

## 3.7 Greenhouse Gas Emissions

This section provides a discussion of greenhouse gas (GHG) emissions, existing regulations pertaining to GHGs, and quantification of GHG emissions that would result from construction and operation of the proposed project. The methods of analyzing emissions described in this section are consistent with the recommendations of the South Coast Air Quality Management District (SCAQMD). GHG modeling calculations are provided in Appendix E of this EIR.

### 3.7.1 Environmental Setting

#### Existing Conditions

##### *GHG Emissions Overview*

Various gases in the earth's atmosphere, classified as GHGs, play a critical role in determining its surface temperature. Solar radiation enters earth's atmosphere from space, and a portion of the radiation is absorbed by the earth's surface. Earth re-radiates this energy back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. GHGs, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation (that otherwise would have escaped back into space) is now retained in the atmosphere, and results in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth. Without the greenhouse effect, the earth would not be able to support life as we know it.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), chlorofluorocarbons (CFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Much of the scientific literature suggests that human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of earth's climate, known as global climate change or global warming. While there is some debate regarding this issue, it is unlikely that global climate change of the past 50 years can be explained without contribution from human activities (IPCC, 2007).

GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO<sub>2</sub> is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO<sub>2</sub> emissions, approximately 54 percent is sequestered through ocean uptake, uptake by northern hemisphere forest regrowth, and other terrestrial sinks within one year, whereas the remaining 46 percent of human-caused CO<sub>2</sub> emissions remains stored in the atmosphere (Seinfeld and Pandis, 1998).

Similarly, impacts of GHGs are global, as opposed to localized air quality effects of criteria air pollutants and toxic air contaminants. The quantity of GHGs that it takes to ultimately result in

climate change is not precisely known; however, it is clear that the quantity is enormous, and no single development project would measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climates. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative (SMAQMD, 2009).

### **Greenhouse Gas Emission Sources**

According to much of the scientific literature on this topic, emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial, and agricultural sectors (CARB, 2014a). Currently in California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (CARB, 2014a). Emissions of CO<sub>2</sub> are byproducts of fossil fuel combustion. Methane (CH<sub>4</sub>), a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. NO<sub>2</sub> is also largely attributable to agricultural practices and soil management. Carbon dioxide sinks, or reservoirs, include vegetation and the ocean, which absorb CO<sub>2</sub> through sequestration and dissolution, respectively, two of the most common processes of CO<sub>2</sub> sequestration.

California is the 12th to 16th largest emitter of CO<sub>2</sub> in the world (CEC, 2006a). California produced approximately 459 million gross metric tons of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) in 2012 (CARB, 2014a). CO<sub>2</sub>e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. Expressing emissions in CO<sub>2</sub>e takes the contributions to the greenhouse effect of all GHG emissions and converts them to the equivalent effect that would occur if only CO<sub>2</sub> were being emitted. This measurement, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, as described in Appendix B of the Calculation References of the General Reporting Protocol of the California Climate Action Registry, one ton of methane (CH<sub>4</sub>) has the same contribution to the greenhouse effect as approximately 21 tons of CO<sub>2</sub> (CCAR, 2009). Therefore, methane (CH<sub>4</sub>) is a much more potent GHG than CO<sub>2</sub>.

Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2012, accounting for 36 percent of total GHG emissions in the state (CARB, 2014a). This sector was followed by the electric power sector (including both in-state and out-of-state sources) (21 percent) and the industrial sector (19 percent) (CARB, 2014a).

## **Regulatory Setting**

### **Federal Clean Air Act**

The federal Clean Air Act (CAA) requires the United States Environmental Protection Agency (USEPA) to define national ambient air quality standards to protect public health and welfare in the U.S. The CAA does not specifically regulate GHG emissions; however, on April 2, 2007 the U.S. Supreme Court in *Massachusetts v. U.S. Environmental Protection Agency*, 549 U.S. 497 (2007) determined that GHGs are pollutants that can be regulated under the CAA. Currently, there are no federal regulations that establish ambient air quality standards for GHGs.

