirements for market-based mechanisms.
2. **California Light-Duty Vehicle Greenhouse Gas Standards.** Implement adopted Pavley standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.
3. **Energy Efficiency.** Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities).
4. **Renewables Portfolio Standards.** Achieve 33 percent renewable energy mix statewide.
5. **Low Carbon Fuel Standard.** Develop and adopt the Low Carbon Fuel Standard.
6. **Regional Transportation-Related Greenhouse Gas Targets.** Develop regional greenhouse gas emissions reduction targets for passenger vehicles.
7. **Vehicle Efficiency Measures.** Implement light-duty vehicle efficiency measures.
8. **Goods Movement.** Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.
9. **Million Solar Roofs Program.** Install 3,000 megawatts of solar-electric capacity under California’s existing solar programs.

<sup>7</sup> California Air Resources Board. California GHG Emissions – Forecast (2002-2020). October 2010

10. **Medium- and Heavy-Duty Vehicles.** Adopt medium- (MD) and heavy-duty (HD) vehicle efficiencies. Aerodynamic efficiency measures for HD trucks pulling trailers 53-feet or longer that include improvements in trailer aerodynamics and use of rolling resistance tires were adopted in 2008 and went into effect in 2010.<sup>8</sup> Future, yet to be determined improvements, includes hybridization of MD and HD trucks.
11. **Industrial Emissions.** Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions and provide other pollution reduction co-benefits. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.
12. **High Speed Rail.** Support implementation of a high speed rail system.
13. **Green Building Strategy.** Expand the use of green building practices to reduce the carbon footprint of California’s new and existing inventory of buildings.
14. **High Global Warming Potential Gases.** Adopt measures to reduce high warming global potential gases.
15. **Recycling and Waste.** Reduce methane emissions at landfills. Increase waste diversion, composting and other beneficial uses of organic materials, and mandate commercial recycling. Move toward zero-waste.
16. **Sustainable Forests.** Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation. The 2020 target for carbon sequestration is 5 million MTCO<sub>2</sub>E/YR.
17. **Water.** Continue efficiency programs and use cleaner energy sources to move and treat water.
18. **Agriculture.** In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020.

Table 3-3 summarizes the Project’s consistency with the State Scoping Plan. As summarized, the Project would not conflict with any of the provisions of the Scoping Plan and in fact supports the action categories: energy efficiency, water conservation, recycling, and landscaping.

**TABLE 3-5: PROJECT CONSISTENCY WITH SCOPING PLAN GREENHOUSE GAS EMISSION REDUCTION**

Number	Scoping Plan Measure	Remarks
T-1	Pavley Motor Vehicle Standards (AB 1493)	Residents would purchase vehicles in compliance with incumbent CARB vehicle standards
H-4	Limit High GWP Use in Consumer Products	Residents would use consumer products that would comply with the incumbent regulations
H-1	Motor Vehicle Air Conditioning Systems – Reduction from Non-Professional Servicing	Residents would be prohibited from performing air conditioning repairs and required to use professional servicing.
T-4	Tire Pressure Program	Motor vehicles driven by residents would maintain proper tire pressure when vehicles are serviced.
T-2	Low Carbon Fuel Standard	Motor vehicles driven by residents would use fuels that are compliant with incumbent standards.

<sup>8</sup> California Air Resources Board. Scoping Plan Measures Implementation Timeline. October 2010

Number	Scoping Plan Measure	Remarks
W-1	Water Use Efficiency	Development proposals within the Project site would implement measures to minimize water use and maximize efficiency. The Project will be required to show consistency with the City of Lake Elsinore's municipal code requiring efficient landscape requirements (Chapter 19.08 of the City's municipal code / consistency with the City's AB 1881 Landscaping Ordinance).
GB-1	Green Buildings	Development proposals within the Project site would be constructed in compliance with incumbent state or local green building standards.
H-5	Air Conditioning Refrigerant Leak Test During Vehicle Smog Check	Motor vehicles driven by residents, employees, and customers would comply with the leak test requirements during smog checks.
E-1	Energy Efficiency Measures (Electricity)	The Project would comply with incumbent electrical energy efficiency standards. At this time, the Project would be required to comply with the 2016 Title 24 standards and applicable green building standards.
CR-1	Energy Efficiency (Natural Gas)	Development proposals within the Project site would comply with incumbent natural gas energy efficiency standards. At this time, the Project would be required to comply with the 2016 Title 24 standards and applicable green building standards.
GB-1	Greening New Residential and Commercial Construction	Development proposals within the Project site would comply with incumbent green building standards. At this time, the Project would be required to comply with the 2016 Title 24 standards and applicable green building standards.
GB-1	Greening Existing Homes and Commercial Buildings	Development proposals within the Project site would meet retrofit standards as they become effective.

### **Consistency with SB 32**

SB 32 requires the state to reduce statewide greenhouse gas emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal of 1990 levels by 2020 and provides an intermediate goal to achieving S-3-05, which sets a statewide greenhouse gas reduction target of 80% below 1990 levels by 2050 (10) (29).

According to research conducted by the Lawrence Berkeley National Laboratory and supported by the CARB, California, under its existing and proposed GHG reduction policies, is on track to meet the 2020 reduction targets under AB 32 and could achieve the 2030 goals under SB 32. The research utilized a new, validated model known as the California LBNL GHG Analysis of Policies Spreadsheet (CALGAPS), which simulates GHG and criteria pollutant emissions in California from 2010 to 2050 in accordance to existing and future GHG-reducing policies. The CALGAPS model showed that GHG emissions through 2020 could range from 317 to 415 MTCO<sub>2e</sub> per year,

“indicating that existing state policies will likely allow California to meet its target [of 2020 levels under AB 32].” CALGAPS also showed that by 2030, emissions could range from 211 to 428 MTCO<sub>2</sub>e per year, indicating that “even if all modeled policies are not implemented, reductions could be sufficient to reduce emissions 40 percent below the 1990 level [of SB 32].” CALGAPS analyzed emissions through 2050 even though it did not generally account for policies that might be put in place after 2030. Though the research indicated that the emissions would not meet the state’s 80 percent reduction goal by 2050, various combinations of policies could allow California’s cumulative emissions to remain very low through 2050 (27) (28).

The Project reduces its GHG emissions to the maximum extent feasible as discussed in this document. Additionally, the project applicant would not actively interfere with any future City-mandated, state-mandated, or federally-mandated retrofit obligations enacted or promulgated to legally require development City-wide, state-wide, or nation-wide to assist in meeting state-adopted greenhouse gas emissions reduction targets, including that established under Executive Order S-3-05, Executive Order B-30-15, or SB 32.

The Project does not interfere with the state’s implementation of (i) Executive Order B-30-15 and SB 32’s target of reducing statewide GHG emissions to 40% below 1990 levels by 2030 or (ii) Executive Order S-3-05’s target of reducing statewide GHG emissions to 80% below 1990 levels by 2050 because it does not interfere with the state’s implementation of GHG reduction plans described in the CARB’s Updated Scoping Plan, including the state providing for 12,000 MW of renewable distributed generation by 2020, the California Building Commission mandating net zero energy homes in the building code after 2020, or existing building retrofits under AB 758. Therefore, the project’s impacts on greenhouse gas emissions in the 2030 and 2050 horizon years are less than significant.

