5.10 GLOBAL CLIMATE CHANGE

This section describes the existing setting related to global climate change and evaluates the potential for GHG emission impacts due to implementation of the Project.

This EIR tiers from the Previous Environmental Review Documents, as described in Chapter 2.0, *Introduction*. This analysis tiers from the program-level Global Climate Change Analysis prepared by RECON Environmental, Inc. in support of the SEIR for the GPA/GDPA (SEIR 09-01). The program-level Global Climate Change Analysis concluded that implementation of the land uses proposed in the GPA/GDPA would not result in significant GHG emissions. Information contained in this section is based on the UID SPA Project Air Quality and Greenhouse Gas Emissions Technical Report, prepared by HELIX in October 2017. The Air Quality and Greenhouse Gas Emissions Technical Report is provided as Appendix C to this EIR. The report updates the applicable information contained in the 2013 SEIR.

5.10.1 Existing Conditions

A. Regulatory Framework

1. Federal

a. Federal Clean Air Act

The U.S. Supreme Court ruled on April 2, 2007, in Massachusetts v. U.S. Environmental Protection Agency, that CO_2 is an air pollutant, as defined under the CAA, and that the USEPA has the authority to regulate emissions of GHGs. The USEPA announced that GHGs (including carbon dioxide [CO_2], methane [CH_4], N_2O, hydrofluorocarbon [HFC], perfluorocarbon [PFC], and sulfur hexafluoride [SF_6]) threaten the public health and welfare of the American people. This action was a prerequisite to finalizing the USEPA's GHG emissions standards for light-duty vehicles, which were jointly proposed by the USEPA and the USDOT's National Highway Traffic Safety Administration (NHTSA). The standards were established on April 1, 2010 for 2012 through 2016 model year vehicles and on October 15, 2012 for 2017 through 2025 model year vehicles (USEPA 2011; USEPA and NHTSA 2012).

b. Corporate Average Fuel Economy Standards

The USEPA and the NHTSA have been working together on developing a national program of regulations to reduce GHG emissions and to improve fuel economy of light-duty vehicles. The USEPA is finalizing the first-ever national GHG emissions standards under the CAA, and the NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. On April 1, 2010, the USEPA and NHTSA announced a joint Final Rulemaking that established standards for 2012 through 2016 model year vehicles. This was followed up on October 15, 2012, when the agencies issued a Final Rulemaking with standards for model years 2017 through 2025. The rules require these vehicles to meet an estimated combined average emissions level of 250 grams per mile by 2016, decreasing to an average industry fleet-wide level of 163 grams per mile in model year 2025. The 2016 standard is equivalent to 35.5 mpg, and the 2025 standard is equivalent to 54.5 mpg if the levels were achieved solely through improvements in fuel efficiency. The agencies expect, however, that a

portion of these improvements will be made through improvements in air conditioning leakage and the use of alternative refrigerants that would not contribute to fuel economy. These standards would cut GHG emissions by an estimated 2 billion metric tons (MT) and 4 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2017–2025). The combined USEPA GHG standards and NHTSA CAFE standards resolve previously conflicting requirements under both federal programs and the standards of the State of California and other states that have adopted the California standards (USEPA 2011; USEPA and NHTSA 2012).

2. State

a. Executive Order S-3-05 – Statewide GHG Emission Targets

On June 1, 2005, Executive Order (EO) S-3-05 proclaimed that California is vulnerable to climate change impacts. It declared that increased temperatures could reduce snowpack in the Sierra Nevada, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. In an effort to avoid or reduce climate change impacts, EO S-3-05 calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

b. Assembly Bill 32 – California Global Warming Solutions Act

The California Global Warming Solutions Act of 2006, widely known as AB 32, requires that the CARB develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. The bill requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions.

c. Senate Bill 32

On September 8, 2016, Governor Brown approved SB 32 (Pavley, Chapter 249, Statutes of 2016), which added a 2030 target to the Global Warming Solutions Act of 2006 (AB 32). SB 32 requires that statewide GHG emissions be reduced to 40 percent below 1990 levels by 2030.

d. Executive Order B-30-15

On April 29, 2015, EO B-30-15 established a California GHG reduction target of 40 percent below 1990 levels by 2030. The EO aligns California's GHG reduction targets with those of leading international governments, including the 28 nation European Union. California is on track to meet or exceed the target of reducing greenhouse gas emissions to 1990 levels by 2020, as established in AB 32. California's new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the ultimate goal established by EO S-3-05 of reducing emissions 80 percent under 1990 levels by 2050.

e. California Air Resources Board: Scoping Plan

On December 11, 2008, the CARB adopted its Climate Change Scoping Plan (CARB 2008) as directed by AB 32. The Scoping Plan proposes a set of actions designed to reduce overall GHG emissions in California to the levels required by AB 32. Measures applicable to development

projects include those related to energy-efficiency building and appliance standards, the use of renewable sources for electricity generation, regional transportation targets, and green building strategy. Relative to transportation, the Scoping Plan includes several measures or recommended actions related to reducing vehicle miles traveled and vehicle GHG emissions through fuel and efficiency measures. These measures would be implemented statewide rather than on a project by project basis.