On December 7, 2009, USEPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding). The Endangerment Finding is based on Section 202(a) of the CAA, which states that the administrator (of USEPA) should regulate and develop standards for “emission[s] of air pollution from any class or classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.” The rule addresses Section 202(a) in two distinct findings. The first addresses whether the concentrations of the six key GHGs (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub>) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and, therefore, contribute to the threat of climate change.

The USEPA Administrator found that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CAA. The evidence supporting this finding consists of human activity resulting in “high atmospheric levels” of GHG emissions, which are likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wildfires, droughts, sea level rise, and higher intensity storms) are a threat to the public health and welfare. Therefore, GHGs were found to endanger the public health and welfare of current and future generations.

The USEPA administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. USEPA’s final findings respond to the 2007 U.S. Supreme Court decision that GHGs fit within the CAA definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements but, rather, allow USEPA to finalize the GHG standards proposed earlier in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation. Specific GHG regulations that the USEPA has adopted include:

**40 CFR Part 98. Mandatory Reporting of Greenhouse Gases Rule.** This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO<sub>2</sub>e emissions per year. Additionally, reporting of emissions is required for owners of SF<sub>6</sub>- and PFC-insulated equipment when the total nameplate capacity of these insulating gases is above 17,280 pounds.

**40 CFR Part 52. Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule.** This rule sets GHG emissions thresholds that define when permits under the USEPA’s New Source Review Prevention Significant Deterioration (PSD) and Title V Operating Permit programs would be required for new and existing industrial facilities. The first step of the USEPA’s tailoring rule, which took effect Jan. 2, 2011, required sources that to obtain permits for their GHG emissions if they emit 75,000 tons of CO<sub>2</sub>e per year. Beginning July 1, 2011, the second phase applied permitting requirements to all stationary sources with GHG emissions of at least 100,000 tons of CO<sub>2</sub>e annually or that made modifications increasing their emissions by at least 75,000 tons per year. The requirements applied to sources even if they were not previously subject to permitting for other pollutants.

### **Assembly Bill 1493 (Pavley)**

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493 (Pavley, Chapter 200, California Statutes of 2002; codified in California Health and Safety Code Section 42823, 43018.5). AB 1493 requires that CARB develop and adopt, by January 1, 2005, regulations that achieve “the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State.” In 2004 CARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California’s existing standards for motor vehicle emissions that require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons), beginning with the 2009 model year.

On September 15, 2009, USEPA and the Department of Transportation’s National Highway Safety Administration (NHTSA) proposed a National Program to reduce GHG emissions and improve fuel economy for new cars and trucks sold in the United States. The combined USEPA and NHTSA standards that make up the proposed National Program applied 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 CO<sub>2</sub> per mile, equivalent to 35.5 miles per gallon (mpg). In December 2011, NHTSA and USEPA issued a joint proposal to extend the National Program to further improve fuel economy and reduce GHG emissions for passenger and light-duty vehicles for model years 2017–2025. This would be accomplished through new proposed Corporate Average Fuel Economy (CAFE) standards by NHTSA and new GHG emission standards by USEPA. The proposed CAFE standards are projected to require, on an average industry-fleet-wide basis for cars and trucks combined, 40.1 mpg in model year 2021, and 49.6 mpg in model year 2025. USEPA’s proposed GHG standards, which would be harmonized with NHTSA’s CAFE standards, are projected to require 163 grams/mile (54.5 mpg) of CO<sub>2</sub> in model year 2025.

### **Executive Order S-3-05**

Executive Order S-03-05, which was signed by Governor Schwarzenegger in 2005, established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The Executive Order directed the Secretary of California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. To comply with the Executive Order, the Secretary of CalEPA created the California Climate Action Team (CCAT) to achieve the targets by building on voluntary actions of California businesses, local government, and community actions, as well as through state incentive and regulatory programs.