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## 5 CERTIFICATION

The contents of this greenhouse gas study report represent an accurate depiction of the greenhouse gas impacts associated with the proposed Nichols Ranch. The information contained in this greenhouse gas report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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### EDUCATION

Master of Science in Environmental Studies  
California State University, Fullerton • May, 2010

Bachelor of Arts in Environmental Analysis and Design  
University of California, Irvine • June, 2006

### PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners  
AWMA – Air and Waste Management Association  
ASTM – American Society for Testing and Materials

### PROFESSIONAL CERTIFICATIONS

Planned Communities and Urban Infill – Urban Land Institute • June, 2011  
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008  
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007  
AB2588 Regulatory Standards – Trinity Consultants • November, 2006  
Air Dispersion Modeling – Lakes Environmental • June, 2006

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**APPENDIX 3.1:**  
**CALEEMOD EMISSIONS MODEL OUTPUTS**

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**Nichols Ranch Project Buildingout (2030 Operations - Unmitigated)**  
**Riverside-South Coast County, Annual**

**1.0 Project Characteristics**

**1.1 Land Usage**

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	43.00	1000sqft	2.34	43,000.00	0
Parking Lot	5.30	Acre	5.30	230,868.00	0
City Park	8.30	Acre	8.30	361,548.00	0
Fast Food Restaurant w/o Drive Thru	5.50	1000sqft	0.31	5,500.00	0
Fast Food Restaurant with Drive Thru	6.00	1000sqft	0.33	6,000.00	0
Health Club	8.00	1000sqft	0.43	8,000.00	0
High Turnover (Sit Down Restaurant)	9.40	1000sqft	0.52	9,400.00	0
Hotel	130.00	Room	10.23	188,760.00	0
Single Family Housing	168.00	Dwelling Unit	31.10	302,400.00	480
Convenience Market With Gas Pumps	16.00	Pump	0.12	2,258.80	0
Strip Mall	4.40	1000sqft	0.24	4,400.00	0

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Urban	<b>Wind Speed (m/s)</b>	2.4	<b>Precipitation Freq (Days)</b>	28
<b>Climate Zone</b>	10			<b>Operational Year</b>	2030
<b>Utility Company</b>	Southern California Edison				
<b>CO2 Intensity (lb/MW hr)</b>	702.44	<b>CH4 Intensity (lb/MW hr)</b>	0.029	<b>N2O Intensity (lb/MW hr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

Project Characteristics -

Land Use - Total Analyzed Project Area is 59.22 acres. Please note that the Total Lot Area as per the Site Plan is 72.5 acres. However, Open Space (1.3 acres) and Public Institutional Draining Basin and Floodway uses (12 acres) will not be included in the analysis.

Construction Phase - Operations Run Only.

Off-road Equipment - Operations Run Only.

Trips and VMT - Operations Run Only.

Vehicle Trips - Trip Rates based on information provided in the TIA.

Woodstoves - Rule 445

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	40.00	1.00
tblFireplaces	NumberGas	142.80	168.00
tblFireplaces	NumberNoFireplace	16.80	0.00
tblFireplaces	NumberWood	8.40	0.00
tblLandUse	LotAcreage	0.99	2.34
tblLandUse	LotAcreage	0.13	0.31
tblLandUse	LotAcreage	0.14	0.33
tblLandUse	LotAcreage	0.18	0.43
tblLandUse	LotAcreage	0.22	0.52
tblLandUse	LotAcreage	4.33	10.23
tblLandUse	LotAcreage	54.55	31.10
tblLandUse	LotAcreage	0.05	0.12
tblLandUse	LotAcreage	0.10	0.24
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblVehicleTrips	ST_TR	22.75	1.96
tblVehicleTrips	ST_TR	722.03	616.12
tblVehicleTrips	ST_TR	158.37	122.40

## Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

tblVehicleTrips	ST_TR	9.91	9.54
tblVehicleTrips	SU_TR	16.74	2.19
tblVehicleTrips	SU_TR	542.72	472.58
tblVehicleTrips	SU_TR	131.84	142.64
tblVehicleTrips	SU_TR	8.62	8.55
tblVehicleTrips	WD_TR	1.89	0.78
tblVehicleTrips	WD_TR	542.60	198.16
tblVehicleTrips	WD_TR	716.00	346.23
tblVehicleTrips	WD_TR	496.12	470.95
tblVehicleTrips	WD_TR	11.03	10.88
tblVehicleTrips	WD_TR	32.93	34.50
tblVehicleTrips	WD_TR	127.15	112.18
tblVehicleTrips	WD_TR	8.17	8.36
tblVehicleTrips	WD_TR	9.52	9.44
tblVehicleTrips	WD_TR	44.32	163.35
tblWoodstoves	NumberCatalytic	8.40	0.00
tblWoodstoves	NumberNoncatalytic	8.40	0.00

## 2.0 Emissions Summary

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Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

**2.2 Overall Operational**

**Unmitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.3548	0.0548	1.7458	3.1000e-004		0.0124	0.0124		0.0124	0.0124	0.0000	43.1790	43.1790	3.4800e-003	7.4000e-004	43.4865
Energy	0.1219	1.0930	0.8200	6.6500e-003		0.0842	0.0842		0.0842	0.0842	0.0000	3,288.9624	3,288.9624	0.1091	0.0399	3,303.5817
Mobile	1.9870	17.6130	17.6457	0.0976	8.0985	0.0477	8.1461	2.1681	0.0443	2.2124	0.0000	9,124.5358	9,124.5358	0.4695	0.0000	9,136.2739
Waste						0.0000	0.0000		0.0000	0.0000	122.4462	0.0000	122.4462	7.2364	0.0000	303.3552
Water						0.0000	0.0000		0.0000	0.0000	9.2627	201.9718	211.2345	0.9597	0.0242	242.4353
<b>Total</b>	<b>4.4636</b>	<b>18.7608</b>	<b>20.2114</b>	<b>0.1046</b>	<b>8.0985</b>	<b>0.1443</b>	<b>8.2428</b>	<b>2.1681</b>	<b>0.1410</b>	<b>2.3091</b>	<b>131.7088</b>	<b>12,658.6489</b>	<b>12,790.3578</b>	<b>8.7782</b>	<b>0.0648</b>	<b>13,029.1326</b>

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**2.2 Overall Operational**

**Mitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.3548	0.0548	1.7458	3.1000e-004		0.0124	0.0124		0.0124	0.0124	0.0000	43.1790	43.1790	3.4800e-003	7.4000e-004	43.4865
Energy	0.1219	1.0930	0.8200	6.6500e-003		0.0842	0.0842		0.0842	0.0842	0.0000	3,288.9624	3,288.9624	0.1091	0.0399	3,303.5817
Mobile	1.9870	17.6130	17.6457	0.0976	8.0985	0.0477	8.1461	2.1681	0.0443	2.2124	0.0000	9,124.5358	9,124.5358	0.4695	0.0000	9,136.2739
Waste						0.0000	0.0000		0.0000	0.0000	122.4462	0.0000	122.4462	7.2364	0.0000	303.3552
Water						0.0000	0.0000		0.0000	0.0000	9.2627	201.9718	211.2345	0.9597	0.0242	242.4353
<b>Total</b>	<b>4.4636</b>	<b>18.7608</b>	<b>20.2114</b>	<b>0.1046</b>	<b>8.0985</b>	<b>0.1443</b>	<b>8.2428</b>	<b>2.1681</b>	<b>0.1410</b>	<b>2.3091</b>	<b>131.7088</b>	<b>12,658.6489</b>	<b>12,790.3578</b>	<b>8.7782</b>	<b>0.0648</b>	<b>13,029.1326</b>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**3.0 Construction Detail**

**Construction Phase**

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/3/2019	6/3/2019	5	1	

**Acres of Grading (Site Preparation Phase): 0**

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 5.3**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**



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**3.2 Site Preparation - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>							