The CARB released the First Update to the Climate Change Scoping Plan in May 2014 to provide information on the development of measure-specific regulations and to adjust projections in consideration of the economic recession (CARB 2014a). (It is noted that the CARB is currently in the process of preparing a second update to the Climate Change Scoping Plan.) To determine the amount of GHG emission reductions needed to achieve the goal of AB 32 (i.e., 1990 levels by 2020) CARB developed a forecast of the AB 32 "business as usual" (BAU) 2020 emissions, which is an estimate of the emissions expected to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. CARB estimated the AB 32 BAU 2020 to be 509 million metric tons (MMT) of CO_2e. The Scoping Plan's current estimate of the necessary GHG emission reductions to achieve AB 32's goal of 1990 levels is 78 MMT CO_2e by 2020 (CARB 2014b). This represents an approximately 15.32 percent reduction over the BAU 2020 emissions. The CARB is forecasting that this would be achieved through the following reductions by sector: 25 MMT CO_2e for energy, 23 MMT CO_2e for transportation, 5 MMT CO_2e for high-Global Warming Potential (GWP) GHGs, and 2 MMT CO_2e for waste. The remaining 23 MMT CO_2e would be achieved through Cap-and-Trade Program reductions. This reduction is flexible—if CARB receives new information and changes the other sectors' reductions to be less than expected, the agency can increase the Cap-and-Trade reduction (and vice versa).

f. Assembly Bill 1493 – Vehicular Emissions of Greenhouse Gases

AB 1493 (Pavley) requires that CARB develop and adopt regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State." On September 24, 2009, CARB adopted amendments to the Pavley regulations that intend to reduce GHG emissions in new passenger vehicles from 2009 through 2016. The amendments bind California's enforcement of AB 1493 (starting in 2009), while providing vehicle manufacturers with new compliance flexibility. The amendments also prepare California to merge its rules with the federal CAFE rules for passenger vehicles (CARB 2013). In January 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single packet of standards called Advanced Clean Cars (CARB 2013).

g. Executive Order S-01-07 – Low Carbon Fuel Standard

This EO, signed by Governor Schwarzenegger on January 18, 2007, directs that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by the year 2020. It orders that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California and directs the CARB to determine whether a

LCFS can be adopted as a discrete early action measure pursuant to AB 32. CARB approved the LCFS as a discrete early action item with a regulation adopted and implemented in April 2010. Although challenged in 2011, the Ninth Circuit reversed the District Court's opinion and rejected arguments that implementing LCFS violates the interstate commerce clause in September 2013. CARB is therefore continuing to implement the LCFS statewide.

h. Senate Bill 375

SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and affordable housing allocations in order to help meet the AB 32 goals by reducing emissions from cars and light duty trucks. Metropolitan Planning Organizations (MPOs) are required to adopt a Sustainable Communities Strategy (SCS), which allocates land uses in the MPO's Regional Transportation Plan (RTP) in a manner that would reduce vehicle miles traveled, thereby reducing GHG emissions. Qualified projects consistent with an approved SCS or Alternative Planning Strategy categorized as "transit priority projects" would receive incentives to streamline CEQA processing.

i. Assembly Bill 341

In 2011, the State legislature enacted AB 341 (California PRC Section 42649.2), increasing the solid waste diversion target to 75 percent statewide by 2020. AB 341 also requires the provision of recycling service to commercial and residential facilities that generate four cubic yards or more of solid waste per week.

j. Renewables Portfolio Standard

The renewables portfolio standard promotes diversification of the state's electricity supply. Its purpose is to achieve 33 percent renewable energy mix statewide; providing 33 percent of the state's electricity needs met by renewable resources by 2020. Renewable energy includes (but is not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas.

k. Title 24, Part 6 – California Energy Code

CCR Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. Energy-efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for water heating) results in GHG emissions.

The Title 24 standards are updated approximately every three years to allow consideration and possible incorporation of new energy efficiency technologies and methods. The latest update to the Title 24 standards occurred in 2016 and went into effect on January 1, 2017. The 2016 update to the Building Energy Efficiency Standards focuses on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings. The most significant efficiency improvements to the residential Standards include improvements for attics, walls, water heating, and lighting. The Standards are divided into three basic sets. First, there is a basic set of mandatory requirements that apply to all buildings. Second, there is a set of

performance standards – the energy budgets – that vary by climate zone (of which there are 16 in California) and building type; thus, the Standards are tailored to local conditions. Finally, the third set constitutes an alternative to the performance standards, which is a set of prescriptive packages that are basically a recipe or a checklist compliance approach.

l. Title 24, Part 11 – California Green Building Standards

The California Green Building Standards Code (CALGreen Code; 24 CCR, Part 11) is a code with mandatory requirements for new residential and nonresidential buildings (including buildings for retail, office, public schools, and hospitals) throughout California. The code is Part 11 of the California Building Standards Code in Title 24 of the CCR (CBSC 2017). The current 2016 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings went into effect on January 1, 2017.

The development of the CALGreen Code is intended to (1) cause a reduction in GHG emissions from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; (3) reduce energy and water consumption; and (4) respond to the directives by the Governor. In short, the code is established to reduce construction waste; make buildings more efficient in the use of materials and energy; and reduce environmental impact during and after construction.