### **Assembly Bill 32 (California Global Warming Solutions Act of 2006)**

In September 2006, Governor Arnold Schwarzenegger signed the California Global Warming Solutions Act (AB 32; California Health and Safety Code Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable

reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished by enforcing a statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires CARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrived at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state reduces GHG emissions enough to meet the cap. AB 32 also includes guidance on instituting emissions reductions in an economically efficient manner, along with conditions to ensure that businesses and consumers are not unfairly affected by the reductions. According to CARB's Scoping Plan, the 2020 target of 427 million metric tons (MMT) of CO<sub>2</sub>e requires the reduction of 169 MMTCO<sub>2</sub>e, or approximately 28.4 percent, from the state's projected 2020 business-as-usual (BAU) emissions level of 596 MMTCO<sub>2</sub>e.<sup>1</sup> However, CARB has discretionary authority to seek greater reductions in more significant and growing GHG sectors, such as transportation, as compared to other sectors that are not anticipated to significantly increase emissions. In August 2011, the Scoping Plan was re-approved by the Board and includes the Final Supplement to the Scoping Plan Functional Equivalent Document. This document includes expanded analysis of project alternatives as well as updates the 2020 emission projections in light of the current economic forecasts. Considering the updated 2020 BAU estimate of 507 MMTCO<sub>2</sub>e, a 16 percent reduction below the estimated BAU levels would be necessary to return to 1990 levels by 2020. The document also excludes one measure identified in the 2008 Scoping Plan that has been adopted and one measure that is no longer under consideration by CARB (CARB, 2011).

As required by AB 32, the Scoping Plan must be updated at least every five years to evaluate the mix of AB 32 policies to ensure that California is on track to meet the targets set out in the legislation. As such, a draft Update to the initial Scoping Plan was developed by CARB in collaboration with the CCAT and was presented to CARB's Board for discussion at its February 20, 2014 meeting. The draft Update builds upon the initial Scoping Plan with new strategies and expanded measures, and identifies opportunities to leverage existing and new funds to drive GHG emission reductions through strategic planning and targeted program investments. The first update to the AB 32 Scoping Plan was approved on May 22, 2014 by CARB (CARB, 2014b).

#### **Executive Order S-1-07**

Executive Order S-1-07, which was signed by Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, generating more than 40 percent of statewide emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in California by at least ten percent by 2020. This order also directs

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<sup>1</sup> BAU is defined as emissions that would be generated prior to AB 32-related emission restrictions beginning in 2006.

CARB to determine whether this low carbon fuel standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

On April 23, 2009 CARB approved the proposed regulation to implement the LCFS. The LCFS will reduce GHG emissions from the transportation sector in California by about 16 MMT in 2020. The LCFS is designed to reduce California's dependence on petroleum, create a lasting market for clean transportation technology, and stimulate the production and use of alternative, low-carbon fuels in California. The LCFS is designed to provide a durable framework that uses market mechanisms to spur the steady introduction of lower carbon fuels. The framework establishes performance standards that fuel producers and importers must meet each year beginning in 2011. One standard is established for gasoline and the alternative fuels that can replace it. A second similar standard is set for diesel fuel and its replacements.

The issuance of regulations by California under the LCFS has resulted in several lawsuits that were brought on by industry trade organizations representing ethanol producers, refiners, and truckers. These lawsuits allege that California acted in violation of the U.S. Constitution because the LCFS are inherently discriminatory against commerce taking place outside of the state of California, since more carbon emissions would always result from the transportation of fuels to California from areas outside of the state when compared to the carbon emissions generated by fuel producers in California who would be able to transport their fuel over shorter distances. In addition, the lawsuit also alleged that California was making an attempt to impermissibly regulate conduct outside of the state and contended that California's LCFS should be preempted by the Renewable Fuel Standards passed on the federal level. In response, the state has indicated that the provisions found within the CCAA provide the authority for California to control air pollution and that its regulation is a permissible act of state sovereignty. Nonetheless, a federal judge issued a preliminary injunction in December 2011 that prevented California from implementing the LCFS on the grounds that California's regulations were in violation of the Commerce Clause in the United States Constitution. CARB appealed the decision and has been allowed to implement the LCFS while the appeal is pending. On September 18, 2013, the Ninth Circuit Court of Appeals reversed the U.S. District Court opinion that held that California's LCFS violated the dormant Commerce Clause of the U.S. Constitution.