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>							

**4.0 Operational Detail - Mobile**

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Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**4.1 Mitigation Measures Mobile**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.9870	17.6130	17.6457	0.0976	8.0985	0.0477	8.1461	2.1681	0.0443	2.2124	0.0000	9,124.5358	9,124.5358	0.4695	0.0000	9,136.2739
Unmitigated	1.9870	17.6130	17.6457	0.0976	8.0985	0.0477	8.1461	2.1681	0.0443	2.2124	0.0000	9,124.5358	9,124.5358	0.4695	0.0000	9,136.2739

**4.2 Trip Summary Information**

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	6.47	16.27	18.18	27,466	27,466
Convenience Market With Gas Pumps	3,170.56	3,271.52	2670.08	1,858,361	1,858,361
Fast Food Restaurant w/o Drive Thru	1,904.27	3,828.00	2750.00	4,165,226	4,165,226
Fast Food Restaurant with Drive Thru	2,825.70	3,696.72	2835.48	3,106,152	3,106,152
General Office Building	467.84	105.78	45.15	1,145,980	1,145,980
Health Club	276.00	166.96	213.84	537,993	537,993
High Turnover (Sit Down Restaurant)	1,054.49	1,150.56	1340.82	1,511,542	1,511,542
Hotel	1,086.80	1,064.70	773.50	2,478,959	2,478,959
Parking Lot	0.00	0.00	0.00		
Single Family Housing	1,585.92	1,602.72	1436.40	5,354,540	5,354,540
Strip Mall	718.74	184.98	89.89	1,051,474	1,051,474
<b>Total</b>	<b>13,096.79</b>	<b>15,088.20</b>	<b>12,173.34</b>	<b>21,237,692</b>	<b>21,237,692</b>

**4.3 Trip Type Information**

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6
Convenience Market With Gas	16.60	8.40	6.90	0.80	80.20	19.00	14	21	65
Fast Food Restaurant w/o Drive	16.60	8.40	6.90	1.50	79.50	19.00	51	37	12
Fast Food Restaurant with Drive	16.60	8.40	6.90	2.20	78.80	19.00	29	21	50
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Convenience Market With Gas Pumps	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Fast Food Restaurant w/o Drive Thru	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Fast Food Restaurant with Drive Thru	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
General Office Building	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Health Club	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
High Turnover (Sit Down Restaurant)	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Hotel	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Parking Lot	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Single Family Housing	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Strip Mall	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615

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**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,082.5961	2,082.5961	0.0860	0.0178	2,090.0467
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,082.5961	2,082.5961	0.0860	0.0178	2,090.0467
NaturalGas Mitigated	0.1219	1.0930	0.8200	6.6500e-003		0.0842	0.0842		0.0842	0.0842	0.0000	1,206.3662	1,206.3662	0.0231	0.0221	1,213.5351
NaturalGas Unmitigated	0.1219	1.0930	0.8200	6.6500e-003		0.0842	0.0842		0.0842	0.0842	0.0000	1,206.3662	1,206.3662	0.0231	0.0221	1,213.5351

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**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Convenience Market With Gas Pumps	5014.54	3.0000e-005	2.5000e-004	2.1000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.2676	0.2676	1.0000e-005	0.0000	0.2692
Fast Food Restaurant w/o Drive Thru	1.50392e+006	8.1100e-003	0.0737	0.0619	4.4000e-004		5.6000e-003	5.6000e-003		5.6000e-003	5.6000e-003	0.0000	80.2549	80.2549	1.5400e-003	1.4700e-003	80.7318
Fast Food Restaurant with Drive Thru	1.64064e+006	8.8500e-003	0.0804	0.0676	4.8000e-004		6.1100e-003	6.1100e-003		6.1100e-003	6.1100e-003	0.0000	87.5508	87.5508	1.6800e-003	1.6100e-003	88.0711
General Office Building	149210	8.0000e-004	7.3100e-003	6.1400e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	7.9624	7.9624	1.5000e-004	1.5000e-004	8.0097
Health Club	259920	1.4000e-003	0.0127	0.0107	8.0000e-005		9.7000e-004	9.7000e-004		9.7000e-004	9.7000e-004	0.0000	13.8703	13.8703	2.7000e-004	2.5000e-004	13.9528
High Turnover (Sit Down Restaurant)	2.57034e+006	0.0139	0.1260	0.1058	7.6000e-004		9.5800e-003	9.5800e-003		9.5800e-003	9.5800e-003	0.0000	137.1629	137.1629	2.6300e-003	2.5100e-003	137.9780
Hotel	1.13275e+007	0.0611	0.5553	0.4664	3.3300e-003		0.0422	0.0422		0.0422	0.0422	0.0000	604.4779	604.4779	0.0116	0.0111	608.0700
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	5.14015e+006	0.0277	0.2369	0.1008	1.5100e-003		0.0192	0.0192		0.0192	0.0192	0.0000	274.2982	274.2982	5.2600e-003	5.0300e-003	275.9282
Strip Mall	9768	5.0000e-005	4.8000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.5213	0.5213	1.0000e-005	1.0000e-005	0.5244
<b>Total</b>		<b>0.1219</b>	<b>1.0930</b>	<b>0.8200</b>	<b>6.6400e-003</b>		<b>0.0842</b>	<b>0.0842</b>		<b>0.0842</b>	<b>0.0842</b>	<b>0.0000</b>	<b>1,206.3662</b>	<b>1,206.3662</b>	<b>0.0231</b>	<b>0.0221</b>	<b>1,213.5351</b>

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**5.2 Energy by Land Use - NaturalGas**

**Mitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Convenience Market With Gas Pumps	5014.54	3.0000e-005	2.5000e-004	2.1000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.2676	0.2676	1.0000e-005	0.0000	0.2692
Fast Food Restaurant w/o Drive Thru	1.50392e+006	8.1100e-003	0.0737	0.0619	4.4000e-004		5.6000e-003	5.6000e-003		5.6000e-003	5.6000e-003	0.0000	80.2549	80.2549	1.5400e-003	1.4700e-003	80.7318
Fast Food Restaurant with Drive Thru	1.64064e+006	8.8500e-003	0.0804	0.0676	4.8000e-004		6.1100e-003	6.1100e-003		6.1100e-003	6.1100e-003	0.0000	87.5508	87.5508	1.6800e-003	1.6100e-003	88.0711
General Office Building	149210	8.0000e-004	7.3100e-003	6.1400e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	7.9624	7.9624	1.5000e-004	1.5000e-004	8.0097
Health Club	259920	1.4000e-003	0.0127	0.0107	8.0000e-005		9.7000e-004	9.7000e-004		9.7000e-004	9.7000e-004	0.0000	13.8703	13.8703	2.7000e-004	2.5000e-004	13.9528
High Turnover (Sit Down Restaurant)	2.57034e+006	0.0139	0.1260	0.1058	7.6000e-004		9.5800e-003	9.5800e-003		9.5800e-003	9.5800e-003	0.0000	137.1629	137.1629	2.6300e-003	2.5100e-003	137.9780
Hotel	1.13275e+007	0.0611	0.5553	0.4664	3.3300e-003		0.0422	0.0422		0.0422	0.0422	0.0000	604.4779	604.4779	0.0116	0.0111	608.0700
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	5.14015e+006	0.0277	0.2369	0.1008	1.5100e-003		0.0192	0.0192		0.0192	0.0192	0.0000	274.2982	274.2982	5.2600e-003	5.0300e-003	275.9282
Strip Mall	9768	5.0000e-005	4.8000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.5213	0.5213	1.0000e-005	1.0000e-005	0.5244
<b>Total</b>		<b>0.1219</b>	<b>1.0930</b>	<b>0.8200</b>	<b>6.6400e-003</b>		<b>0.0842</b>	<b>0.0842</b>		<b>0.0842</b>	<b>0.0842</b>	<b>0.0000</b>	<b>1,206.3662</b>	<b>1,206.3662</b>	<b>0.0231</b>	<b>0.0221</b>	<b>1,213.5351</b>

## Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

Land Use	Electricity Use kWh/yr	Total CO2 MT/yr	CH4 MT/yr	N2O MT/yr	CO2e MT/yr
City Park	0	0.0000	0.0000	0.0000	0.0000
Convenience Market With Gas Pumps	28528.6	9.0898	3.8000e-004	8.0000e-005	9.1224
Fast Food Restaurant w/o Drive Thru	261140	83.2048	3.4400e-003	7.1000e-004	83.5025
Fast Food Restaurant with Drive Thru	284880	90.7689	3.7500e-003	7.8000e-004	91.0936
General Office Building	409360	130.4309	5.3800e-003	1.1100e-003	130.8975
Health Club	81200	25.8721	1.0700e-003	2.2000e-004	25.9646
High Turnover (Sit Down Restaurant)	446312	142.2046	5.8700e-003	1.2100e-003	142.7133
Hotel	3.42411e+006	1,090.9937	0.0450	9.3200e-003	1,094.8967
Parking Lot	80803.8	25.7458	1.0600e-003	2.2000e-004	25.8379
Single Family Housing	1.46437e+006	466.5792	0.0193	3.9900e-003	468.2484
Strip Mall	55572	17.7064	7.3000e-004	1.5000e-004	17.7698
<b>Total</b>		<b>2,082.5961</b>	<b>0.0860</b>	<b>0.0178</b>	<b>2,090.0467</b>

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**5.3 Energy by Land Use - Electricity**

**Mitigated**

Land Use	Electricity Use kWh/yr	Total CO2 MT/yr	CH4 MT/yr	N2O MT/yr	CO2e MT/yr
City Park	0	0.0000	0.0000	0.0000	0.0000
Convenience Market With Gas Pumps	28528.6	9.0898	3.8000e-004	8.0000e-005	9.1224
Fast Food Restaurant w/o Drive Thru	261140	83.2048	3.4400e-003	7.1000e-004	83.5025
Fast Food Restaurant with Drive Thru	284880	90.7689	3.7500e-003	7.8000e-004	91.0936
General Office Building	409360	130.4309	5.3800e-003	1.1100e-003	130.8975
Health Club	81200	25.8721	1.0700e-003	2.2000e-004	25.9646
High Turnover (Sit Down Restaurant)	446312	142.2046	5.8700e-003	1.2100e-003	142.7133
Hotel	3.42411e+006	1,090.9937	0.0450	9.3200e-003	1,094.8967
Parking Lot	80803.8	25.7458	1.0600e-003	2.2000e-004	25.8379
Single Family Housing	1.46437e+006	466.5792	0.0193	3.9900e-003	468.2484
Strip Mall	55572	17.7064	7.3000e-004	1.5000e-004	17.7698
<b>Total</b>		<b>2,082.5961</b>	<b>0.0860</b>	<b>0.0178</b>	<b>2,090.0467</b>

**6.0 Area Detail**

**6.1 Mitigation Measures Area**

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.3548	0.0548	1.7458	3.1000e-004		0.0124	0.0124		0.0124	0.0124	0.0000	43.1790	43.1790	3.4800e-003	7.4000e-004	43.4865
Unmitigated	2.3548	0.0548	1.7458	3.1000e-004		0.0124	0.0124		0.0124	0.0124	0.0000	43.1790	43.1790	3.4800e-003	7.4000e-004	43.4865

**6.2 Area by SubCategory**

**Unmitigated**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2217					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.0770					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	4.0800e-003	0.0348	0.0148	2.2000e-004		2.8200e-003	2.8200e-003		2.8200e-003	2.8200e-003	0.0000	40.3430	40.3430	7.7000e-004	7.4000e-004	40.5828
Landscaping	0.0520	0.0200	1.7309	9.0000e-005		9.6200e-003	9.6200e-003		9.6200e-003	9.6200e-003	0.0000	2.8359	2.8359	2.7100e-003	0.0000	2.9037
<b>Total</b>	<b>2.3548</b>	<b>0.0548</b>	<b>1.7458</b>	<b>3.1000e-004</b>		<b>0.0124</b>	<b>0.0124</b>		<b>0.0124</b>	<b>0.0124</b>	<b>0.0000</b>	<b>43.1790</b>	<b>43.1790</b>	<b>3.4800e-003</b>	<b>7.4000e-004</b>	<b>43.4865</b>

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**6.2 Area by SubCategory**

**Mitigated**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2217					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.0770					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	4.0800e-003	0.0348	0.0148	2.2000e-004		2.8200e-003	2.8200e-003		2.8200e-003	2.8200e-003	0.0000	40.3430	40.3430	7.7000e-004	7.4000e-004	40.5828
Landscaping	0.0520	0.0200	1.7309	9.0000e-005		9.6200e-003	9.6200e-003		9.6200e-003	9.6200e-003	0.0000	2.8359	2.8359	2.7100e-003	0.0000	2.9037
<b>Total</b>	<b>2.3548</b>	<b>0.0548</b>	<b>1.7458</b>	<b>3.1000e-004</b>		<b>0.0124</b>	<b>0.0124</b>		<b>0.0124</b>	<b>0.0124</b>	<b>0.0000</b>	<b>43.1790</b>	<b>43.1790</b>	<b>3.4800e-003</b>	<b>7.4000e-004</b>	<b>43.4865</b>

**7.0 Water Detail**

**7.1 Mitigation Measures Water**

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	211.2345	0.9597	0.0242	242.4353
Unmitigated	211.2345	0.9597	0.0242	242.4353

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**7.2 Water by Land Use**

**Unmitigated**

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 9.8893	35.0070	1.4500e-003	3.0000e-004	35.1322
Convenience Market With Gas Pumps	0.167315 / 0.102548	1.1102	5.5000e-003	1.4000e-004	1.2887
Fast Food Restaurant w/o Drive Thru	1.66944 / 0.10656	7.8330	0.0547	1.3500e-003	9.6018
Fast Food Restaurant with Drive Thru	1.8212 / 0.116247	8.5450	0.0597	1.4700e-003	10.4747
General Office Building	7.64255 / 4.68414	50.7131	0.2510	6.2900e-003	58.8640
Health Club	0.473145 / 0.289992	3.1396	0.0155	3.9000e-004	3.6442
High Turnover (Sit Down Restaurant)	2.85322 / 0.18212	13.3872	0.0935	2.3000e-003	16.4104
Hotel	3.29768 / 0.366409	16.0246	0.1081	2.6700e-003	19.5206
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	10.9459 / 6.90066	73.3121	0.3596	9.0200e-003	84.9884
Strip Mall	0.325919 / 0.199757	2.1627	0.0107	2.7000e-004	2.5103
<b>Total</b>		<b>211.2345</b>	<b>0.9597</b>	<b>0.0242</b>	<b>242.4353</b>