The CALGreen Code contains requirements for storm water control during construction; construction waste reduction; indoor water use reduction; material selection; natural resource conservation; site irrigation conservation; and more. The code provides for design options allowing the designer to determine how best to achieve compliance for a given site or building condition. The code also requires building commissioning, which is a process for the verification that all building systems, like heating and cooling equipment and lighting systems, are functioning at their maximum efficiency.

3. Local

a. San Diego Association of Government Regional Plan

San Diego Forward: The Regional Plan (The Regional Plan) (SANDAG 2015) is the long-range planning document developed to address the region's housing, economic, transportation, environmental, and overall quality-of-life needs. The Regional Plan establishes a planning framework and implementation actions that increase the region's sustainability and encourage "smart growth while preserving natural resources and limiting urban sprawl." The Regional Plan includes several elements, one of which is the Sustainable Communities Strategy (SCS). Required by state law (SB 375), the primary purpose of the SCS is to show how development patterns and our transportation system could work together to reduce GHG emissions for cars and light trucks, providing a more sustainable future for the San Diego region. The Regional Plan encourages the region's cities and the County to increase residential and employment concentrations in areas with the best existing and future transit connections, and to preserve important open spaces. The focus is on implementation of basic smart growth principles designed to strengthen the integration of land use and transportation. General urban form goals, policies, and objectives are summarized as follows:

- Mix compatible uses.
- Take advantage of compact building design.
- Create a range of housing opportunities and choices.
- Create walkable neighborhoods.
- Foster distinctive, attractive communities with a strong sense of place.
- Preserve open space, natural beauty, and critical environmental areas.
- Strengthen and direct development towards existing communities.
- Provide a variety of transportation choices.
- Make development decisions predictable, fair, and cost-effective.
- Encourage community and stakeholder collaboration in development decisions.

The Regional Plan also addresses border issues, providing an important guideline for communities that have borders with Mexico. In this case, the goal is to create a regional community where San Diego, its neighboring counties, tribal governments, and northern Baja California mutually benefit from San Diego's varied resources and international location.

b. Chula Vista Climate Action Plan

Since 2000, Chula Vista has been implementing a CAP to address the threat of climate change to the local community. The City's original Carbon Dioxide Reduction Plan was revised in 2008 and again in 2011 to incorporate new climate mitigation and adaptation measures to strengthen the City's climate action efforts and to facilitate the numerous community co-benefits such as utility savings, better air quality, reduced traffic congestion, local economic development, and improved quality of life. During 2014, a Climate Change Working Group, comprised of residents, businesses, and community organization representatives, reconvened to help update the City's Climate Action Plan. Specifically, the Climate Change Working Group developed recommendations through an open and transparent public process for new GHG reduction strategies to assist the City in reaching its CO_2e reduction goals. The CAP was last updated in 2017 and incorporates the original CO_2 reduction plan of 2000, mitigation and adaptation plans of 2008 and 2011, and the 2014 CAP measures. To help guide implementation of the CAP, the City regularly conducts GHG emission inventories, described further below.

c. Chula Vista Climate Adaption Strategies – Implementation Plans

The City's Climate Adaptation Strategies – Implementation Plans (2011) document includes 11 strategies to adapt Chula Vista to the potential impacts of global climate change related to energy and water supply, public health, wildfires, ecosystem management, coastal infrastructure, and the local economy sectors. The strategies include cool paving, shade trees, cool roofs, local water supply and reuse, storm water pollution prevention and reuse, education and wildfires, extreme heat plans, open space management, wetlands preservation, sea level rise and land development codes, and green economy. For each strategy, the plans outline specific implementation components, critical steps, costs, and timelines. In order to limit the necessary staffing and funding required to implement the strategies, the plans were also designed to build

upon existing municipal efforts rather than create new, stand-alone policies or programs. Initial implementation of all 11 strategies is intended to be phased in over a three-year period from plan adoption.

d. City of Chula Vista Mandatory Construction and Demolition Debris Recycling Ordinance

CVMC Section 8.25.095 requires that 90 percent of inert materials and a minimum of 50 percent of all other materials be recycled and/or reused from certain covered projects. Covered projects include:

- Any project requiring a permit for demolition or construction, which has a project valuation of $20,000 or more.
- Housing subdivision construction or demolition and/or any sequenced development will be considered a project in its entirety and not a series of individual projects.
- Individually built single-family homes.
- All City projects.

Covered projects must submit a waste management plan to the Chula Vista Public Works Department, Environmental Services Division, which must be reviewed and approved prior to the issuance of a demolition or building permit. The waste management plan will indicate how the applicant will recycle and/or reuse 90 percent of inert materials and at least 50 percent of the remaining construction and demolition debris generated from the project.

B. Existing Greenhouse Gas Conditions

1. Climate Change Overview

Global climate change refers to changes in average climatic conditions on Earth, as a whole, including temperature, wind patterns, precipitation, and storms. Historical records show that global temperature changes have occurred naturally, such as during previous ice ages. To measure climate change, scientists look at long-term trends. The temperature trend, including data through 2010, shows the climate has warmed by approximately 0.36 °F per decade since the late 1970s (National Aeronautics and Space Administration [NASA] 2011).

