Greenhouse Gas Technical Report

Valley Center ARCO

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Greenhouse Gas Technical Report

for the

Valley Center ARCO Project
Valley Center, California

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

ATTACHMENT A – GHG Calculations

Acronyms and Abbreviations

ºF	degrees Fahrenheit
AB	Assembly Bill
AQTR	Air Quality Technical Report
AR4	IPCC Fourth Assessment Report
BAU	business as usual
CalEEMod®	California Emissions Estimator Model
CalGreen	California Green Building Standards Code
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Control Board
CAT	Climate Action Team
CEQA	California Environmental Quality Act
CFC	chlorofluorocarbon
CH_4	methane
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
EO	Executive Order
EPA	United States Environmental Protection Agency
GHG	greenhouse gas
GP	General Plan
GWP	global warming potential
HFC	hydrofluorocarbon
IPCC	International Panel on Climate Change
M	Million or 10^6
MAWA	Maximum Applied Water Allowance
$MtCO_2e$	million tonnes of carbon dioxide equivalents
N_2O	nitrous oxide
NHTSA	National Highway Traffic Safety Administration
OPR	Office of Planning and Research
ppm	parts per million
PFC	perfluorocarbon
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SAFE	Safer Affordable Fuel-Efficient
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SDAPCD	San Diego Air Pollution Control District
SCS	Sustainable Communities Strategy

Acronyms and Abbreviations

SF_6	sulfur hexafluoride
SLT	screening level threshold
SMAQMD	Sacramento Metropolitan Air Quality Management District
t	abbreviation for tonne (or metric ton)
tCO_2e	tonne of carbon dioxide equivalents
UNFCCC	United Nations Framework Convention on Climate Change
WRI	World Resources Institute
ZEV	zero emission vehicle

SECTION 1.0 – INTRODUCTION

1.1. Report Purpose

The purpose of this Greenhouse Gas Technical Report (Report) is to analyze the potential climate change impacts that could occur with the construction and operation of the Valley Center ARCO Project (Project), in San Diego County, California. The Project is within the jurisdiction of the Department of Planning and Development Services in the County of San Diego. The evaluation addresses the Project's potential for greenhouse gas (GHG) emissions to create a considerable significant cumulative impact on climate change. This assessment was conducted within the context of the California Environmental Quality Act (CEQA), California Public Resources Code Sections 21000 *et seq.*

1.2. Project Location

The Project is in northern San Diego County approximately 7 miles north northwest of Escondido (see Figure 1) in the unincorporated community of Valley Center. The specific Project site encompasses 0.90 acres at the southwest corner of the intersection of Valley Center Road and Cole Grade Road (see Figure 2). The property is part of what is commonly known as the North Village on the General Plan Update (GP Update) map, an area that is intended to form the core of Valley Center's Northern town center.

1.3. Project Description

The Project proposed is the construction of a 3,028 square foot convenience market, with 925 square foot of storage space, and 13 parking spaces, operating 24 hours a day, 7 days a week. It will have a fueling facility with a 38 x 86-foot canopy and 6 multi-product dispensers (12 fueling positions).

Since the Project also includes 6,110 ft^2 ± of landscaping with over half of the area being established as

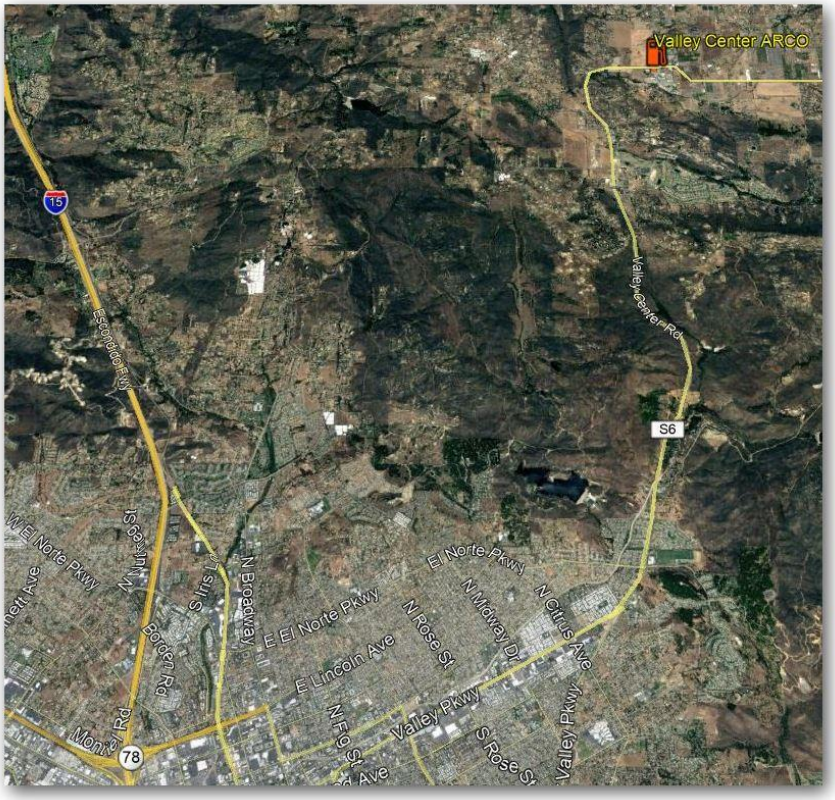

Figure 1 - Vicinity

Bio-Retention for storm water treatment, the Project will include a sustainability feature where they will submit a Landscape Document Package that is compliant with the County's Water Conservation in Landscaping Ordinance (Ordinance Number 10427) that demonstrates a 40% reduction in current Maximum Applied Water Allowance (MAWA) for outdoor use. It is important to note that this action applies only to potable water use in landscaping.