#### **Senate Bills 1078 and 107 and Executive Order S-14-08**

SB 1078 (Chapter 516, Statutes of 2002; Section 399.15) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006; PRC Section 25740) changed the target date to 2010. In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewables Energy Standard to 33 percent renewable power by 2020. In April 2011, Governor Jerry Brown signed SB 2X, that created a legislative mandate codifying the 33 percent Renewables Portfolio Standard into law.

#### **Senate Bill 375**

SB 375, signed in September 2008 (Chapter 728, Statutes of 2008; PRC Sections 65080, 65400, 65583, 65584.01, 65584.02, 65584.04, 65587, 65588, 14522.1, 14522.2, 65080.01 21061.3, and 21159.28), aligns regional transportation planning efforts, regional GHG reduction targets, and

land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will prescribe land use allocation in that MPOs regional transportation plan (RTP). CARB, in consultation with MPOs, has provided each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO’s SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects may not be eligible for funding programmed after January 1, 2012.

This law also extends the minimum time period for the regional housing needs allocation cycle from five years to eight years for local governments located within an MPO that meet certain requirements. City or county land use policies (including general plans) are not required to be consistent with the regional transportation plan (and associated SCS or APS). However, new provisions of CEQA would incentivize (through streamlining and other provisions) qualified projects that are consistent with an approved SCS or APS, categorized as “transit priority projects.”

On April 4, 2012, the Regional Council of the Southern California Association of Governments (SCAG), which is the MPO in Southern California, adopted the *2012-2035 Regional RTP/SCS: Towards a Sustainable Future*. The RTP/SCS is the culmination of a multi-year effort involving stakeholders from across the SCAG region, which contains six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) and 191 cities in Southern California.

### **CARB Climate Change Scoping Plan**

On December 11, 2008, CARB adopted its Scoping Plan, which functions as a roadmap of CARB’s plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations and through the recommended actions. **Table 3.7-1** shows the Recommended Actions contained in Appendices C and E of CARB’s Scoping Plan (CARB, 2008).

**TABLE 3.7-1  
RECOMMENDED ACTIONS FROM CARB CLIMATE CHANGE SCOPING PLAN**

<b>ID #</b>	<b>Sector</b>	<b>Strategy Name</b>
T-1	Transportation	Pavley I and II – Light-Duty Vehicle GHG Standards
T-2	Transportation	LCFS (Discrete Early Action)
T-3	Transportation	Regional Transportation-Related GHG Targets
T-4	Transportation	Vehicle Efficiency Measures
T-5	Transportation	Ship Electrification at Ports (Discrete Early Action)
T-6	Transportation	Goods-movement Efficiency Measures
T-7	Transportation	Heavy Duty Vehicle GHG Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)
T-8	Transportation	Medium and Heavy-Duty Vehicle Hybridization
T-9	Transportation	High Speed Rail
E-1	Electricity and Natural Gas	Increased Utility Energy efficiency programs More stringent Building and Appliance Standards
E-2	Electricity and Natural Gas	Increase Combined Heat and Power Use by 30,000GWh
E-3	Electricity and Natural Gas	Renewables Portfolio Standard

ID #	Sector	Strategy Name
E-4	Electricity and Natural Gas	Million Solar Roofs
CR-1	Electricity and Natural Gas	Energy Efficiency
CR-2	Electricity and Natural Gas	Solar Water Heating
GB-1	Green Buildings	Green Buildings
W-1	Water	Water Use Efficiency
W-2	Water	Water Recycling
W-3	Water	Water System Energy Efficiency
W-4	Water	Reuse Urban Runoff
W-5	Water	Increase Renewable Energy Production
W-6	Water	Public Goods Charge (Water)
I-1	Industry	Energy Efficiency and Co-benefits Audits for Large Industrial Sources
I-2	Industry	Oil and Gas Extraction GHG Emission Reduction
I-3	Industry	GHG Leak Reduction from Oil and Gas Transmission
I-4	Industry	Refinery Flare Recovery Process Improvements
I-5	Industry	Removal of methane (CH <sub>4</sub> ) Exemption from Existing Refinery Regulations
RW-1	Recycling and Waste Management	Landfill methane (CH <sub>4</sub> ) Control (Discrete Early Action)
RW-2	Recycling and Waste Management	Additional Reductions in Landfill methane (CH <sub>4</sub> ) – Capture Improvements
RW-3	Recycling and Waste Management	High Recycling/Zero Waste
F-1	Forestry	Sustainable Forest Target
H-1	High GWP Gases	Motor Vehicle Air Conditioning Systems (Discrete Early Action)
H-2	High GWP Gases	SF <sub>6</sub> Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)
H-3	High GWP Gases	Reduction in Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)
H-4	High GWP Gases	Limit High GWP Use in Consumer Products (Discrete Early Action, Adopted June 2008)
H-5	High GWP Gases	High GWP Reductions from Mobile Sources
H-6	High GWP Gases	High GWP Reductions from Stationary Sources
H-7 <sup>a</sup>	High GWP Gases	Mitigation Fee on High GWP Gases
A-1	Agriculture	Methane (CH <sub>4</sub> ) Capture at Large Dairies