Global temperatures are moderated by naturally occurring atmospheric gases. These gases are commonly referred to as GHGs because they function like a greenhouse by letting light in but preventing heat from escaping, thus warming the Earth's atmosphere. The resulting balance between incoming solar radiation and outgoing radiation from both the Earth's surface and the atmosphere maintains the planet's habitability. The Earth's surface temperature averages about 58°F because of the greenhouse effect. Without it, the Earth's average surface temperature would be somewhere around an uninhabitable 0°F.

GHGs are emitted by natural processes and human (anthropogenic) activities. Anthropogenic GHG emissions are primarily associated with (1) the burning of fossil fuels during motorized

transport, electricity generation, natural gas consumption, industrial activity, manufacturing, and other activities; (2) deforestation; (3) agricultural activity; and (4) solid waste decomposition.

The United Nations Intergovernmental Panel on Climate Change (IPCC) constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. The statistical models show a "high confidence" that temperature increase caused by anthropogenic GHG emissions could be kept to less than two degrees Celsius relative to pre-industrial levels if atmospheric concentrations are stabilized at about 450 ppm carbon dioxide equivalent (CO_2e) by the year 2100 (IPCC 2014).

a. Greenhouse Gases of Primary Concern

The GHGs, as defined under California's AB 32, include CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. Although water vapor is the most abundant and variable GHG in the atmosphere, it is not considered a pollutant; it maintains a climate necessary for life.

CO_2 is the most important and common anthropogenic GHG. CO_2 is an odorless, colorless GHG. Natural sources include the decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungi; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of CO_2 include burning fuels, such as coal, oil, natural gas, and wood. Data from ice cores indicate that CO_2 concentrations remained steady prior to the current period for approximately 10,000 years. The atmospheric CO_2 concentration in 2010 was 390 ppm, 39 percent above the concentration at the start of the Industrial Revolution (about 280 ppm in 1750). As of February 2016, the CO_2 concentration exceeded 403 ppm (National Oceanic and Atmospheric Administration [NOAA] 2016).

CH_4 is the main component of natural gas used in homes. A natural source of methane is from the decay of organic matter. Geological deposits known as natural gas fields contain methane, which is extracted for fuel. Other sources are from decay of organic material in landfills, fermentation of manure, and cattle digestion.

N_2O is produced by both natural and human-related sources. N_2O is emitted during agricultural and industrial activities, as well as during the combustion of fossil fuels and solid waste. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic (fatty) acid production, and nitric acid production.

Fluorocarbons are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. Chlorofluorocarbons are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at Earth's surface). Chlorofluorocarbons were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped as required by the 1989 Montreal Protocol.

SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semi-conductor manufacturing, and as a tracer gas for leak detection.

GHGs have long atmospheric lifetimes that range from one year to several thousand years. Long atmospheric lifetimes allow for GHGs to disperse around the globe. Because GHGs vary widely in the power of their climatic effects, climate scientists have established a unit called GWP. The GWP of a gas is a measure of both potency and lifespan in the atmosphere as compared to CO_2. For example, because methane and N_2O are approximately 25 and 298 times more powerful than CO_2, respectively, in their ability to trap heat in the atmosphere, they have GWPs of 25 and 298, respectively (CO_2 has a GWP of 1). CO_2e is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the prevalence of that gas to produce CO_2e. The atmospheric lifetime and GWP of selected GHGs are summarized in Table 5.10-1, *Global Warming Potentials and Atmospheric Lifetimes*.

Table 5.10-1 GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES

Gas	Atmospheric Lifetime (years)	100- year Global Warming Potential
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	114	298
HFC-134a	14	1,430
PFC: Tetrafluoromethane	50,000	7,390
PFC: Hexafluoroethane	10,000	12,200
Sulfur Hexafluoride	3,200	22,800

Source: IPCC 2007
HFC: hydrofluorocarbon; PFC: perfluorocarbon

b. Greenhouse Gas Emissions Inventories

i. State

The CARB performs statewide GHG inventories. The inventory is divided into six broad sectors; agriculture and forestry, commercial, electricity generation, industrial, residential, and transportation. Emissions are quantified in MMT of CO_2e. Table 5.10-2, *California Greenhouse Gas Emissions by Sector*, shows the estimated statewide GHG emissions for the years 1990, 2000, 2010, and 2013.

As shown, statewide GHG emissions totaled 433 MMT CO_2e in 1990, 469 MMT CO_2e in 2000, 456 MMT CO_2e in 2010, and 459 MMT CO_2e in 2013. Transportation-related emissions consistently contribute the most GHG emissions, followed by electricity generation and industrial emissions.

Table 5.10-2 CALIFORNIA GREENHOUSE GAS EMISSIONS BY SECTOR (MMT CO_2e)

Sector	1990	2000	2010	2013
Agriculture and Forestry	23.6 (5%)	32.1 (7%)	34.5 (8%)	36.2 (8%)
Commercial	14.4 (3%)	15.0 (3%)	21.6 (5%)	22.6 (5%)
Electricity Generation	110.6 (26%)	105.2 (22%)	90.5 (20%)	90.6 (20%)
Industrial	103.0 (24%)	105.4 (22%)	102.7 (23%)	104.2 (23%)
Residential	29.7 (7%)	31.8 (7%)	32.2 (7%)	32.3 (7%)
Transportation	150.7 (35%)	178.1 (38%)	173.7 (38%)	172.5 (38%)
Unspecified Remaining	1.3 (<1%)	1.2 (<1%)	0.8 (<1%)	0.8 (<1%)
TOTAL	**433.3**	**468.8**	**456.0**	**459.3**

Source: CARB 2007 and CARB 2015a

ii. Regional

A San Diego regional emissions inventory was prepared by the USD School of Law's Energy Policy Initiatives Center (EPIC) that took into account the unique characteristics of the region. Their 2012 emissions inventory for San Diego is duplicated below in Table 5.10-3, *San Diego County Greenhouse Gas Emissions by Sector*. The sectors included in this inventory are somewhat different from those in the statewide inventory. Similar to the statewide emissions, transportation-related GHG emissions contributed the most countywide, followed by emissions associated with energy use.