Figure 2 - Location

SECTION 2.0 – EXISTING CONDITIONS

2.1. Greenhouse Gases

Constituent gases that trap heat in the Earth's atmosphere are called GHGs, analogous to the way a greenhouse retains heat. GHGs play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface, which would otherwise have escaped into space. Prominent GHGs contributing to this process include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). Without the natural heat-trapping effect of GHG, the Earth's surface would be about 34 degrees Fahrenheit (°F) cooler[1]. This is a natural phenomenon, known as the "Greenhouse Effect," and is responsible for maintaining a habitable climate. However, anthropogenic emissions of these GHGs more than natural ambient concentrations are responsible for the enhancement of the "Greenhouse Effect" and have led to a trend of unnatural warming of the Earth's natural climate known as global warming or climate change, or more accurately Global Climate Disruption. Emissions of these gases that induce Global Climate Disruption are attributable to human activities associated with industrial/manufacturing/ commercial, utilities, transportation, residential, and agricultural sectors.

The global warming potential (GWP) is the potential of a gas or aerosol to trap heat in the atmosphere. Individual GHG compounds have varying GWP and atmospheric lifetimes. The reference gas for the GWP is CO_2; CO_2 has a GWP of one. The calculation of the CO_2 equivalent (CO_2e) is a consistent methodology for comparing GHG emissions since it normalizes various GHG emissions to a consistent metric. A CO_2e is the mass emissions of an individual GHG multiplied by its GWP. For example, CH_4's warming potential of 25 indicates that CH_4 has a 25 times greater warming affect than CO_2 on a molecular basis. The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that period on a molecular basis. The period usually used for GWPs is 100 years. GWPs for the three GHGs produced by the Project are presented in **Table 1**. GHGs are internationally presented in units called tonnes (t) (i.e., metric tons in the United States) of CO_2e (tCO_2e).

2.1.1 Types of Greenhouse Gases

GHGs are defined under the California Global Warming Solutions Act of 2006 (AB 32) as CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6). Descriptions and health effects of GHGs are listed below. This analysis focused upon emissions of CO_2, CH_4, and N_2O. Other GHGs, such as chlorofluorocarbons, HFCs, PFCs, and SF_6, are emitted in negligible quantities by project sources, so they are not discussed further.

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

Table 1 – Global Warming Potentials[2]

Pollutant	GWP for 100-year time horizon	
	Second assessment report[3]	4th assessment report[4]
Carbon dioxide (CO_2)	1	1
Methane (CH_4)	21	25
Nitrous oxide (N_2O)	310	298

Note: Current protocol is to use the 4th assessment values, however, the second assessment report values are also provided since they are the values used by many inventories and public documents.

Carbon Dioxide (CO_2) is a colorless, odorless gas consisting of molecules made up of two oxygen atoms and one carbon atom. CO_2 is produced when an organic carbon compound (such as wood) or fossilized organic matter, (such as coal, oil, or natural gas) is burned in the presence of oxygen. CO_2 is removed from the atmosphere by CO_2 "sinks", such as absorption by seawater and photosynthesis by ocean-dwelling plankton and land plants, including forests and grasslands. However, seawater is also a source of CO_2 to the atmosphere, along with land plants, animals, and soils, when CO_2 is released during respiration. Whereas the natural production and absorption of CO_2 is achieved through the terrestrial biosphere and the ocean, humankind has altered the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid-1700s, each of these activities has increased in scale and distribution. Prior to the industrial revolution, concentrations CO_2 were stable at a range of 275 to 285 parts per million (ppm)[5]. The Bulletin of the American Meteorological Society[6] indicates that global average concentration of CO_2 was 405.0 ppm in 2017, the highest in the modern atmospheric measurement record and in ice core records dating back as far as 800,000 years. In addition, the monthly mean of CO_2 globally was measured at 410.60 ppm in February 2019[7], up from 407.96 ppm the previous year.

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2 *Global Warming Potentials. Greenhouse Gas Protocol.* World Resources Institute and World Business Council on Sustainable Development. http://www.ghgprotocol.org/files/ghgp/tools/Global-Warming-Potential-Values.pdf. Accessed May 2015.

3 *Second Assessment Report. Climate Change 1995: WG I - The Science of Climate Change*. Intergovernmental Panel on Climate Change. 1996

4 *Climate Change 2007: The Physical Science Basis.* Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. 2007

5 *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007*. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

6 *State of the Climate in 2017.* Special Supplement to the Bulletin of the American Meteorological Society. Blunden, J., D.S. Arndt, and Hartfield, G. Eds., Vol. 99, No. 8, S1–S275. August 2018.

7 *Trends in Atmospheric Carbon Dioxide*. National Oceanic & Atmospheric Administration/Earth Systems Research Laboratory. (www.esrl.noaa.gov/gmd/ccgg/trends/) Accessed May 2019.

Health Effects: Exposure to CO_2 can produce a variety of health effects. These may include headaches, dizziness, restlessness, a tingling or pins or needles feeling, difficulty breathing, sweating, tiredness, increased heart rate, elevated blood pressure, coma, asphyxia, and convulsions[8].

Methane (CH_4) is a colorless, odorless non-toxic gas consisting of molecules made up of four hydrogen atoms and one carbon atom. CH_4 is combustible, and it is the main constituent of natural gas—a fossil fuel. Methane is also released when organic matter decomposes in low oxygen environments. Natural sources include wetlands, swamps and marshes, termites, and oceans. Human sources include the mining of fossil fuels and transportation and use of natural gas, digestive processes in ruminant animals such as cattle, rice paddies, and the buried waste in landfills. 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 CH_4. Other anthropogenic sources include combustion of other fossil-fuels and biomass burning.