<sup>a</sup> This original measure in the 2008 Scoping Plan was subsequently excluded by CARB in the Final Supplement to the Scoping Plan Functional Equivalent Document in 2011, as CARB staff concluded that implementation of this measure would not be feasible.  
 Source: CARB, 2008.

An Update to the initial Scoping Plan was approved on May 22, 2014 by CARB to address the requirement by AB 32 that the Scoping Plan be updated at least every five years. The Update builds upon the initial Scoping Plan with new strategies and expanded measures, and identifies opportunities to leverage existing and new funds to drive GHG emission reductions through strategic planning and targeted program investments. As part of the update to the Scoping Plan, the emissions reductions required to meet the 2020 statewide GHG emissions limit were adjusted, which determined that a 15 percent reduction below the estimated BAU levels is necessary to return to 1990 levels by 2020 (CARB, 2014b).

### **Executive Order B-30-15 – 2030 Statewide Emission Reduction Target**

Executive Order B-30-15 was signed by Governor Jerry Brown on April 29, 2015, establishing an interim statewide GHG reduction target of 40 percent below 1990 levels by 2030, which is necessary to guide regulatory policy and investments in California in the midterm, and put

California on the most cost-effective path for long-term emission reductions. Under this Executive Order, all state agencies with jurisdiction over sources of greenhouse gas emissions are required to continue to develop and implement emissions reduction programs to reach the state's 2050 target and attain a level of emissions necessary to avoid dangerous climate change. According to the Governor's Office, this Executive Order is in line with the scientifically established levels needed in the United States to limit global warming below 2°C - the warming threshold at which scientists say there will likely be major climate disruptions such as super droughts and rising sea levels.

### **Clean Energy Reduction Act**

Clean Energy and Pollution Reduction Act of 2015, Senate Bill (SB) 350 (Chapter 547, Statutes of 2015) was approved by Governor Brown on October 7, 2015. SB 350 will (1) increase standards by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030; (2) require the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that would achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030; (3) provide for the evolution of the Independent System Operator (ISO) into a regional organization; and (4) require the state to reimburse local agencies and school districts for certain costs mandated by the state through procedures established by statutory provisions. This Act is intended to double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation (Brown, 2015).

### **California Building Standards Code (Title 24) and California Energy Code (Part 6)**

California's Building Energy Efficiency Standards for Residential and Nonresidential Buildings, located at Title 24, Part 6, of the California Code of Regulations, is commonly known as the "Title 24" standards, the standards are typically updated every three years; the 2013 standards were effective on July 1, 2014. Title 24 provides energy efficiency standards for residential and non-residential development with the express goal of "reducing of wasteful, uneconomic, inefficient or unnecessary consumption of energy." (Public Resources Code Section 25402.) Updated standards take effect January 1, 2017.

### **California Green Buildings Standards**

The California Green Building Standards (CALGreen) are located in Title 24, Part 11 of the California Code of Regulations. The purpose of the CALGreen Code is to enhance the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices in planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. The code provides a various mandatory and voluntary measures to be enforced on new building construction. The CALGreen Code, which became effective on January 1, 2014 was anticipated to reduce 3 MMT of GHG emissions by 2020, reduce water use by 20 percent or more, and divert 50 percent of construction waste from landfills. The California Green Building Standards Code was most recently updated in 2016 to

include new mandatory measures for residential as well as nonresidential uses; the new measures take effect on January 1, 2017.