Table 5.10-3 SAN DIEGO COUNTY GREENHOUSE GAS EMISSIONS BY SECTOR (MMT CO2e)

Sector	2012	
	CO_2e Emissions (MMT)	Percentage of Total Emissions
Passenger Cars and Light Duty Vehicles	13.14	37.2%
Electricity	7.97	22.6%
Natural Gas	2.84	8.0%
Heavy Duty Trucks and Vehicles	1.89	5.4%
Solid Waste	1.75	4.9%
Other Fuels	1.64	4.6%
Industrial	1.43	4.1%
Aviation	1.37	3.9%
Off-Road	0.92	2.6%
Wildfire	0.81	2.3%
Other – Thermal Cogeneration	0.64	1.8%
Water	0.52	1.5%
Wastewater	0.16	0.5%
Rail	0.11	0.3%
Agriculture	0.08	0.2%
Marine Vessels	0.05	0.1%
Development and Sequestration	(0.65)	N/A
TOTAL	**34.67**	**100%**

Source: SANDAG 2015

iii. Local

To help guide implementation of the CAP, the City regularly conducts GHG emission inventories. Table 5.10-4, *Chula Vista Greenhouse Gas Emissions*, shows the estimated city-wide GHG emissions for the years 1990, 2005, and 2012.

Table 5.10-4 CHULA VISTA GREENHOUSE GAS EMISSIONS ($MT\ CO_2e$)

Source	1990	2005	2012
Transportation	340,090	322,293	400,133
Energy	416,575	480,950	503,936
Solid Waste	80,895	87,621	65,610
Potable Water	*	46,951	43,014
Waste Water	9,607	15,457	17,719
TOTAL	**847,166**	**953,272**	**1,030,412**

Source: City of Chula Vista 2012
* = Not Available

iv. Existing Project Site GHG Emissions

The UID is located in the southern portion of the Otay Ranch GDP area of the City. The Otay Ranch GDP area is former agricultural ranch land historically used for ranching, grazing, and dry farming. It is currently vacant of development and is thus not a source of anthropogenic GHGs.

c. Climate Change Effects

The potential consequences of global climate change on the San Diego region are far reaching. The Climate Scenarios report, published in 2006 by the California Climate Change Center, uses a range of emissions scenarios to project a series of potential warming ranges (low, medium or high temperature increases) that may occur in California during the 21st century. Throughout the state and the region, global climate and local microclimate changes could cause an increase in extreme heat days; higher concentrations, frequency and duration of air pollutants; an increase in wildfires; more intense coastal storms; sea level rise; impacts to water supply and water quality through reduced snowpack and saltwater influx; public health impacts; impacts to near-shore marine ecosystems; reduced quantity and quality of agricultural products; pest population increases; and altered natural ecosystems and biodiversity.

5.10.2 Thresholds of Significance

Given the relatively small levels of emissions generated by a typical development in relationship to the total amount of GHG emissions generated on a national or global basis, individual development projects are not expected to result in significant, direct impacts with respect to climate change. However, given the magnitude of the impact of GHG emissions on the global climate, GHG emissions from new development could result in significant, cumulative impacts with respect to climate change. Thus, the analysis of the potential for a significant GHG impact is limited to cumulative impacts.

According to Appendix G of the CEQA Guidelines, the following criteria may be considered in evaluating the significance of GHG emissions:

Would the project:

- **Threshold 1:** Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

- **Threshold 2:** Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

5.10.3 Impact Analysis

A. Threshold 1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

In establishing numerical thresholds for GHG emissions, most lead agencies look to compliance with AB 32. AB 32 set the goal of reducing statewide GHG emissions to 1990 levels by the year 2020. SB 32 looks beyond 2020 and set the goal for reducing statewide GHG emissions to 40 percent below 1990 levels by the year 2030. Given the Project's development timeline with full buildout in 2030, Project emissions are compared to the reduction target set by EO B-30-15 with the use of an efficiency threshold.

One method for determining whether a project's contribution to GHG impacts is cumulatively considerable uses an efficiency threshold to determine whether a project's per service population (SP) (i.e., residents and employees of the project) GHG efficiency level is more or less than the GHG efficiency level that would be needed for a jurisdiction to achieve the goals mandated by AB 32 and SB 32. An efficiency threshold sets a per capita emissions limit. The total emissions from a given project are summed and divided by the project's SP to determine emissions per person and are then compared to the efficiency threshold. The metric represents the rate of emissions needed to achieve a fair share of the State's emissions mandate embodied in AB 32. To develop an efficiency threshold for the Project that would satisfy the requirements of SB 32, the City's 1990 emissions inventory, less 40 percent, must be divided by the City's 2030 population.