Health Effects: Exposure to high levels of methane can cause mood changes, slurred speech, vision problems, memory loss, nausea, vomiting, facial flushing, and headache[9].

Nitrous Oxide (N_2O) is a colorless, non-flammable gas with a sweetish odor, commonly known as "laughing gas", and sometimes used as an anesthetic. N_2O is naturally produced in the oceans and in rainforests. Man-made sources of N_2O include the use of fertilizers in agriculture, nylon and nitric acid production, cars with catalytic converters, and the burning of organic matter. Concentrations of N_2O also began to rise at the beginning of the industrial revolution.

Health Effects: Negative side effects may include nausea or vomiting, headache, increased sleepiness, and/or excessive sweating or shivering[10].

Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in CH_4 or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically un-reactive in the troposphere (the level of air at the Earth's surface). CFCs have no natural source but were first synthesized in 1928. It was used for refrigerants, aerosol propellants, and cleaning solvents. Because of the discovery that they can destroy stratospheric ozone, an ongoing global effort to halt their production was undertaken and has been 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.

Health Effects: Inhalation of high CFC concentrations can cause symptoms of intoxication, reduced

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8 Carbon Dioxide Health Effects. Wisconsin Department of Health Services. https://www.dhs.wisconsin.gov/chemical/carbondioxide.htm. Accessed August 2020.

9 Methane – General Information. Public Health England. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/769766/Methane_PHE_general_information__070119.pdf. Accessed August 2020.

10 Nitrous Oxide. California Dental Association. https://www.cda.org/portals/0/pdfs/fact_sheets/nitrous_oxide_english.pdf. Accessed August 2020.

coordination, light-headedness, and headache; tremors and convulsion; and an irregular heartbeat[11].

Hydrofluorocarbons (HFCs) are synthesized chemicals that are used as a substitute for CFCs. Out of all the GHGs, HFCs are one of three groups with the highest GWP. HFCs are synthesized for applications such as automobile air conditioners and refrigerants.

Health Effects: HFCs can pose a risk to humans as the HFC gases often are explosive gases that are highly flammable. Exposure to high concentrations of HFCs may cause suffocation as HFCs displace the oxygen from the air. Exposure to high levels of some HFCs may also severely affect the heart[12].

Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface can destroy the compounds. Because of this, PFCs have exceedingly long lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Health Effects: Perfluorocarbons are not toxic, and there are no direct health effects associated with exposures to them[13].

Sulfur Hexafluoride (SF_6) is an extremely potent GHG. Sulfur hexafluoride is very persistent, with an atmospheric lifetime of more than a thousand years. Thus, a relatively small amount of SF_6 can have a significant long-term impact on global climate change. Sulfur hexafluoride is human-made, and the primary user of SF_6 is the electric power industry. Because of its inertness and dielectric properties, it is the industry's preferred gas for electrical insulation, current interruption, and arc quenching (to prevent fires) in the transmission and distribution of electricity. Sulfur hexafluoride is used extensively in high voltage circuit breakers and switchgear, and in the magnesium metal casting industry.

Health Effects: Higher exposures of SF_6 can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath. High exposure can also cause headache, confusion, dizziness, suffocation, fainting, seizures, and coma. Sulfur Hexafluoride may damage the liver and kidneys[14].

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11 Chlorofluorocarbons (CFCs). ToxTown. https://toxtown.nlm.nih.gov/chemicals-and-contaminants/chlorofluorocarbons-cfcs.Accessed August 2020.

12 Hydrofluorocarbons (HFCs). Swedish Pollutant Release and Transfer Register. Swedish Environmental Protection Agency. http://utslappisiffror.naturvardsverket.se/en/Substances/Greenhouse-gases/Hydrofluorocarbons/. Accessed August 2020.

13 What are PFCs and How Do They Relate to Per- and Polyfluoroalkyl Substances (PFASs)? United States Environmental Protection Agency. https://www.epa.gov/pfas/what-are-pfcs-and-how-do-they-relate-and-polyfluoroalkyl-substances-pfass. Accessed August 2020.

14 SULFUR HEXAFLUORIDE. Hazardous Substance Fact Sheet. New Jersey Department of Health and Senior Services. https://www.state.nj.us/health/eoh/rtkweb/documents/fs/1760.pdf. Accessed August 2020.

2.1.2 GHG Emission Levels

2.1.2.1 Global and State

Per the World Resources Institute[15] (WRI) in 2014, total worldwide GHG emissions were estimated to be 44,204 million (M) t[16] of CO_2e ($MtCO_2e$) and GHG emissions per capita worldwide was 6.13 tCO_2e. These emissions exclude GHG emissions associated with the land use, land-use change, and forestry sector, and bunker fuels. The WRI reports that in 2014, total GHG emissions in the U.S. were 6,371 $MtCO_2e$, with average GHG emissions per capita of 20.00 tCO_2e and total GHG emissions in California were 454.5 $MtCO_2e$ in 2014, with average GHG emissions per capita of 11.75 tCO_2e.

California has a larger percentage of its total GHG emissions coming from the transportation sector (45%) than the U.S. emissions (27%) and a smaller percentage of its total GHG emissions from the electricity generation sector, i.e., California has only 10 percent, but the U.S. has 45 percent.