### **County of Orange General Plan**

The County's General Plan does not include any specific goals and objectives related to GHGs.

## **3.7.2 Thresholds of Significance**

According to Appendix G of the *CEQA Guidelines* and the County of Orange Environmental Analysis Checklist, a project could have a significant adverse effect on GHG emissions if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The analysis methodologies from SCAQMD are used in evaluating potential impacts related to GHG from implementation of the proposed project. SCAQMD provides a tiered approach to evaluate GHG impacts, which includes:

- Tier 1: determine whether or not the project qualifies for any applicable exemption under CEQA
- Tier 2: determine whether the project is consistent with a greenhouse gas reduction plan, which would mean that it does not have significant greenhouse gas emissions.
- Tier 3: determine if the project would be below screening values; if a project's GHG emissions are under one of the following screening thresholds, then the project is less than significant:
  - All land use types: 3,000 MTCO<sub>2</sub>e per year
  - Residential: 3,500 MTCO<sub>2</sub>e per year
  - Commercial: 1,400 MTCO<sub>2</sub>e per year
  - Mixed use: 3,000 MTCO<sub>2</sub>e per year

SCAQMD also recommends that construction GHG emissions be amortized over a 30-year period and added to its operational emission estimates to determine if the project would exceed the screening values listed above (SCAQMD, 2008).

Thus, based on the SCAQMD methodologies, the proposed residential uses would result in less than significant impacts if they generate less than 3,500 MTCO<sub>2</sub>e per year, including construction emissions averaged over a 30-year period and added to the modeled annual operational emissions.

### 3.7.3 Methodology

Construction-related GHG emissions were estimated using a similar methodology to that described for criteria air pollutants in Section 3.3, *Air Quality*, of this EIR. SCAQMD recommends the use of the California Emissions Estimator Model (CalEEMod) for estimating construction and operational emissions associated with land use projects. CalEEMod estimates the emissions of CO<sub>2</sub>, methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) as well as the resulting total CO<sub>2</sub>e emissions associated with construction-related GHG sources such as off-road construction equipment, material delivery trucks, soil haul trucks, and construction worker vehicles. As CalEEMod uses IPCC's 1996 SAR to assign the GWPs for methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), the emissions for these two GHGs were taken from the CalEEMod outputs and converted to CO<sub>2</sub>e emissions outside of CalEEMod using the updated GWPs from IPCC's AR4.

Operational emissions of GHGs, including GHGs generated by direct and indirect sources, are estimated according to the recommended methodologies from SCAQMD. Direct sources include emissions such as vehicle trips, natural gas consumption, and landscape maintenance. Indirect sources include off-site emissions occurring as a result of the project's operations such as electricity and water consumption and solid waste disposal. The direct and indirect emissions generated during the proposed project's operations were estimated using CalEEMod. Similar to the calculation of the project's construction-related GHG emissions, the operational emissions of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) were extracted from the CalEEMod output file and converted to CO<sub>2</sub>e emissions using the GWPs from IPCC's AR4. Modeling was based on project-specific data (e.g., size and type of proposed uses, use of septic systems on-site, etc.) and vehicle trip information from the traffic analysis prepared for the project (Urban Crossroads, 2014; see Appendix J of this EIR).