Based on the data provided in Tables 2 and 3 of the City of Chula Vista 2012 Greenhouse Gas Emissions Inventory, the City's 1990 GHG emissions inventory totals approximately 847,166 MT CO_2e. Consistent with SB 32, the City's 2030 goal is 508,300 MT CO_2e (847,166 x [1-0.40]). Based on data provided by SANDAG, the City's service population in 2030 is estimated to be 389,979 (288,978 residents + 101,001 employees) (SANDAG 2010). Dividing the City's 2030 goal by the City's 2030 service population results in an efficiency threshold of 1.30 MT CO_2e/SP (508,300/389,979). In the absence of other statewide or regional guidance on thresholds of significance for land use projects, for this EIR, emissions in excess of the 1.30 MT CO2e/SP efficiency threshold would be considered significant.

1. Construction

Project construction GHG emissions were estimated using the CalEEMod model. Project-specific input was based on general information provided in the UID SPA Plan, and default model settings to estimate reasonable worst-case conditions. For modeling purposes, construction was assumed to begin in January 2017 and be completed in May 2030. The quantity, duration, and the intensity of construction activity have an effect on the amount of construction emissions and their related pollutant concentrations that occur at any one time. As such, the emission forecasts provided herein reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction is occurring in a relatively intensive manner. Because of this conservative assumption, actual emissions could be less than those forecasted. If construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix than incorporated in the CalEEMod, and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). Additional details of phasing, selection of construction equipment, and other input parameters, including CalEEMod data, are included in Appendix A.

Emissions of GHGs related to the construction of the UID would be temporary. As shown in Table 5.10-5, *Estimated Construction Greenhouse Gas Emissions,* total GHG emissions associated with construction of all land uses proposed under the UID are estimated at 55,423 MT of CO_2e. For construction emissions, City guidance recommends that the emissions be amortized (i.e., averaged) over 30 years and added to operational emissions. Averaged over 30 years, the proposed construction activities would contribute approximately 1,847 MT CO_2e emissions per year.

Table 5.10-5 ESTIMATED CONSTRUCTION GREENHOUSE GAS EMISSIONS

Year	Emissions (MT CO_2e)
2017	513
2018	758
2019	746
2020	4,673
2021	6,264
2022	6,188
2023	6,137
2024	6,144
2025	6,087
2026	6,058
2027	6,033
2028	4,604
2029	845
2030	373
TOTAL[1]	**55,423**
Amortized Construction Emissions[2]	1,847

Source: CalEEMod (output data is provided in Appendix A)
[1] The total presented is the sum of the unrounded values.
[2] Construction emissions are amortized over 30 years in accordance with City guidance.

2. Operational Emissions

Operational sources of GHG emissions include: (1) energy use (electricity and natural gas) and area sources (landscaping equipment); (2) vehicle use; (3) solid waste generation; and (4) water conveyance and treatment. It is noted that the Project includes several Project Design Features to promote alternative transportation use, reduce traffic congestion, encourage energy efficiency, and reduce area source pollutants (see Project Design Features included in Chapter 4 of the Project's Air Quality Improvement Plan [refer to Appendix B of the UID SPA Plan]).

a. Energy Use

The Project would be constructed as a zero net energy facility, which means that the Project would incorporate sustainable design and energy reduction measures (such as photovoltaic panels) to completely offset the UID's annual electricity use. Energy sources also include the on-site burning of natural gas for space and water heating. The natural gas consumption assumptions include 25 percent increased efficiency beyond the CalEEMod default Title 24 standards (2008) to reflect the 2013 Title 24 standards. This reduction was only applied to the portion of energy consumption regulated by Title 24. Applying a 25 percent increase in Title 24 regulated energy consumption results in an overall 19 percent reduction in natural gas emissions. The annual GHG emissions from energy usage, comprised exclusively of natural gas usage, are estimated to be 8,117 MT CO2e per year.

b. Area Sources

A relatively small amount of GHGs, approximately 25 MT CO_2e per year, would result from area sources (primarily landscaping equipment).

c. Vehicular (Mobile) Sources

Mobile-source GHG emissions were based on vehicle trip generation provided in the Project traffic study, which was prepared by LLG. The projected ADT rate for the proposed Project is 54,360 trips. The vehicle trip emissions account for the design features described in the California Air Pollution Control Officers Association's (CAPCOA's) *Quantifying Greenhouse Gas Mitigation Measures*. These CAPCOA measures are also consistent with the following policies and objectives of the Regional Plan: mix compatible uses; compact building design; walkable neighborhoods; and access to transit. Using CalEEMod defaults for trip type, distribution, and length, the total annual vehicle miles traveled (VMT) associated with the UID was estimated to be 55.9 million miles, and vehicle-related GHG emissions were estimated to be 20,342 MT CO_2e per year at buildout (year 2030).

d. Solid Waste Sources

Solid waste generated by the Project would also contribute to GHG emissions. Treatment and disposal of solid waste produces significant amounts of methane. Through mandatory compliance with AB 341, the Project would achieve an average 75 percent diversion of waste during operations. Applying this reduction to CalEEMod defaults, GHG emissions from project-related solid waste would be 559 MT CO_2e per year.