2.1.2.2 County of San Diego

In 2017 the County of San Diego conducted an inventory[17] of GHG emissions for the unincorporated portion of San Diego County. The baseline emissions year was 2014. Annual unincorporated County-wide 2014 GHG emissions from sectors including transportation and electricity are presented in Potential Environmental Effects

Worldwide, global mean surface temperatures are likely to increase by 3 °F to 7 °F by the end of the 21st century. However, a global temperature increase does not directly translate to a uniform increase in temperature in all locations on the earth. Regional climate changes are dependent on multiple variables, such as topography. One region of the Earth may experience increased temperature, increased incidents of drought, and similar warming effects, whereas another region may experience a relative cooling. According to the International Panel on Climate Change's (IPCC's) Working Group II Report, climate change impacts to North America may include diminishing snowpack, increasing evaporation, exacerbated shoreline erosion, exacerbated inundation from sea level rising, increased risk and frequency of wildfire, increased risk of insect outbreaks, increased experiences of heat waves, and rearrangement of ecosystems, as species and ecosystem zones shift northward and to higher elevations.

Table 2. In San Diego County the County equals the State's percentage of total for transportation but has 24 percent of the total emissions from electricity generation.

2.1.3 Potential Environmental Effects

Worldwide, global mean surface temperatures are likely to increase by 3 °F to 7 °F by the end of the 21st

[15] CAIT Climate Data Explorer. Historical Emissions. World Resources Institute. http://cait2.wri.org/historical/. Accessed May 2019.

[16] t is the international symbol for tonne, or metric ton in the United States

[17] County of San Diego, 2014 Greenhouse Gas Emissions Inventory and Projection. County of San Diego. August 2017.

century[18]. However, a global temperature increase does not directly translate to a uniform increase in temperature in all locations on the earth. Regional climate changes are dependent on multiple variables, such as topography. One region of the Earth may experience increased temperature, increased incidents of drought, and similar warming effects, whereas another region may experience a relative cooling. According to the International Panel on Climate Change's (IPCC's) Working Group II Report[19], climate change impacts to North America may include diminishing snowpack, increasing evaporation, exacerbated shoreline erosion, exacerbated inundation from sea level rising, increased risk and frequency of wildfire, increased risk of insect outbreaks, increased experiences of heat waves, and rearrangement of ecosystems, as species and ecosystem zones shift northward and to higher elevations.

Table 2 – 2014 Unincorporated County GHG Emissions by Sector[20]

Sector	GHG Emissions	
	Tonnes of CO_2e	Percentage of Total
On-Road Transportation	1,456,060	45.3%
Electricity	760,638	23.7%
Solid Waste	338,107	10.5%
Natural Gas	290,712	9.1%
Agriculture	163,696	5.1%
Water	134,269	4.2%
Off-Road Transportation	36,927	1.1%
Wastewater	21,183	0.7%
Propane	9,914	0.3%
TOTAL	**3,211,506**	**100%**

2.1.4 California Implications

Even though climate change is a global problem and GHGs are global pollutants, the specific potential effects of climate change on California have been studied. California's Fourth Climate Change Assessment[21] explores local and statewide vulnerabilities to climate change, highlighting opportunities for taking concrete actions to reduce climate-change impacts. Projected changes for the remainder of this century in California include:

- **Temperatures** – By mid-century (2040-2069), California is projected the average daily maximum

[18] Climate Change 2007: Impacts, Adaptation, and Vulnerability. Website http://www.ipcc.ch/ipccreports/ar4-wg2.htm. Accessed March 2013.

[19] *ibid*

[20] *ibid*

[21] *California's Fourth Climate Change Assessment. Statewide Summary Report*. Governor's Office of Planning and Research, California Energy Commission, and California Natural Resources Agency. https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-

temperature to warm by approximately 4.4 °F above early-century (2006-2039) averages[22] and springtime warming — a critical influence on snowmelt and water resources — will be particularly pronounced.

- **Rainfall** – Even though model projections continue to show the Mediterranean pattern of wet winters and dry summers with seasonal, year-to-year, and decade-to-decade variability. In California's highly variable climate setting, climate models shift to "less frequent but more extreme daily precipitation, year-to-year precipitation becomes more volatile, and the number of dry years increase"[23].
- **Wildfire** - Earlier snowmelt, higher temperatures, and longer dry periods over a longer fire season will directly increase wildfire risk. Indirectly, wildfire risk will also be influenced by potential climate-related changes in vegetation and ignition potential from lightning, with human activities continuing to be the biggest factor in ignition risk. Land use and development patterns play an important role in future fire activity, what with the exacerbated by the rapid growth in the wildland-urban interface. Models are showing that there may be a large increase in area burned per year in the forests of the Sierra Nevada and North Coast, by as much as 178 percent by the end of the century, and extreme wildfires—greater than 24,710 acres—would occur 50 percent more frequently.

The Fourth Assessment not only defines projected vulnerabilities to climatic changes but analyzes potential impacts from adaptation measures used to minimize harm and take advantage of beneficial opportunities that may arise from climate change.

The report highlights important new insights including:

- Equity and social vulnerability.
- Public health and wellbeing.
- Economic impacts.
- Emergency management and disaster prevention.
- Tribal and indigenous communities.

013_Statewide_Summary_Report_ADA.pdf. Accessed August 2020.

[22] *ibid*

[23] *ibid*

SECTION 3.0 – REGULATORY CONTEXT

3.1. Climate Change

3.1.1 Federal Climate Change Legislation

The federal government is taking several common-sense steps to address the challenge of climate change. The United States Environmental Protection Agency (EPA) collects several types of GHG emissions data. This data helps policy makers, businesses, and EPA track GHG emissions trends and identify opportunities for reducing emissions and increasing efficiency. EPA has been collecting a national inventory of GHG emissions since 1990 and in 2009 established mandatory reporting of GHG emissions from large GHG emissions sources.