CalEEMod estimates energy use from residential land uses based on the Residential Appliance Saturation Survey reported by CEC, which is a comprehensive energy use assessment that includes the end use for various climate zones in California. Emissions from energy use are estimated based on USEPA's *Compilation of Air Pollutant Emission Factors* (AP-42) emission factors and the California Climate Action Registry's General Reporting Protocol. Water consumption data was obtained from Table ES-1 of the Pacific Institute's "Waste Not Want Not" report (Pacific Institute, 2003). Electricity intensity factors were obtained from the 2006 CEC report, "Refining Estimates of Water-Related Energy Use in California" (CEC, 2006b). CalEEMod calculates the indirect GHG emissions associated with solid waste that is disposed of at a landfill. The program uses annual waste disposal rates from the California Department of Resources Recycling and Recovery (CalRecycle) data for individual land uses. The program quantifies the GHG emissions associated with the decomposition of the waste which generates methane based on the total amount of degradable organic carbon. Default landfill gas concentrations are used as reported in Section 2.4 of AP-42. Additionally, wastewater generated by the development would also produce GHG emissions. For the proposed project, wastewater would be treated by an on-site wastewater system. GHG emissions associated with the use of septic systems are quantified by CalEEMod based on CARB's Local Government Operations Protocol (LGOP), which in turn are based on USEPA methodologies (SCAQMD, 2013).

### 3.7.4 Project Impacts

**Impact 3.7.1: Would the project generate significant amounts of greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

**Less than Significant Impact.**

#### Construction Emissions

The proposed project consists of the construction of 72 single-family residential units. Construction-related GHG emissions were estimated using the same assumptions and methodology as the air quality analysis included in Section 3.3, *Air Quality*, of this EIR. As shown in **Table 3.7-2**, the total GHG emissions that are anticipated during construction of the proposed project at Phase 1 (south parcel) and Phase 2 (north parcel) would be approximately 1,403 MTCO<sub>2e</sub> (detailed GHG modeling data is provided in Appendix E).

**TABLE 3.7-2  
ESTIMATED PROJECT CONSTRUCTION-RELATED GREENHOUSE GAS EMISSIONS**

Emission Source	Estimated CO <sub>2e</sub> Emissions <sup>a</sup>
<b>Construction</b>	
Phase 1 (south parcel)	805 (MT)
Phase 2 (north parcel)	598 (MT)
Total	1,403 (MT)
Annual Construction (Amortized over 30 years)	<b>47 (MT/yr)</b>

Source: 2016 CalEEMOD modeling, Entech Consulting, see Appendix E for model output.  
Notes: CO<sub>2e</sub>= carbon dioxide equivalent; MT =metric tons; MT/yr = metric tons per year.

This would equal to approximately 47 MTCO<sub>2e</sub> per year after amortization over 30 years per SCAQMD methodology.

#### Operational Emissions

Area and indirect sources associated with the proposed project would primarily result from electricity and natural gas consumption, water transport (the energy used to pump water to and from the project site, respectively), wastewater treatment by on-site septic systems, and solid waste generation. GHG emissions from electricity consumed on the site would be generated off-site by fuel combustion at the electricity provider. GHG emissions from water transport are also indirect emissions resulting from the energy required to transport water from its source. In addition, the residential uses at the project site would also generate mobile source emissions from motor vehicle trips generated by residents and visitors.

As discussed previously, for the purpose of analyzing the project's impact associated with the generation of GHG emissions, the threshold for determining significance is based upon SCAQMD's recommended methodologies and thresholds for residential uses. The various operational GHG emissions associated with the proposed project are listed in **Table 3.7-3**. As recommended by SCAQMD, the project's annual amortized construction GHG emissions (from **Table 3.7-2**) were added to the project's operational GHG emissions to assess the project's total GHG emissions impacts (detailed GHG modeling data is provided in Appendix E).

**TABLE 3.7-3  
ESTIMATED CONSTRUCTION AND OPERATIONS-RELATED GREENHOUSE GAS EMISSIONS**

Emission Source	Estimated Emissions CO <sub>2</sub> e (MT/yr)
<b>Construction</b>	
Annual Construction (Amortized over 30 years)	47
<b>Operations</b>	
Mobile Sources	1,102
Energy Consumption <sup>a</sup>	318
Water Consumption <sup>a</sup>	444
Solid Waste	43
Area Source	19
Total Operational Emissions	1,925
<b>Total (Construction and Operational Emissions)</b>	<b>1,972</b>

Notes: CO<sub>2</sub>e= carbon dioxide equivalent; MT/yr = metric tons per year; see Appendix E of this EIR for CalEEMod model output.

Source: 2016 CalEEMOD modeling, Entech Consulting, see Appendix E for model output.