e. Water Sources

Water-related GHG emissions are from the conveyance and treatment of water. The CEC's 2006 *Refining Estimates of Water-Related Energy Use in California* defines average energy values for water in Southern California. These values are used in CalEEMod to establish default water-related emission factors. The Project would implement water conservation features to increase water use efficiency. Applying these reductions to the CalEEMod defaults, the Project's estimated GHG emissions related to water treatment and conveyance would be 5,064 MT CO_2e per year.

f. Other GHG Emission Sources

Ozone is also a GHG; however, unlike other GHGs, ozone in the troposphere is relatively short lived and; therefore, is not global in nature. According to CARB, it is difficult to make an accurate determination of the contribution of ozone precursors (NO_X and VOCs) to global warming (CARB 2004). Therefore, it is assumed that emission of ozone precursors associated with the Project would not significantly contribute to climate change.

At present, there is a federal ban on chlorofluorocarbons (CFCs); therefore, it is assumed that the Project would not generate emissions of this GHG. Implementation of the Project may emit a small amount of HFC emissions from leakage, service of, and from disposal at the end of the life of refrigeration and air conditioning equipment. However, these emissions are not quantifiable and are assumed to be negligible. PFCs and sulfur hexafluoride are typically used in heavy-duty industrial applications. The proposed Project would not include heavy-duty industrial

applications. Therefore, it is not anticipated that the Project would contribute significant emissions of these GHGs.

g. Summary

As illustrated in Table 5.10-6, *Estimated Annual Greenhouse Gas Emissions*, full buildout of the UID (assumed by 2030) would result in 35,954 MT CO_2e per year. Project emissions are compared to the reduction target set by SB 32 with the use of an efficiency threshold. The efficiency threshold was calculated by dividing the City's 2030 emissions goal consistent with SB 32 by the City's 2030 service population. The result is an efficiency threshold of 1.30 MT CO2e/SP per year. The Project's service population is the sum of all the Project's students, employees, and/or residents. As shown in Table 5.10-7, *UID Service Population*, the service population for the UID is 34,000 persons.

Table 5.10-6 ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS

Emission Sources	Emissions (MT CO_2e/year)
Area Sources	25
Energy Sources	8,117
Vehicular (Mobile) Sources	20,342
Solid Waste Sources	559
Water Sources	5,064
Operational Subtotal	34,107
Construction (Annualized over 30 years)	1,847
TOTAL PROJECT	**35,954**

Source: CalEEMod output data is provided in Appendix A of the Air Quality and Greenhouse Gas Emissions Technical Report (HELIX 2016).

Table 5.10-7 UID SERVICE POPULATION

Person Type	Number of Persons
University Students (Full-Time)	20,000
University Faculty/Staff	6,000
Innovation District Employees	8,000
TOTAL SERVICE POPULATION	**34,000**

Source: ASG 2015

The results of the GHG calculations for full development of the UID are shown in Table 5.10-8, *Greenhouse Gas Emissions Determination.* The data are presented in terms of emissions per service population for comparison with the efficiency threshold.

Table 5.10-8 GREENHOUSE GAS EMISSIONS DETERMINATION

Category	Value
Total 2030 UID Emissions (Table 5.10-5)	35,954 MT CO_2e
UID 2030 Service Population (Table 5.10-6)	34,000 Persons
UID Emissions per Service Population	**1.06 MT CO_2e/SP/yr**
Efficiency Threshold	*1.30 MT CO_2e/SP/yr*
Significant Impact?	***No***

As shown in Table 5.10-8, full buildout of the UID (year 2030) would result in 1.06 MT CO_2e/SP/yr. This value can be compared to, and is less than, the identified efficiency threshold. Impacts due to GHG emissions would be less than significant.

3. Horizon Year (2050) Emissions Inventory

Beyond Project buildout, the Project's GHG emissions would reduce with the continued implementation of the reduction strategies and increased stringency of state reduction measures based on actions included in the Scoping Plan related to energy use and transportation that transition the state towards meeting its longer term GHG emission reduction goals. In addition to the reduction measures already applied to the Project, the following assumption was included in the reduced 2050 GHG emissions:

- Mobile source reductions resulting from fleet wide emissions improvements over current standards were estimated using the EMFAC2014 emissions inventories. Emissions were modeled using Project specific assumptions for fleet mix and VMT as detailed the CalEEMod output files.

The emissions by source for 2050 were calculated by modeling 2050 mobile source emissions using EMFAC2014. Table 5.10-9 summarizes the 2050 emissions as broken down by emissions category. Construction emissions are included in the summary provided in Table 5.10-9 and are expected to be fully amortized by 2060.

Table 5.10-9 ESTIMATED 2050 OPERATIONAL GHG EMISSIONS

Emission Sources	Emissions (MT CO_2e/year)
Area Sources	25
Energy Sources	8,117
Vehicular (Mobile) Sources	16,790
Solid Waste Sources	559
Water Sources	5,064
Operational Subtotal	30,555
Construction (Annualized over 30 years)	1,847
TOTAL PROJECT	**32,403**

Source: HELIX 2017

Through implementation of the Scoping Plan Measures, it is expected that additional reductions would occur. Strengthening of the LCFS and expansion of the zero emissions vehicles program will likely result in further reductions to mobile source emissions. Additionally, the Renewable Portfolios Standard would likely continue beyond the 2030 goal of 50 percent. However, because the design of any such measures has yet to be finalized, any reduction credit associated with these measures has not been included. As such, the analysis presented above reflects a conservative set of assumptions and demonstrates that emissions are on a downward trajectory and would remain less than significant.