EPA is also getting GHG reductions through partnerships and initiatives; evaluating policy options, costs, and benefits; advancing the science; partnering internationally and with states, localities, and tribes; and helping communities adapt.

3.1.1.1 Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule

On September 27, 2019, the EPA and the National Highway Traffic Safety Administration (NHTSA) published the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program[24], which revokes California's authority to set its own GHG emissions standards and set zero emission vehicle (ZEV) mandates in California. The loss of the ZEV sales requirements will likely result in additional gasoline-fueled vehicles being sold in the State and criteria emissions increasing. On April 30, 2020, EPA and NHTSA issued the Final SAFE Rule,[25] which relaxes the federal GHG emissions and Corporate Average Fuel Economy standards resulting in the probable increase of CO_2 emissions.

3.1.2 State Climate Change Legislation

3.1.2.1 Executive Order S-3-05

On June 1, 2005, the Governor issued Executive Order (EO) S-3-05 which set the following GHG emission reduction targets:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

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[24] *EMFAC Off-Model Adjustment Factors to Account for the SAFE Vehicle Rule Part One*. California Air Resources Board. https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf. Accessed September 2020.

[25] *EMFAC Off-Model Adjustment Factors for Carbon Dioxide (CO2) Emissions to Account for the SAFE Vehicles Rule Part One and the Final SAFE Rule*. California Air Resources Board. June 26, 2020. https://ww3.arb.ca.gov/msei/emfac_off_model_co2_adjustment_factors_06262020-final.pdf?utm_medium=email&utm_source=govdelivery. Accessed September 2020.

To meet these targets, the Climate Action Team (CAT) prepared a report to the Governor in 2006 that contains recommendations and strategies to help ensure the targets in EO S-3-05 are met.

3.1.2.2 Assembly Bill 32 (AB 32)

In 2006, the California State Legislature enacted the California Global Warming Solutions Act of 2006, also known as Assembly Bill (AB)-32. AB-32 focuses on reducing GHG emissions in California. GHGs, as defined under AB-32, include CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. AB-32 requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. The California Air Resources Board (CARB) is the State agency charged with monitoring and regulating sources of emissions of GHGs that cause global warming to reduce emissions of GHGs. AB-32 also requires that by January 1, 2008, CARB must determine what the statewide GHG emissions level was in 1990, and it was to approve a statewide GHG emissions limit so it would be applied to the 2020 benchmark. CARB approved a 1990 GHG emissions level of 427 $MtCO_2e$, on December 6, 2007 in its Staff Report. Therefore, in 2020, emissions in California are required to be at or below 427 $MtCO_2e$.

Under the "business as usual or (BAU)" scenario established in 2008, Statewide emissions were increasing at a rate of approximately 1 percent per year as noted below. It was estimated that the 2020 estimated BAU of 596 $MtCO_2e$ would have required a 28 percent reduction to reach the 1990 level of 427 $MtCO_2e$.

3.1.2.3 Climate Change Scoping Plan

The Climate Change Scoping Plan[26] released by CARB in 2008 outlined the State's strategy to achieve the AB-32 goals. This Scoping Plan, developed by CARB in coordination with the CAT, proposed a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health. It was adopted by CARB at its meeting in December 2008. According to the Scoping Plan, the 2020 target of 427 $MtCO_2e$ requires the reduction of 169 $MtCO_2e$, or approximately 28.3 percent, from the State's projected 2020 BAU emissions level of 596 $MtCO_2e$.

However, in August 2011, the Scoping Plan was re-approved by the Board and includes the Final Supplement to the Scoping Plan Functional Equivalent Document[27]. This document includes expanded analysis of project alternatives as well as updates the 2020 emission projections considering the updated economic forecasts. The updated 2020 BAU estimate of 507 $MtCO_2e$ yielded that only a 16 percent reduction below the estimated new BAU levels would be necessary to return to 1990 levels by 2020. The 2011 Scoping Plan expands the list of nine Early Action Measures into a list of 39 Recommended Actions contained in Appendices C and E of the Plan.

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[26] *Climate Change Scoping Plan: a framework for change.* California Air Resources Board. December 2008.

[27] *Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document.* California Air Resources Board. August 19, 2011.

However, in May 2014, CARB developed; in collaboration with the CAT, the First Update to California's Climate Change Scoping Plan[28] (Update), which shows that California is on track to meet the near-term 2020 greenhouse gas limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB-32. In accordance with the United Nations Framework Convention on Climate Change (UNFCCC), CARB is beginning to transition to the use of the IPCC's Fourth Assessment Report (AR4's)[29] 100-year GWPs in its climate change programs. CARB has recalculated the 1990 GHG emissions level with the AR4 GWPs to be 431 $MtCO_2e$, therefore the 2020 GHG emissions limit established in response to AB-32 is now slightly higher than the 427 $MtCO_2e$ in the initial Scoping Plan.

A 2017 Scoping Plan[30] builds upon the former Scoping Plan and Updates by outlining priorities and recommendations for the State to achieve its long-term climate objectives. The Scoping Plan establishes a framework of action for California to meet the climate target of a 40 percent reduction in GHGs by 2030, compared to 1990 levels. The major elements of the framework are cleaner zero and near zero emission from cars, trucks, and buses; more clean and renewable fuels; cleaner freight and goods movement; double building energy efficiency; achieving 50 percent of electrical grid from renewable power; achieve walkable/bikeable communities with transit; invest in communities to reduce emissions; cap emissions from transportation, industry, natural gas, and electricity; and slash potent "super-pollutants" from dairies, landfills, and refrigerants.