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**7.2 Water by Land Use**

**Mitigated**

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 9.8893	35.0070	1.4500e-003	3.0000e-004	35.1322
Convenience Market With Gas Pumps	0.167315 / 0.102548	1.1102	5.5000e-003	1.4000e-004	1.2887
Fast Food Restaurant w/o Drive Thru	1.66944 / 0.10656	7.8330	0.0547	1.3500e-003	9.6018
Fast Food Restaurant with Drive Thru	1.8212 / 0.116247	8.5450	0.0597	1.4700e-003	10.4747
General Office Building	7.64255 / 4.68414	50.7131	0.2510	6.2900e-003	58.8640
Health Club	0.473145 / 0.289992	3.1396	0.0155	3.9000e-004	3.6442
High Turnover (Sit Down Restaurant)	2.85322 / 0.18212	13.3872	0.0935	2.3000e-003	16.4104
Hotel	3.29768 / 0.366409	16.0246	0.1081	2.6700e-003	19.5206
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	10.9459 / 6.90066	73.3121	0.3596	9.0200e-003	84.9884
Strip Mall	0.325919 / 0.199757	2.1627	0.0107	2.7000e-004	2.5103
<b>Total</b>		<b>211.2345</b>	<b>0.9597</b>	<b>0.0242</b>	<b>242.4353</b>

**8.0 Waste Detail**

**8.1 Mitigation Measures Waste**

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**Category/Year**

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	122.4462	7.2364	0.0000	303.3552
Unmitigated	122.4462	7.2364	0.0000	303.3552

## Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**8.2 Waste by Land Use****Unmitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.71	0.1441	8.5200e-003	0.0000	0.3571
Fast Food Restaurant w/o Drive Thru	63.35	12.8595	0.7600	0.0000	31.8588
Fast Food Restaurant with Drive Thru	69.11	14.0287	0.8291	0.0000	34.7555
General Office Building	39.99	8.1176	0.4797	0.0000	20.1110
Health Club	45.6	9.2564	0.5470	0.0000	22.9323
High Turnover (Sit Down Restaurant)	111.86	22.7066	1.3419	0.0000	56.2546
Hotel	71.17	14.4469	0.8538	0.0000	35.7915
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	196.8	39.9486	2.3609	0.0000	98.9710
Strip Mall	4.62	0.9378	0.0554	0.0000	2.3234
<b>Total</b>		<b>122.4462</b>	<b>7.2364</b>	<b>0.0000</b>	<b>303.3552</b>

Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**8.2 Waste by Land Use**

**Mitigated**

Land Use	Waste Disposed tons	Total CO2 MT/yr	CH4 MT/yr	N2O MT/yr	CO2e MT/yr
City Park	0.71	0.1441	8.5200e-003	0.0000	0.3571
Fast Food Restaurant w/o Drive Thru	63.35	12.8595	0.7600	0.0000	31.8588
Fast Food Restaurant with Drive Thru	69.11	14.0287	0.8291	0.0000	34.7555
General Office Building	39.99	8.1176	0.4797	0.0000	20.1110
Health Club	45.6	9.2564	0.5470	0.0000	22.9323
High Turnover (Sit Down Restaurant)	111.86	22.7066	1.3419	0.0000	56.2546
Hotel	71.17	14.4469	0.8538	0.0000	35.7915
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	196.8	39.9486	2.3609	0.0000	98.9710
Strip Mall	4.62	0.9378	0.0554	0.0000	2.3234
<b>Total</b>		<b>122.4462</b>	<b>7.2364</b>	<b>0.0000</b>	<b>303.3552</b>

**9.0 Operational Offroad**

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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Nichols Ranch Project Buildingout (2030 Operations - Unmitigated) - Riverside-South Coast County, Annual

**10.0 Stationary Equipment**

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**Fire Pumps and Emergency Generators**

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
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**Boilers**

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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**User Defined Equipment**

Equipment Type	Number
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**11.0 Vegetation**

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Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**Nichols Ranch Project Buildingout (2030 Operations - Mitigated)**  
**Riverside-South Coast County, Annual**

**1.0 Project Characteristics**

**1.1 Land Usage**

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	43.00	1000sqft	2.34	43,000.00	0
Parking Lot	5.30	Acre	5.30	230,868.00	0
City Park	8.30	Acre	8.30	361,548.00	0
Fast Food Restaurant w/o Drive Thru	5.50	1000sqft	0.31	5,500.00	0
Fast Food Restaurant with Drive Thru	6.00	1000sqft	0.33	6,000.00	0
Health Club	8.00	1000sqft	0.43	8,000.00	0
High Turnover (Sit Down Restaurant)	9.40	1000sqft	0.52	9,400.00	0
Hotel	130.00	Room	10.23	188,760.00	0
Single Family Housing	168.00	Dwelling Unit	31.10	302,400.00	480
Convenience Market With Gas Pumps	16.00	Pump	0.12	2,258.80	0
Strip Mall	4.40	1000sqft	0.24	4,400.00	0

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Urban	<b>Wind Speed (m/s)</b>	2.4	<b>Precipitation Freq (Days)</b>	28
<b>Climate Zone</b>	10			<b>Operational Year</b>	2030
<b>Utility Company</b>	Southern California Edison				
<b>CO2 Intensity (lb/MWhr)</b>	367.5	<b>CH4 Intensity (lb/MWhr)</b>	0.029	<b>N2O Intensity (lb/MWhr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**

## Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

Project Characteristics - CO2 intensity factor represents CO2e intensity factor. The projected 2030 RPS target is derived based on a linear trajectory to reach the 50% project RPS consistent with SB 32 and SB 350.

Land Use - Total Analyzed Project Area is 59.22 acres. Please note that the Total Lot Area as per the Site Plan is 72.5 acres. However, Open Space (1.3 acres) and Public Institutional Draining Basin and Floodway uses (12 acres) will not be included in the analysis.

Construction Phase - Operations Run Only.

Off-road Equipment - Operations Run Only.

Trips and VMT - Operations Run Only.

Vehicle Trips - Trip Rates based on information provided in the TIA.

Woodstoves - Rule 445

Energy Use - Title-24 Electricity Energy Intensity was adjusted by 53% (Residential) and 31% (Commercial) to reflect 2019 Title 24 requirements.

Mobile Land Use Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	40.00	1.00
tblEnergyUse	T24E	4.58	3.16
tblEnergyUse	T24E	12.38	8.54
tblEnergyUse	T24E	12.38	8.54
tblEnergyUse	T24E	3.07	2.12
tblEnergyUse	T24E	2.20	1.52
tblEnergyUse	T24E	12.38	8.54
tblEnergyUse	T24E	6.47	4.46
tblEnergyUse	T24E	951.67	447.28
tblEnergyUse	T24E	4.58	3.16
tblFireplaces	NumberGas	142.80	168.00
tblFireplaces	NumberNoFireplace	16.80	0.00
tblFireplaces	NumberWood	8.40	0.00
tblLandUse	LotAcreage	0.99	2.34

## Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

tblLandUse	LotAcreage	0.13	0.31
tblLandUse	LotAcreage	0.14	0.33
tblLandUse	LotAcreage	0.18	0.43
tblLandUse	LotAcreage	0.22	0.52
tblLandUse	LotAcreage	4.33	10.23
tblLandUse	LotAcreage	54.55	31.10
tblLandUse	LotAcreage	0.05	0.12
tblLandUse	LotAcreage	0.10	0.24
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	367.5
tblVehicleTrips	ST_TR	22.75	1.96
tblVehicleTrips	ST_TR	722.03	616.12
tblVehicleTrips	ST_TR	158.37	122.40
tblVehicleTrips	ST_TR	9.91	9.54
tblVehicleTrips	SU_TR	16.74	2.19
tblVehicleTrips	SU_TR	542.72	472.58
tblVehicleTrips	SU_TR	131.84	142.64
tblVehicleTrips	SU_TR	8.62	8.55
tblVehicleTrips	WD_TR	1.89	0.78
tblVehicleTrips	WD_TR	542.60	198.16
tblVehicleTrips	WD_TR	716.00	346.23
tblVehicleTrips	WD_TR	496.12	470.95
tblVehicleTrips	WD_TR	11.03	10.88
tblVehicleTrips	WD_TR	32.93	34.50
tblVehicleTrips	WD_TR	127.15	122.18
tblVehicleTrips	WD_TR	8.17	8.36

## Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

tblVehicleTrips	WD_TR	9.52	9.44
tblVehicleTrips	WD_TR	44.32	163.35
tblWoodstoves	NumberCatalytic	8.40	0.00
tblWoodstoves	NumberNoncatalytic	8.40	0.00

## 2.0 Emissions Summary

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Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

**2.2 Overall Operational**

**Unmitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.3548	0.0548	1.7458	3.1000e-004		0.0124	0.0124		0.0124	0.0124	0.0000	43.1790	43.1790	3.4800e-003	7.4000e-004	43.4865
Energy	0.1219	1.0930	0.8200	6.6500e-003		0.0842	0.0842		0.0842	0.0842	0.0000	2,196.0182	2,196.0182	0.1012	0.0383	2,209.9544
Mobile	1.9967	17.7003	17.7260	0.0981	8.1334	0.0479	8.1812	2.1774	0.0445	2.2220	0.0000	9,165.5036	9,165.5036	0.4718	0.0000	9,177.2981
Waste						0.0000	0.0000		0.0000	0.0000	122.4462	0.0000	122.4462	7.2364	0.0000	303.3552
Water						0.0000	0.0000		0.0000	0.0000	9.2627	105.6669	114.9295	0.9597	0.0242	146.1304
<b>Total</b>	<b>4.4734</b>	<b>18.8481</b>	<b>20.2918</b>	<b>0.1050</b>	<b>8.1334</b>	<b>0.1445</b>	<b>8.2779</b>	<b>2.1774</b>	<b>0.1412</b>	<b>2.3186</b>	<b>131.7088</b>	<b>11,510.3677</b>	<b>11,642.0765</b>	<b>8.7725</b>	<b>0.0632</b>	<b>11,880.2245</b>

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**2.2 Overall Operational**

**Mitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.3548	0.0548	1.7458	3.1000e-004		0.0124	0.0124		0.0124	0.0124	0.0000	43.1790	43.1790	3.4800e-003	7.4000e-004	43.4865
Energy	0.1219	1.0930	0.8200	6.6500e-003		0.0842	0.0842		0.0842	0.0842	0.0000	2,196.0182	2,196.0182	0.1012	0.0383	2,209.9544
Mobile	1.9439	17.3959	16.3162	0.0892	7.1736	0.0435	7.2171	1.9205	0.0404	1.9609	0.0000	8,342.4064	8,342.4064	0.4522	0.0000	8,353.7116
Waste						0.0000	0.0000		0.0000	0.0000	122.4462	0.0000	122.4462	7.2364	0.0000	303.3552
Water						0.0000	0.0000		0.0000	0.0000	7.4101	84.5335	91.9436	0.7678	0.0194	116.9043
<b>Total</b>	<b>4.4206</b>	<b>18.5437</b>	<b>18.8820</b>	<b>0.0962</b>	<b>7.1736</b>	<b>0.1401</b>	<b>7.3137</b>	<b>1.9205</b>	<b>0.1371</b>	<b>2.0576</b>	<b>129.8563</b>	<b>10,666.1371</b>	<b>10,795.9934</b>	<b>8.5610</b>	<b>0.0584</b>	<b>11,027.4120</b>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
<b>Percent Reduction</b>	<b>1.18</b>	<b>1.61</b>	<b>6.95</b>	<b>8.44</b>	<b>11.80</b>	<b>3.05</b>	<b>11.65</b>	<b>11.80</b>	<b>2.92</b>	<b>11.26</b>	<b>1.41</b>	<b>7.33</b>	<b>7.27</b>	<b>2.41</b>	<b>7.66</b>	<b>7.18</b>

**3.0 Construction Detail**

**Construction Phase**

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/3/2019	6/3/2019	5	1	

**Acres of Grading (Site Preparation Phase): 0**

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 5.3**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**



Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**3.2 Site Preparation - 2019**

**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>							

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>							

**4.0 Operational Detail - Mobile**

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Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**4.1 Mitigation Measures Mobile**

Increase Diversity

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.9439	17.3959	16.3162	0.0892	7.1736	0.0435	7.2171	1.9205	0.0404	1.9609	0.0000	8,342.4064	8,342.4064	0.4522	0.0000	8,353.7116
Unmitigated	1.9967	17.7003	17.7260	0.0981	8.1334	0.0479	8.1812	2.1774	0.0445	2.2220	0.0000	9,165.5036	9,165.5036	0.4718	0.0000	9,177.2981

**4.2 Trip Summary Information**

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	6.47	16.27	18.18	27,466	24,225
Convenience Market With Gas Pumps	3,170.56	3,271.52	2670.08	1,858,361	1,639,074
Fast Food Restaurant w/o Drive Thru	1,904.27	3,828.00	2750.00	4,165,226	3,673,729
Fast Food Restaurant with Drive Thru	2,825.70	3,696.72	2835.48	3,106,152	2,739,626
General Office Building	467.84	105.78	45.15	1,145,980	1,010,754
Health Club	276.00	166.96	213.84	537,993	474,509
High Turnover (Sit Down Restaurant)	1,148.49	1,150.56	1340.82	1,603,046	1,413,887
Hotel	1,086.80	1,064.70	773.50	2,478,959	2,186,442
Parking Lot	0.00	0.00	0.00		
Single Family Housing	1,585.92	1,602.72	1436.40	5,354,540	4,722,705
Strip Mall	718.74	184.98	89.89	1,051,474	927,400
<b>Total</b>	<b>13,190.79</b>	<b>15,088.20</b>	<b>12,173.34</b>	<b>21,329,196</b>	<b>18,812,351</b>

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6
Convenience Market With Gas	16.60	8.40	6.90	0.80	80.20	19.00	14	21	65
Fast Food Restaurant w/o Drive	16.60	8.40	6.90	1.50	79.50	19.00	51	37	12
Fast Food Restaurant with Drive	16.60	8.40	6.90	2.20	78.80	19.00	29	21	50
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Convenience Market With Gas Pumps	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Fast Food Restaurant w/o Drive Thru	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Fast Food Restaurant with Drive Thru	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
General Office Building	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Health Club	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
High Turnover (Sit Down Restaurant)	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Hotel	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Parking Lot	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Single Family Housing	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615
Strip Mall	0.562310	0.034239	0.191194	0.102231	0.010280	0.004149	0.017053	0.070255	0.001423	0.001071	0.004354	0.000825	0.000615

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated							0.0000	0.0000		0.0000	0.0000	989.6520	989.6520	0.0781	0.0162	996.4193
Electricity Unmitigated							0.0000	0.0000		0.0000	0.0000	989.6520	989.6520	0.0781	0.0162	996.4193
NaturalGas Mitigated	0.1219	1.0930	0.8200	6.6500e-003			0.0842	0.0842		0.0842	0.0000	1,206.3662	1,206.3662	0.0231	0.0221	1,213.5351
NaturalGas Unmitigated	0.1219	1.0930	0.8200	6.6500e-003			0.0842	0.0842		0.0842	0.0000	1,206.3662	1,206.3662	0.0231	0.0221	1,213.5351