B. Threshold 2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

There are numerous State plans, policies and regulations adopted for the purpose of reducing GHG emissions. Under AB 32, the California Global Warming Solutions Act of 2006, the quantitative goal is to reduce GHG emissions to 1990 levels by 2020. SB 32 looks beyond 2020 and set the goal for reducing statewide GHG emissions to 40 percent below 1990 levels by the year 2030. As previously discussed, the UID's GHG emissions would be less than efficiency threshold, and therefore would be in compliance with SB 32.

Statewide plans and regulations such as CARB's Scoping Plan, GHG emissions standards for vehicles (AB 1493), the LCFS, and regulations requiring an increasing fraction of electricity to be generated from renewable sources are being implemented at the statewide level; as such, compliance at the project level is not addressed. Therefore, the proposed project does not conflict with those plans and regulations.

The Project would be consistent with the goals of SANDAG's Regional Plan to develop compact, walkable communities close to transit connections and consistent with smart growth principles. The Regional Plan emphasize development patterns and transportation systems that work together to reduce the use of automobiles. The Project would be designed to incorporate a future BRT stop, which would allow for the use of public transit to project uses. The Project's high density uses would allow people to live, work, or attend university through the use of the BRT stop. In addition, bike lanes and pedestrian-friendly avenues would be incorporated throughout much of the project site to encourage non-vehicular circulation to and within the project area and surrounding villages in Otay Ranch. The Regional Plan also shows an overall population increase in Chula Vista of 39 percent from 2012 to 2050, compared to a region average of 29 percent. The Project would also be consistent with the Regional Plan's growth forecasts.

Since 2000, Chula Vista has been implementing a CAP to address the threat of climate change to the local community. The Project's consistency with these policies is analyzed in Table 5.10-10, *City Climate Action Plan Implementation Strategies*.

Table 5.10-10 CITY CLIMATE ACTION PLAN IMPLEMENTATION STRATEGIES

Measure	Project Consistency
Measure #6: Smart Growth Around Trolley Station	*Consistent*. A BRT station is identified at the intersection of Campus Boulevard and Orion Avenue that would serve the project site and nearby off-site residential and commercial areas.
Measure #7: Increased Housing Density near Transit	*Consistent.* The project implements design features to include housing density near transit.
Measure #8: Site Design with Transit Orientation:	*Consistent.* The project accommodates a centrally located transit stop and provides for pedestrian-scaled building frontages to encourage walking.
Measure #9: Increased Land Use Mix	*Consistent.* The project provides for an increase land use mix and variety of land uses.
Measure #10: Reduced Commercial Parking Requirements	*Consistent.* The project provides for a managed parking system.
Measure #11: Site Design with Pedestrian/Bicycle Orientation	*Consistent.* The project provides for pedestrian-scaled building frontages to encourage walking and bicycling. The project also provides pedestrian and bicycle amenities.
Measure #12: Bicycle Integration with Transit and Employment	*Consistent.* The project promotes alternatives to vehicle use thereby reducing VMTs that in turn reduced GHG emissions
Measure #13: Bike Lanes, paths, and routes	*Consistent.* The project provides for separated bike lanes.
Measure #14: Energy Efficient Landscaping	*Consistent.* The Project provides for landscaped parkways with street trees. The Water Conservation Plan identifies appropriate trees to increase water efficiency.
Measure #15: Solar Pool Heating	*Consistent.* Any installation of a pool will comply with the City's Municipal Code, which requires mandatory solar heating of new pools or optional motorized insulated pool covers.
Measure #16: Traffic Signal and System Upgrades	*Consistent.* All traffic signals will comply with the requirements of the City's Traffic Signal Program.
Measure #18: Energy Efficient Building Recognition Program	*Consistent.* All new construction will comply with the Municipal Code requirements to exceed Title 24 by 15%.
Measure #20: Increased Employment Density Near Transit	*Consistent.* The Project provides for increased density within 0.25 mile of a transit stop.

5.10.4 Level of Significance Prior to Mitigation

A. GHG Emissions

Impacts due to GHG emissions would be less than significant, due to the inclusion of the Project Design Features included in Chapter 4 of the Project's Air Quality Improvement Plan (refer to Appendix B of the UID SPA Plan). Therefore, no mitigation measure is required.

B. Plan Consistency

Implementation of the Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. This would represent a less than significant impact.

5.10.5 Mitigation Measures

A. GHG Emissions

Impacts due to GHG emissions would be less than significant. Therefore, no mitigation is required.

B. Plan Consistency

No mitigation measures are required.

5.10.6 Level of Significance After Mitigation

A. GHG Emissions

The Project's GHG emissions, as shown above, would result in less than significant impacts without mitigation, due to the inclusion of the Project Design Features included in Chapter 4 of the Project's Air Quality Improvement Plan (refer to Appendix B of the UID SPA Plan).

B. Plan Consistency

Impacts related to compliance with applicable plans, policies, and regulations adopted for the purpose of reducing GHG emissions would be less than significant without mitigation.