3.1.2.4 Senate Bill 375 (SB 375)

Senate Bill (SB) 375 passed the Senate on August 30, 2008 and was signed by the Governor on September 30, 2008. Per SB 375, the transportation sector is the largest contributor of GHG emissions and contributes approximately 45 percent of the GHG emissions in California, with automobiles and light trucks alone contributing almost 30 percent. SB 375 indicates that GHGs from automobiles and light trucks can be reduced by new vehicle technology. However, significant reductions from changed land use patterns and improved transportation also are necessary. 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: (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.

3.1.2.5 Executive Order B-30-15

On April 29, 2015, the Governor issued EO B-30-15 which added an interim target of GHG emissions

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28 *First Update to the Climate Change Scoping Plan, Building on the Framework*. California Air Resources Board. May 2014.

29 *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Intergovernmental Panel on Climate Change. Core Writing Team; Pachauri, R.K; Reisinger, A., eds., 2007. ISBN 92-9169-122-4.

30 *California's 2017 Climate Change Scoping Plan - The strategy for achieving California's 2030 greenhouse gas target*. California Air Resources Board. November 2017.

reductions to help ensure the State meets its 80 percent reduction by 2050, as set in EO S-3-05. The interim target is reducing GHG emissions by 40 percent by 2030. It also directs State agencies to update the Scoping Plan, update Adaptation Strategy every 3 years, and take climate change into account in their planning and investment strategies. Additionally, it requires the State's Five-Year Infrastructure Plan will take current and future climate change impacts into account in all infrastructure projects.

3.1.2.6 Building Energy Efficiency Standards - Title 24

Although not originally intended to reduce GHGs, California Code of Regulations Title 24 Part 6: California's Building 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. The 2016 standards have been published and became effective July 1, 2017. The requirement for when the 2008 standards must be followed is dependent on when the application for the building permit is submitted. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The 2019 Standards improve upon the 2016 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. Buildings whose permit applications are dated on or after January 1, 2020, must comply with the 2019 Standards. The 2019 Standards is a major step towards meeting the Zero Net Energy goal by the year 2030 and is the last of three updates to move California towards achieving that goal. The California Energy Commission updates the standards every three years[31].

3.1.2.7 California Green Standards Code (CalGreen)

Part 11 of Title 24 is specifically addressed as the California Green Building Standards Code (CalGreen Code). The 2019 CalGreen Code also became effective January 1, 2020. The specific purpose of the CalGreen Code is to improve public health, safety, and general welfare by enhancing the design and construction of buildings with building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices in the categories of planning and design; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; and environmental quality.

3.1.3 County of San Diego

3.1.3.1 County General Plan

The San Diego County General Plan (GP)[32], updated in 2011, included specific goals and policies aimed at reducing GHG emissions including growing in a compact and efficient manner, using energy more

[31] 2019 Building Energy Efficiency Standards. California Energy Commission. Became effective January 1, 2020.

[32] *San Diego County General Plan. A Plan for Growth, Conservation, and Sustainability.* County of San Diego. August 2011.

efficiently, harnessing renewable energy to power buildings, improving waste recycling, and improving access to sustainable transportation.

3.1.3.2 Regional Transportation Plan/Sustainable Communities Strategy

The San Diego Association of Governments' (SANDAG's) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)[33], updated in 2015, included a specific strategy for sustainability aimed at reducing GHG emissions through charting a course toward lower GHG emissions related to emissions from cars and trucks and proposes other measures the make the San Diego County more environmentally sustainable. The Sustainable Communities Strategy (SCS) builds the strategy by using that addressed accommodated land use patterns, transportation networks, managed demands on the transportation system, manages the transportation system to maximize overall efficiency, and innovative pricing policies. The SCS integrates plans for how the County will use their land with plans for transportation and shows how future investments will reduce GHG emissions to meet the targets established by SB 375. The County's SCS SB 375 per capita target is 7 percent below 2005 GHG levels and 13 percent by 2035. By implementing the strategies, the RTP/SCS would result in a per capita reduction of 15 percent by 2020 and 21 percent by 2035.

3.1.3.3 Climate Action Plan

In February 2018, the County adopted a long-term programmatic Climate Action Plan (CAP) that outlines the actions the County would undertake to achieve its proportional share of state GHG emission reductions to be compliant with AB 32 and EO S-3-05.

After hearing petitions challenging the CAP, the San Diego County Superior Court ruled on December 24, 2018–which the Appellate Court affirmed on June 12, 2020–that the CAP failed to adequately account for potential environmental impacts for General Plan Amendment projects, and the County is required to set aside and vacate the CAP, the certification of its associated Supplemental EIR, and related actions. As a result, on September 30, 2020, the County Board of Supervisors rescinded and vacated the CAP and associated actions. Pending adoption of a new CAP, the County would continue to implement the 26 GHG reduction measures and sustainability initiatives and programs identified in the 2018 CAP to reduce GHG emissions to meet the State's 2030 reduction target. Since the CAP has been formally rescinded, it is not discussed further in this report.

[33] *San Diego Forward. The Regional Plan.* County of San Diego. October 2015.

SECTION 4.0 – SIGNIFICANCE CRITERIA

4.1. California Environmental Quality Act (CEQA)

The State of California has developed guidelines to address the significance of climate change impacts based on Appendix G of the CEQA Guidelines, which provides guidance that a project would have a significant environmental impact if it would:

- Generate GHG 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 GHGs.

The State of California has not adopted emission-based thresholds for GHG emissions under CEQA. Office of Planning and Research (OPR)'s Technical Advisory titled CEQA and Climate Change: Addressing Climate Change through CEQA Review states, "public agencies are encouraged, but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to a significant, cumulative climate change impact".[34] Furthermore, the advisory document indicates, "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice."