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Convenience Market With Gas Pumps	5014.54	3.0000e-005	2.5000e-004	2.1000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.2676	0.2676	1.0000e-005	0.0000	0.2692
Fast Food Restaurant w/o Drive Thru	1.50392e+006	8.1100e-003	0.0737	0.0619	4.4000e-004		5.6000e-003	5.6000e-003		5.6000e-003	5.6000e-003	0.0000	80.2549	80.2549	1.5400e-003	1.4700e-003	80.7318
Fast Food Restaurant with Drive Thru	1.64064e+006	8.8500e-003	0.0804	0.0676	4.8000e-004		6.1100e-003	6.1100e-003		6.1100e-003	6.1100e-003	0.0000	87.5508	87.5508	1.6800e-003	1.6100e-003	88.0711
General Office Building	149210	8.0000e-004	7.3100e-003	6.1400e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	7.9624	7.9624	1.5000e-004	1.5000e-004	8.0097
Health Club	259920	1.4000e-003	0.0127	0.0107	8.0000e-005		9.7000e-004	9.7000e-004		9.7000e-004	9.7000e-004	0.0000	13.8703	13.8703	2.7000e-004	2.5000e-004	13.9528
High Turnover (Sit Down Restaurant)	2.57034e+006	0.0139	0.1260	0.1058	7.6000e-004		9.5800e-003	9.5800e-003		9.5800e-003	9.5800e-003	0.0000	137.1629	137.1629	2.6300e-003	2.5100e-003	137.9780
Hotel	1.13275e+007	0.0611	0.5553	0.4664	3.3300e-003		0.0422	0.0422		0.0422	0.0422	0.0000	604.4779	604.4779	0.0116	0.0111	608.0700
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	5.14015e+006	0.0277	0.2369	0.1008	1.5100e-003		0.0192	0.0192		0.0192	0.0192	0.0000	274.2982	274.2982	5.2600e-003	5.0300e-003	275.9282
Strip Mall	9768	5.0000e-005	4.8000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.5213	0.5213	1.0000e-005	1.0000e-005	0.5244
<b>Total</b>		<b>0.1219</b>	<b>1.0930</b>	<b>0.8200</b>	<b>6.6400e-003</b>		<b>0.0842</b>	<b>0.0842</b>		<b>0.0842</b>	<b>0.0842</b>	<b>0.0000</b>	<b>1,206.3662</b>	<b>1,206.3662</b>	<b>0.0231</b>	<b>0.0221</b>	<b>1,213.5351</b>

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**5.2 Energy by Land Use - NaturalGas**

**Mitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Convenience Market With Gas Pumps	5014.54	3.0000e-005	2.5000e-004	2.1000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.2676	0.2676	1.0000e-005	0.0000	0.2692
Fast Food Restaurant w/o Drive Thru	1.50392e+006	8.1100e-003	0.0737	0.0619	4.4000e-004		5.6000e-003	5.6000e-003		5.6000e-003	5.6000e-003	0.0000	80.2549	80.2549	1.5400e-003	1.4700e-003	80.7318
Fast Food Restaurant with Drive Thru	1.64064e+006	8.8500e-003	0.0804	0.0676	4.8000e-004		6.1100e-003	6.1100e-003		6.1100e-003	6.1100e-003	0.0000	87.5508	87.5508	1.6800e-003	1.6100e-003	88.0711
General Office Building	149210	8.0000e-004	7.3100e-003	6.1400e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	7.9624	7.9624	1.5000e-004	1.5000e-004	8.0097
Health Club	259920	1.4000e-003	0.0127	0.0107	8.0000e-005		9.7000e-004	9.7000e-004		9.7000e-004	9.7000e-004	0.0000	13.8703	13.8703	2.7000e-004	2.5000e-004	13.9528
High Turnover (Sit Down Restaurant)	2.57034e+006	0.0139	0.1260	0.1058	7.6000e-004		9.5800e-003	9.5800e-003		9.5800e-003	9.5800e-003	0.0000	137.1629	137.1629	2.6300e-003	2.5100e-003	137.9780
Hotel	1.13275e+007	0.0611	0.5553	0.4664	3.3300e-003		0.0422	0.0422		0.0422	0.0422	0.0000	604.4779	604.4779	0.0116	0.0111	608.0700
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	5.14015e+006	0.0277	0.2369	0.1008	1.5100e-003		0.0192	0.0192		0.0192	0.0192	0.0000	274.2982	274.2982	5.2600e-003	5.0300e-003	275.9282
Strip Mall	9768	5.0000e-005	4.8000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.5213	0.5213	1.0000e-005	1.0000e-005	0.5244
<b>Total</b>		<b>0.1219</b>	<b>1.0930</b>	<b>0.8200</b>	<b>6.6400e-003</b>		<b>0.0842</b>	<b>0.0842</b>		<b>0.0842</b>	<b>0.0842</b>	<b>0.0000</b>	<b>1,206.3662</b>	<b>1,206.3662</b>	<b>0.0231</b>	<b>0.0221</b>	<b>1,213.5351</b>

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**5.3 Energy by Land Use - Electricity**

**Unmitigated**

Land Use	Electricity Use kWh/yr	Total CO2	CH4	N2O	CO2e
		MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Convenience Market With Gas Pumps	25321.6	4.2210	3.3000e-004	7.0000e-005	4.2499
Fast Food Restaurant w/o Drive Thru	240032	40.0122	3.1600e-003	6.5000e-004	40.2858
Fast Food Restaurant with Drive Thru	261853	43.6497	3.4400e-003	7.1000e-004	43.9482
General Office Building	368437	61.4167	4.8500e-003	1.0000e-003	61.8366
Health Club	75744	12.6262	1.0000e-003	2.1000e-004	12.7125
High Turnover (Sit Down Restaurant)	410237	68.3845	5.4000e-003	1.1200e-003	68.8521
Hotel	3.04551e+006	507.6720	0.0401	8.2900e-003	511.1435
Parking Lot	80803.8	13.4696	1.0600e-003	2.2000e-004	13.5617
Single Family Housing	1.37963e+006	229.9780	0.0182	3.7500e-003	231.5506
Strip Mall	49324.9	8.2222	6.5000e-004	1.3000e-004	8.2784
<b>Total</b>		<b>989.6520</b>	<b>0.0781</b>	<b>0.0162</b>	<b>996.4193</b>

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**5.3 Energy by Land Use - Electricity**

**Mitigated**

Land Use	Electricity Use kWh/yr	Total CO2	CH4	N2O	CO2e
		MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Convenience Market With Gas Pumps	25321.6	4.2210	3.3000e-004	7.0000e-005	4.2499
Fast Food Restaurant w/o Drive Thru	240032	40.0122	3.1600e-003	6.5000e-004	40.2858
Fast Food Restaurant with Drive Thru	261853	43.6497	3.4400e-003	7.1000e-004	43.9482
General Office Building	368437	61.4167	4.8500e-003	1.0000e-003	61.8366
Health Club	75744	12.6262	1.0000e-003	2.1000e-004	12.7125
High Turnover (Sit Down Restaurant)	410237	68.3845	5.4000e-003	1.1200e-003	68.8521
Hotel	3.04551e+006	507.6720	0.0401	8.2900e-003	511.1435
Parking Lot	80803.8	13.4696	1.0600e-003	2.2000e-004	13.5617
Single Family Housing	1.37963e+006	229.9780	0.0182	3.7500e-003	231.5506
Strip Mall	49324.9	8.2222	6.5000e-004	1.3000e-004	8.2784
<b>Total</b>		<b>989.6520</b>	<b>0.0781</b>	<b>0.0162</b>	<b>996.4193</b>