<sup>a</sup> GHG emissions reductions associated with Title 24 standards and water use resulting from compliance with CALGreen requirements were accounted for in CalEEMod model run.

As shown in **Table 3.7-3**, the proposed project’s total annual GHG emissions resulting from construction and operational activities would be 1,972 MTCO<sub>2</sub>e per year. Thus, the project’s GHG emissions would be below the 3,500 MTCO<sub>2</sub>e per year threshold.

In addition, although not factored into the emissions calculations shown in **Table 3.7-3**, the Project Design Features integrated into the project would further reduce GHG emissions generated at the project site.<sup>2</sup> In particular, the provision of landscaping (Project Design Feature PDF-4) would assist in carbon intake (as opposed to implementing all hardscape at the project site), while revegetation of new slope areas with drought tolerant species (Project Design Feature PDF-4) and use of grey water for landscape irrigation would reduce the amount of watering required at the project site, which indirectly reduces GHG emissions associated with both water and wastewater transport to/from the project site. Nonetheless, even without taking these project design features into consideration, the project’s GHG would be below the SCAQMD’s recommended thresholds for residential uses; therefore, impacts from project GHG emissions would be less than significant.

**Impact 3.7.2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?**

**Less than Significant Impact.** The proposed project would comply with state and federal programs that are designed to improve energy efficiency and would provide new residential uses in a sustainable manner. The proposed project would comply with all mandatory measures under

<sup>2</sup> The additional GHG emissions reductions beyond those shown in Table 3.7-3 from implementation of the project design features were not quantified as no specific percentage reduction in water consumption amounts have been determined from these features.

the California Title 24, California Energy Code, and the CALGreen Code, which would provide efficient energy and water consumption.

In addition, the CARB Scoping Plan provides strategies to reduce GHG emissions that are applicable to the proposed project. The County assists in implementation of the Scoping Plan measures by reviewing projects for compliance with SCAQMD GHG thresholds, and Title 24 standards that help reduce GHG emissions through increasing energy efficiency of new residential and nonresidential buildings. The 2016 update to the Building Energy Efficiency Standards that is effective January 1, 2017 would result in greater energy efficiencies when compared to the current Title 24 Standards and focuses on several key areas to improve the energy efficiency of buildings that include improvements for attics, walls, water heating, and lighting. The proposed residences would be developed in compliance with 2016 Title 24 standards, which would be verified by the County's Building and Safety Department during the permitting process.

In addition, the project includes the following Project Design Feature PDF-1 that would preserve 414.6 acres of open space and PDF-4 that would assist in carbon intake and utilize drought tolerant species, that are consistent with existing plans, policies, and regulations adopted for the purpose of reducing the emissions of greenhouse gases.

Emissions from vehicles, which are the main source of operational GHG emissions associated with the project, would be reduced through implementation of the state Pavley standards, the state LCFS, and the federal CAFE standards. As discussed above, Executive Order S-01-07 established the goals of reducing carbon intensity in fuels by 10 percent by the year 2020 and establishing a LCFS for California. In addition, Executive Order B-30-15 established a statewide GHG reduction target of 40 percent below 1990 levels by 2030.

Overall, implementation of the proposed project would not conflict with existing plans, policies, and regulations adopted for the purpose of reducing the emissions of greenhouse gases. Additionally, the GHG emissions generated from the proposed project would be below the SCAQMD recommended threshold. Therefore, the proposed project would not conflict with any applicable plan, program, policy, or regulation related to the reduction of GHG emissions, and impacts would be less than significant.

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### 3.7.5 Cumulative Impacts

As described above, the California Air Pollution Control Officers Association's (CAPCOA) *CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act* document determined that GHG impacts are exclusively cumulative impacts; and there are no non-cumulative GHG emission impacts from a climate change perspective. As such, impacts of the project's GHG emissions that are described above are cumulative.

As shown in **Table 3.7-3**, the proposed project's total annual GHG emissions resulting from construction and operational activities would be 1,972 MTCO<sub>2</sub>e per year. Thus, the project's

GHG emissions would be below the 3,500 MTCO<sub>2</sub>e per year threshold and impacts related to GHG emissions would be less than significant.

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