4.1.1 California Air Pollution Control Officers Association Screening Thresholds

In lieu of specific Statewide quantitative GHG thresholds, the California Air Pollution Control Officers Association (CAPCOA) offered a White Paper[35] in 2008 that recommended a unit-based screening threshold that was based on market capture of various land use densities and project types. This White Paper proposed that projects that would meet or fall below the screening threshold of 900 tCO_2e per year of GHG could be expected to result a level that the climate change impacts would be considered less than significant. This level was developed to meet the AB 32's State target of reducing GHG emissions to 1990 levels by 2020.

However, the Project is scheduled to be constructed after the CAPCOA's "sunset" target year and even though the CAPCOA threshold does not consider the reduction targets set by the SB 32 that established a target to reduce 2030 GHG emissions to 40 percent below the 1990 levels, the CAPCOA threshold

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[34] *Technical Advisory – CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review*. California Governor's Office of Planning and Research. 2008.

[35] *CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act.* California Air Pollution Control Officers Association. January 2008. Available at http://www.capcoa.org/wp-content/uploads/downloads/2010/05/CAPCOA-White-Paper.pdf.

represents a more stringent screening level than has been approved by other air districts in compliance with 2030 statewide reduction targets. Furthermore, as State legislative requirements such as Building Energy Efficiency Standards and transportation-related efficiency measures become increasingly more stringent overtime, future project GHG emissions would be reduced helping to meet State emission reduction targets.

As a comparison to the CAPCOA threshold, other regional air districts, such as the Sacramento Metropolitan Air Quality Management District (SMAQMD), have updated their GHG emission significance thresholds to ensure future proposed projects help meet the State's 2030 emission reduction target and do not result in a cumulative impact to climate change. In April 2020, the SMAQMD published updated project screening levels and determined that projects estimated to generate less than 1,100 tCO_2e per year would not result in a significant cumulative impact[36]. This threshold was developed to demonstrate compliance with the statewide reduction targets in 2030 and the SLT was determined by SMAQMD to capture 98 percent of total GHG emissions. The CAPCOA threshold may be considered a stricter threshold.

4.1.2 Local Significance Thresholds

Amendments to the CEQA Guidelines were adopted to assist lead agencies in determining the significance of the impacts of GHG emissions that specifies that a lead agency "shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project."[37] This amendment also provides lead agencies with the discretion to determine whether to assess those emissions quantitatively or to rely on a qualitative analysis or performance-based standards. In addition, the CEQA Guidelines specify that "[w]hen adopting or using thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence"[38].

Since the County has no adopted GHG threshold due to the rescinding of the CAP and the San Diego Air Pollution Control District (SDAPCD) has not adopted a numeric GHG threshold. A well-recognized CEQA-applicable methodology to determine project-specific thresholds would be to evaluate projects by considering whether a project's GHG emissions meet the CAPCOA 900 tCO_2e per year screening level threshold (SLT). The SLT was developed based on various land use densities and future discretionary project types to determine the size of projects that would likely have a less than cumulatively considerable contribution to climate change.

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36 Sacramento Metropolitan Air Quality Management District. 2020. Greenhouse Gas Thresholds for Sacramento County. Available: http://www.airquality.org/LandUseTransportation/Documents/SMAQMDGHGThresholds2020-03-04v2.pdf. Accessed. August 11, 2020.

37 14 CCR 15064.4

38 14 CCR 15064.7[c]

As a comparison to the CAPCOA threshold, other regional air districts, such as the Sacramento Metropolitan Air Quality Management District (SMAQMD), have updated their GHG emission significance thresholds to ensure future proposed projects help meet the State's 2030 emission reduction target and do not result in a cumulative impact to climate change. In April 2020, the SMAQMD published updated project screening levels and determined that projects estimated to generate less than 1,100 tCO2e per year would not result in a significant cumulative impact36. This threshold was developed to demonstrate compliance with the statewide reduction targets in 2030 and the SLT was determined by SMAQMD to capture 98 percent of total GHG emissions. Since the SMAQMD's threshold is higher than the CAPCOA threshold, it is concluded that the CAPCOA threshold may be considered a stricter threshold.

Projects that would generate emissions beyond the 900 tCO_2e per year SLT would need to implement feasible onsite mitigation measures to reduce their impacts on climate change. Projects that meet or fall below CAPCOA's SLT threshold would be expected to result in 900 tCO_2e per year of GHG emissions or less and would have a less than cumulatively considerable contribution to climate change and would not require additional analysis.

In the absence of a locally adopted CAP, the SANDAG's 2050 RTP/SCS is considered the County's applicable plan for the purposes of reducing GHG emissions for which the project should demonstrate consistency.

SECTION 5.0 – IMPACT ANALYSIS

5.1. Analysis Methodology

Information and analysis have been compiled based on an understanding of the existing ambient air quality of the San Diego Air Basin and review of existing technical data, aerial maps, and applicable laws, regulations, and guidelines. This analysis uses data provided in the Air Quality Technical Report (AQTR)[39] produced for this Project. The AQTR used California Emissions Estimator Model (CalEEMod®), Version 2013.2.2 model to estimate annual GHG emissions from construction and operation of the Project. Construction of the Project would result in temporary emissions of GHGs from exhaust emissions from off-road construction equipment, on-road employee travel, and on-road vendor activity. Long-term operational emissions will come directly from mobile sources and some indirect area sources from energy use, water supply, wastewater, and solid waste.

The CalEEMod output report for annual emissions are presented in Appendix A.