**6.0 Area Detail**

**6.1 Mitigation Measures Area**

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.3548	0.0548	1.7458	3.1000e-004		0.0124	0.0124		0.0124	0.0124	0.0000	43.1790	43.1790	3.4800e-003	7.4000e-004	43.4865
Unmitigated	2.3548	0.0548	1.7458	3.1000e-004		0.0124	0.0124		0.0124	0.0124	0.0000	43.1790	43.1790	3.4800e-003	7.4000e-004	43.4865

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2217					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.0770					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	4.0800e-003	0.0348	0.0148	2.2000e-004		2.8200e-003	2.8200e-003		2.8200e-003	2.8200e-003	0.0000	40.3430	40.3430	7.7000e-004	7.4000e-004	40.5828
Landscaping	0.0520	0.0200	1.7309	9.0000e-005		9.6200e-003	9.6200e-003		9.6200e-003	9.6200e-003	0.0000	2.8359	2.8359	2.7100e-003	0.0000	2.9037
<b>Total</b>	<b>2.3548</b>	<b>0.0548</b>	<b>1.7458</b>	<b>3.1000e-004</b>		<b>0.0124</b>	<b>0.0124</b>		<b>0.0124</b>	<b>0.0124</b>	<b>0.0000</b>	<b>43.1790</b>	<b>43.1790</b>	<b>3.4800e-003</b>	<b>7.4000e-004</b>	<b>43.4865</b>

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**6.2 Area by SubCategory**

**Mitigated**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2217					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.0770					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	4.0800e-003	0.0348	0.0148	2.2000e-004		2.8200e-003	2.8200e-003		2.8200e-003	2.8200e-003	0.0000	40.3430	40.3430	7.7000e-004	7.4000e-004	40.5828
Landscaping	0.0520	0.0200	1.7309	9.0000e-005		9.6200e-003	9.6200e-003		9.6200e-003	9.6200e-003	0.0000	2.8359	2.8359	2.7100e-003	0.0000	2.9037
<b>Total</b>	<b>2.3548</b>	<b>0.0548</b>	<b>1.7458</b>	<b>3.1000e-004</b>		<b>0.0124</b>	<b>0.0124</b>		<b>0.0124</b>	<b>0.0124</b>	<b>0.0000</b>	<b>43.1790</b>	<b>43.1790</b>	<b>3.4800e-003</b>	<b>7.4000e-004</b>	<b>43.4865</b>

**7.0 Water Detail**

**7.1 Mitigation Measures Water**

Apply Water Conservation Strategy

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	91.9436	0.7678	0.0194	116.9043
Unmitigated	114.9295	0.9597	0.0242	146.1304

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**7.2 Water by Land Use**

**Unmitigated**

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 9.8893	18.3148	1.4500e-003	3.0000e-004	18.4401
Convenience Market With Gas Pumps	0.167315 / 0.102548	0.6062	5.5000e-003	1.4000e-004	0.7846
Fast Food Restaurant w/o Drive Thru	1.66944 / 0.10656	4.3506	0.0547	1.3500e-003	6.1194
Fast Food Restaurant with Drive Thru	1.8212 / 0.116247	4.7461	0.0597	1.4700e-003	6.6757
General Office Building	7.64255 / 4.68414	27.6880	0.2510	6.2900e-003	35.8389
Health Club	0.473145 / 0.289992	1.7142	0.0155	3.9000e-004	2.2188
High Turnover (Sit Down Restaurant)	2.85322 / 0.18212	7.4355	0.0935	2.3000e-003	10.4586
Hotel	3.29768 / 0.366409	8.8825	0.1081	2.6700e-003	12.3786
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	10.9459 / 6.90066	40.0110	0.3596	9.0200e-003	51.6873
Strip Mall	0.325919 / 0.199757	1.1808	0.0107	2.7000e-004	1.5284
<b>Total</b>		<b>114.9295</b>	<b>0.9597</b>	<b>0.0242</b>	<b>146.1304</b>

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**7.2 Water by Land Use**

**Mitigated**

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 7.91144	14.6519	1.1600e-003	2.4000e-004	14.7520
Convenience Market With Gas Pumps	0.133852 / 0.0820383	0.4849	4.4000e-003	1.1000e-004	0.6277
Fast Food Restaurant w/o Drive Thru	1.33555 / 0.0852478	3.4804	0.0438	1.0800e-003	4.8955
Fast Food Restaurant with Drive Thru	1.45696 / 0.0929976	3.7969	0.0477	1.1800e-003	5.3406
General Office Building	6.11404 / 3.74732	22.1504	0.2008	5.0300e-003	28.6711
Health Club	0.378516 / 0.231994	1.3713	0.0124	3.1000e-004	1.7750
High Turnover (Sit Down Restaurant)	2.28257 / 0.145696	5.9484	0.0748	1.8400e-003	8.3669
Hotel	2.63814 / 0.293127	7.1060	0.0865	2.1300e-003	9.9029
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	8.7567 / 5.52053	32.0088	0.2876	7.2100e-003	41.3499
Strip Mall	0.260735 / 0.159805	0.9446	8.5600e-003	2.1000e-004	1.2227
<b>Total</b>		<b>91.9436</b>	<b>0.7678</b>	<b>0.0193</b>	<b>116.9043</b>

**8.0 Waste Detail**

**8.1 Mitigation Measures Waste**

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**Category/Year**

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	122.4462	7.2364	0.0000	303.3552
Unmitigated	122.4462	7.2364	0.0000	303.3552

## Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**8.2 Waste by Land Use****Unmitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.71	0.1441	8.5200e-003	0.0000	0.3571
Fast Food Restaurant w/o Drive Thru	63.35	12.8595	0.7600	0.0000	31.8588
Fast Food Restaurant with Drive Thru	69.11	14.0287	0.8291	0.0000	34.7555
General Office Building	39.99	8.1176	0.4797	0.0000	20.1110
Health Club	45.6	9.2564	0.5470	0.0000	22.9323
High Turnover (Sit Down Restaurant)	111.86	22.7066	1.3419	0.0000	56.2546
Hotel	71.17	14.4469	0.8538	0.0000	35.7915
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	196.8	39.9486	2.3609	0.0000	98.9710
Strip Mall	4.62	0.9378	0.0554	0.0000	2.3234
<b>Total</b>		<b>122.4462</b>	<b>7.2364</b>	<b>0.0000</b>	<b>303.3552</b>

Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**8.2 Waste by Land Use**

**Mitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.71	0.1441	8.5200e-003	0.0000	0.3571
Fast Food Restaurant w/o Drive Thru	63.35	12.8595	0.7600	0.0000	31.8588
Fast Food Restaurant with Drive Thru	69.11	14.0287	0.8291	0.0000	34.7555
General Office Building	39.99	8.1176	0.4797	0.0000	20.1110
Health Club	45.6	9.2564	0.5470	0.0000	22.9323
High Turnover (Sit Down Restaurant)	111.86	22.7066	1.3419	0.0000	56.2546
Hotel	71.17	14.4469	0.8538	0.0000	35.7915
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	196.8	39.9486	2.3609	0.0000	98.9710
Strip Mall	4.62	0.9378	0.0554	0.0000	2.3234
<b>Total</b>		<b>122.4462</b>	<b>7.2364</b>	<b>0.0000</b>	<b>303.3552</b>

**9.0 Operational Offroad**

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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## Nichols Ranch Project Buildingout (2030 Operations - Mitigated) - Riverside-South Coast County, Annual

**10.0 Stationary Equipment**

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**Fire Pumps and Emergency Generators**

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
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**Boilers**

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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**User Defined Equipment**

Equipment Type	Number
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**11.0 Vegetation**

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