5.2. Impact Analyses

IMPACT 1: Would the Project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

The GHG emissions inventory for this analysis includes the following sources of annual direct and indirect emissions: (1) area sources (e.g., landscaping-related fuel combustion sources); (2) energy use associated with commercial buildings; (3) water and wastewater; (4) solid waste; (5) mobile sources (e.g., passenger vehicles and trucks); and (6) construction activity. The ongoing operational emissions consist of the first five categories, while emissions associated with construction are one-time only. The typical types of GHG gasses resulting from developments such as the Project are emissions of CO_2, CH_4, and N_2O.

The major construction phases included in the AQTR were grading, tank installation, building construction, paving, and architectural coating. Emissions are from off-road construction equipment and on-road vehicles like worker and vendor commuting and trucks for soil and material hauling. CalEEMod defaults were used for construction activity and equipment usage. To assess the temporary construction effect on the Project's overall lifetime GHG emissions, the South Coast Air Quality Management District (SCAQMD) developed an Interim Guidance[40] that recommends that construction emissions should be amortized over the life of the Project, defined in the Guidance as 30 years, which is then added to the operational emissions and compared to the applicable GHG significance threshold.

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39 *Air Quality Technical Report for the Valley Center ARCO Project, Valley Center, California.* Scientific Resources Associated. September 28, 2020.

40 *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans.* South Coast Air Quality Management Board. Adopted December 5, 2008.

GHG emissions would also continue to occur every year after build-out. GHGs are emitted from buildings because of activities for which electricity and natural gas are typically used as energy sources. Combustion of any type of fossil fuel emits CO_2 and other GHGs directly into the atmosphere; these emissions are considered direct emissions when associated with a building. GHGs are also emitted during the generation of electricity from fossil fuels; these emissions are indirect emissions as they occur elsewhere but are attributed to the power usage on-site. Indirect GHG emissions also 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. In addition, CalEEMod calculated the indirect GHG emissions associated with waste that is disposed of at a landfill using waste disposal rates by land use and overall composition. CalEEMod defaults were used throughout.

A summary of all GHG emissions from the Project is presented in **Table 3**. Construction emissions in **Table 3** were amortized pursuant to SCAQMD's GHG Interim Guidance[41] to assess the overall lifetime of project GHG emissions, the direct mobile emissions were adjusted[42] to compensate for the estimated effects on the current EMFAC model[43] created in response to the enactment of the SAFE Rule.

Table 3 – Project GHG Emissions

Category	CO_2e (t/year)
Direct – Amortized Construction	7.64
Direct – Mobile (Operational)	699.70
Direct – Area Source	< 1.00
Indirect – Purchased Electricity (Power)	6.68
Indirect – Purchased Natural Gas (Power)	0.20
Indirect – Purchased Electricity (Water)	0.99
Direct – Fugitive – Solid Waste	< 1.00
TOTAL	**715.2**

The estimated annual GHG emissions shown in **Table 3** are less than a CAPCOA recommended SLT of 900 tCO_2e per year and therefore, would have a level of less than cumulatively considerable significant.

41 Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans. South Coast Air Quality Management Board. Adopted December 5, 2008.

42 Mobile source emissions were multiplied by a factor of 1.0023 pursuant to CARB adjustment factors.

43 EMFAC Off-Model Adjustment Factors for Carbon Dioxide (CO_2) Emissions to Account for the SAFE Vehicle Rule Part One and the Final SAFE Rule. California Air Resources Board. June 26, 2020.

IMPACT 2: Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

The Conservation and Open Space Element of the County GP[44] includes a goal for establishing a more sustainable water supply (Goal COS-19), which is designed in part to minimize water consumption resulting in reduction of energy needs related to the transport of water. Policy COS-19.1 specifically addresses sustainable development practices that include water usage demands for landscaping. The Proposed Project will achieve consistency with this Policy by achieving a 40 percent reduction in water usage in landscaping needs via compliance with the County's Water Conservation in Landscaping Ordinance (Ordinance Number 10427).

SANDAG's RTP/SCS[45] identifies a per capita emissions reduction that would be achieved by adhering to the strategy of investing in a transportation network that gives people more transportation options. The emissions reduction that would be achieved through these strategies would achieve per capita emissions in the region consistent State targets set by SB 375. GHG emissions reductions would be achieved through this strategy by developing a transportation network that reduces the need for single-occupancy vehicle trips and increases available travel modes; improves the transportation network with technology designed to help reduce congestion and travel times; invests in new and more efficient transit infrastructure and vehicles; and accommodates all roadway users (i.e., vehicles, bicycles, and pedestrians) on city streets.

SANDAG's RTP/SCS is the region's applicable plan for reducing GHG emissions and is consistent with State GHG emissions reductions goals set by the CARB 2017 Scoping Plan. The County's GP was used to inform the growth projects included within the RTP/SCS, and through its goals, policies, and land use designations, the County's GP aims to reduce County-wide GHG emissions. Therefore, projects that are consistent with the County's GP would also be consistent with the RTP/SCS and associated regional growth projects. The project is consistent with the County's GP land use designation for Valley Center of General Commercial (C-36). Because the proposed project is consistent with the GP land use and zoning, it is also consistent with State GHG emission reduction targets through SANDAG RTP/SCS consistency. Furthermore, the project would incorporate water efficiency features to reduce the Project's energy needs and GHG emissions consistent with State GHG reduction efforts. Therefore, the project's impacts related to consistency with a plan developed for the purpose of reducing GHG emissions would be less than significant.

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[44] *San Diego County General Plan. A Plan for Growth, Conservation, and Sustainability.* County of San Diego. August 2011.

[45] *San Diego Forward. The Regional Plan.* County of San Diego. October 2015.